Corrosion Protection

Video Scripts

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Version: 3.3

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Introduction

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Video: Topics Off Limits

It's important that we avoid topics which create a conflict with anti-trust laws or the combines act. Therefore, we will not talk about labor rates, parts or equipment prices, repair times, cost and profit margins, dividing up the market between customers and suppliers, a boycott or refusal to deal with anyone, judgment on the work of a specific shop or practices of a specific insurance company, policies and guidelines for settling claims, or how a shop or company conducts its business.

These topics have nothing to do with repair technology, so there is no need to discuss them in class. If they are brought up in class, the conversation will be stopped.

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Module 1 - Corrosion Origins And Prevention

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Video: Importance Of Corrosion Protection

(MICHAEL MEDVEC) As soon as the vehicle leaves the repair facility, it's under attack.

(DENNIS KEICHER) Corrosion starts to form immediately.

(PAT HORAN) Immediately.

(DOUG CRAIG) Corrosion starts immediately.

(PAT HORAN) …as soon as a panel gets exposed to the atmosphere.

(DOUG CRAIG) Corrosion is going to start as soon as the repair occurs, probably when the accident occurs.

(MICHAEL MEDVEC) There's just no going back. Once it starts it just progresses.

(DOUG CRAIG) I'll use Buffalo, New York as an example as a benchmark for the worst place to be a car. Instead of sodium chloride I believe they're using magnesium chloride which may be more corrosive.

(BOB HISER) There's no bigger threat to the body structure of the vehicle than an improperly done body repair.

(PAT HORAN) It's not just what you see that causes corrosion, there's the hidden damage of a collision that needs to be addressed as well.

(GERRY BONANNI) The customer doesn't see the internal cavity wax corrosion protection, but I will tell you that when we look at the value of the vehicle and the longevity of the repair, it's very critical to provide protection where they don't see it.

(BOB HISER) Quite frankly, today's customer, if they're paying attention at all, is a consumer that fully expects that car to perform just as it did originally in the event that they're in another accident. Out of sight is not out of mind and everyone's going to see the backside of the repair in a couple years, especially if you're in a high corrosion area and they're going to see it through a rust hole.

(MICHAEL MEDVEC) A repair shop is under an obligation to restore that vehicle to that level of corrosion protection and strength and structural integrity that was there when the car was built by the factory.

(BOB HISER) If we make a repair, even a sectioning joint that's condoned by the engineers, and we don't address the inside of that joint and we leave the opportunity for premature corrosion to begin, which in some areas of the country can happen by the end of the week, then what we've done is we've begun to have a car on our hands that's severely compromised in its ability to perform properly in the event that it's in another accident. If it doesn't perform properly, then it may not fold up the way it's designed to fold up. It certainly might not respond in a way airbags are going to respond properly and deployment may not come off as it was intended. The ability to walk away, undamaged or uninjured from a vehicle accident is much greater today than it's ever been. The role the collision industry has in that is when we do repair these vehicles, we've got to be able to let that car go back to the customer knowing that it's going to perform in the same way against corrosion that it did when it was first built.

Video: OEM-Applied Corrosion Protection

(Doug Craig) The three primary steps that we take to prevent corrosion on our products come down to material selection, E-coat, and body sealing. The first, the material selection, different grades of steel are chosen for strength. Then there are the coatings that would be on those materials and those coatings are there strictly for corrosion protection. The next step is the E-coat process, which is actually a very involved process of physically washing the vehicle body through multiple tanks, taking it through a phosphate process where you're chemically modifying the surface of the material to make it rough. Then there's the E-coat, which is dipping the vehicle into vats of two-component epoxy, not catalyzed because of the combination but catalyzed via the heat of the bake oven that comes after they've been dipped. So they come back out, they drain, then they go through a high bake. Then you have body sealing. We call it in the field "seam sealing." There's a lot of other sealers that are going on there, underbody coatings of PVC, seams are sealed, then it goes into the paint process. The one you can't see, and it's before the E-coat, is when you're assembling the body. We've begun to use a lot of adhesives and / or weldable seam sealers. Those are in the joints, so they're not visible typically, but they're also providing the sealing out of moisture and air as well as corrosion protection in and of itself.

(GERRY BONANNI) Basically we start with coated steel, the majority of our vehicles are coated steel, extensive use of phosphate treatments, followed by the E-coat tank, and of course body seam sealing, flutter foam, all come into play and work in concert to help protect that vehicle. The use of plastics for shields, seals on the side of the body, rubber plugs, all come into play and are critical. Commonly, cavity waxes and undercoating are

not applied on the paint line. We deal usually with two-part urethane or acrylic seam sealers. In particular, many of them are applied as sound deadeners in the wheelhouses and other areas. But primarily when we're looking at undercoats and other products such as cavity waxes, they're used in the repair industry.

(BOB HISER) Once these vehicles are fully assembled in the body shop and welded together, they ride through a phosphate wash, which is a full immersion. Then they go through a full-immersion priming process to render this coating you see here. This is our current color of what we call Elpo primer. It's basically electrostatically applied, so that once the vehicle is fully submerged in the tank and it's literally "underwater" if you will, the solution gets inside everywhere and gets on the outside. What we get is the most ideal coverage of literally every surface of the body structure. After it comes out of that, it'll go to a sealer deck where sealers get applied, and then to a very high temperature bake, some 450°, which is certainly nothing we can do in the body shop business, but it's what we can do in the in-plant setting. So it renders you this coating which is remarkably resilient to exposure to the elements is how we like to talk of it as.

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Module 2 - Corrosion Protection During Repairs

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Video: Part Preparation

(LYNN ENGMARK) For chemically cleaning a panel, if it's an OEM part we can go directly to a wax and grease remover. Once you've allowed it to soak there briefly then it's removed by taking clean, dry towels, wiping in one direction rotating your towels frequently so you're always using a clean surface, and continue to wipe until the part is dry. One direction, so that you're more or less picking the contaminants off the surface and not just moving them back and forth on the part. Once an OEM part is cleaned, and we're assuming it has an E-coat primer on it, it still should be inspected to make sure the primer is smooth and paintable. Then it should be mechanically cleaned or scuffed or sanded, however you want to word that. That would entail scrubbing the edges thoroughly and then sanding the outside surface carefully with a relative fine grit of paper, maybe a 320 or 400 grit, maybe even a 500 grit paper. The E-coat should be sanded primarily just to remove and defects that would make it unpaintable.

Even though an OEM part has primer on it from the factory, that primer is relatively thin. If you have sanded that part to remove defects, you're obviously taking some of that film off that part. The typical paint system is always going to start with a primer sealer to give us an additional coat of primer that will provide additional corrosion resistance, improve adhesion of the basecoat, and improve adhesion to the original primer. It'll give us some additional film thickness too. A lot of people don't take that into consideration, but one of the primary causes of premature chipping is thin paint film. So it's always good practice to put a primer sealer down.

When it comes to preparing aftermarket parts, we would recommend that you thoroughly wash them first, inspect the surface. Then we would do what's called a solvent rub. You take a urethane-grade reducer, a thinner, put some on a clean white towel, and rub the outer surface of that panel, just to make sure it's a hard, cured finish. If nothing comes off and doesn't soften the film, you're probably OK to go ahead and finish cleaning it, sanding it, and preparing it in the usual manner. If you do a solvent rub and the coating softens up, it really should be removed because you're dealing with some kind of uncured film or inferior type of paint coating that shouldn't be painted over.

When you're working with salvage parts, it would be important again to clean the part thoroughly first. Wash it with soap and water, rinse it, and dry it. Inspect the surface. If at all possible, look for signs the part has been previously repaired or painted. Again, we recommend you do a solvent rub on it to make sure the coating was hard and cured. If you can't see that there's any paint peeling or flaking, it's probably a sound finish. Go ahead and finish your cleaning process, wipe it down thoroughly with wax and grease remover, sand the part thoroughly, and prepare the part for primer sealer just as you would a replacement OEM or aftermarket part. As a paint manufacturer, we hesitate to recommend painting over parts that have more than 10 mils of paint on the part. Not that

you couldn't put another coat of paint over that, or another system over that, but once the paint film becomes thick it doesn't have as much chip resistance as it normally would have if it were the standard 4, 5, 6 mils thick. So I it does chip, the chips tend to be larger and more unsightly.

Video: Chrysler On Weld-Through Primer

(DOUG CRAIG) Many years ago we did some testing with weld-through primers. That wasn't the point of the testing but it was something we were able to tack on. What we determined, was that the weld-through primer did not provide a benefit to the repair. This is our finding.

What we did find, though, is that weld bonding, having that structural adhesive in there, significantly eliminated corrosion, as well as application of inner panel corrosion protection. Different names, cavity wax, honey, all those materials seal up the area. Applying that in two coats, because we differ from all I think in that respect. Apply a coat of the inner panel material, give it 30 minutes or more to flash off, do it again. That ensures that it's creeping where you want it to go. And the second application gives you a better guarantee that you've made 100% coverage because you're working blind.

Taking those steps, you should have a vehicle that's repaired back to as-built status, maybe even a little bit better. That's always a question, is it OK to be better in the end? Definitely, because you don't know, you're working in blind areas so you need to take extra steps to make sure that you get back to the base.

Video: Epoxy And Self-Etching Primer

(PAT HORAN) Epoxy primers are excellent barrier coatings. One of the advantages of E-coat is the electrodeposition application creates a very good bond with very good barrier properties. So epoxy primers, having very good barrier properties, are very close to the E-coat in their ability to prevent the underlaying substrate to be attacked. The biggest reason why a customer would NOT use an epoxy primer is usually speed. Epoxy primers take a little longer to set up. They have a little longer flash time. They are reserved for specialty vehicles that are required, or for more of a restoration-type repair.

1K epoxies are not prominent in the collision industry. Most are two-part where you have an epoxide A-part and a polyamine-based activator. Etching is not required. It depends on the composition of the coating itself. Some epoxies are built to go direct to metal. Others do require a metal treatment process prior to the epoxy being applied. The tech data sheet will indicate the proper process for using these coatings.

Self-Etching Primers

They're usually applied at lower film builds. They do not usually cross-link. So that would be a big difference between an epoxy and an etch primer. They're usually a lacquer chemistry, one component though they have an acid additive.

Self-Etching Vs. Wash Primers?
They perform the same function. The biggest difference between a wash primer and a self-etching primer in my mind is its transparency, whether it's opaque and achieves hiding or if it's translucent and you're able to see the underlying layers. I would say that's the biggest difference between a wash primer and a self-etching primer.

Most self-etching primers require a second coating, whether it be a primer surfacer or primer sealer to isolate them from the atmosphere. They're not a barrier coating, they're an etching treatment so they'll treat the substrate, but they don't create a barrier coating like an epoxy would with a tight network formation, so they would be permeable to atmosphere over time.

I can't think of anywhere that you couldn't apply a self-etching primer. It's designed to treat steel, so anywhere you have steel it's an appropriate coating. I would say, however, that on the inside of a rail or somewhere where you have confined spaces, you need to topcoat that with a barrier coating, whether it be a primer surfacer or primer sealer, so inside of a rail I would say an epoxy primer would be preferred because it's a single process as opposed to a two application in a confined space.

Surface Condition For Primers
All coatings require a thoroughly clean substrate to create good bonding. Whether that's mechanically cleaned and then chemically cleaned, you need to have a defect-free substrate to get good bonding between any primer whether it's an epoxy or an etch primer or a metal treatment. Cleanliness is what creates the bond.

Video: Thin-Film Technology

(MICHAEL JOHNSON) There are aerosol products out there that use a new technology, thin-film technology. They have properties of wicking into the surface around welds and joints. We apply a weld-through primer on both sides of the mating surface, and then use our compression spot welder or a regular MIG welder. It's a very tight seam, and (it would be difficult) to try and get traditional corrosion protection material (anti-corrosion compound) in between those two surfaces. With the CPS aerosol product, you attach the wand to it, spray it across the top surface, puddle it, and give it 15 minutes to self-wick itself in. Any removal of the external CPS can be done with the CPS remover.

This is a panel that I had welded. Afterwards, I cut the spot welds off, and you can see the wicking capability of the CPS going around the weld. Traditional corrosion protection (material) would have difficulty going around that weld. (Time lapse)

The wands are for accessing areas that are not very accessible. By going through an existing hole in the panel, you can actually get it in there and get 360° coming from the tip with the aerosol.

(HOST) We've made a plastic rocker panel here and there's a reinforcement. There's an access hole, so you can use that to coat the inside of it.

(MICHAEL JOHNSON) Absolutely. It's very simple to do. By taking the CPS, the tips are designed to fit with the wand and be able to access inside that hole so you can pull it back up through. It's very easy to clean (the wand) by simply taking the CPS remover. The tip is (also) designed to fit the wand. Give it a short blast holding a rag at the bottom, it's a very easy cleanup. It's all done.

(HOST) Let's get some safety gear on and see how it works. (Demonstration)

(MICHAEL JOHNSON) With this new thin-film technology, less is better. You don't need a heavy barrier coat to protect the surface. We've tested it and it actually does very well with the salt-spray test. It's able to wick into areas that conventional systems do not have access to.

Video: Application Of Seam Sealers

(MICHAEL MEDVEC) Seam sealers are an important part of the repair process because they protect the vehicle from corrosion. If they're not applied, you have a question of passenger comfort. You've got wind, water, and dust leaks. You've got a possibility of damage to electrical components. You've got a possibility of the vehicle losing structural integrity because of corrosion.

You need to prepare the area properly. Obviously like anything else you need a clean, dry surface for the most part to get these materials to adhere and seal properly. Also, you got to be careful where the sealers are applied so you don't plug up drain holes. You don't apply sealer in too big a quantity where it might interfere with something else.

Characteristics that you want to see in any seam sealer (include) good adhesion. You want a product that will stick and stay where you put it. The vehicle stretches and heats and cools and flexes as it goes down the road, so you want a product that will take that flexing and stretching without breaking or opening up the seam. You want a product that doesn't shrink. You also want to look for viscosity, how thick of a bead are you putting down? How heavy a material is it being applied? You (may) want a self-leveling product or a high-build product, depending on the situation. Some of the other factors are color. If it's a dark vehicle, you don't want to start with a white sealer that takes a lot of paint to cover. You might want a darker sealer or a sealer that matches the color of whatever the factory material is, (which is) sometimes a factor, whether it's visible.

Video: Matching OEM Application

(MICHAEL MEDVEC) Most mechanics will try to duplicate what is on the left side to the right side that they're doing a repair, whether it's a brushed-on look or a corrugated-looking bead. Some of these look like a bad weld bead. You don't want the vehicle to look like it was repaired, you want it to look as original as possible, try to duplicate not just the function of the sealer but also the look.

(HOST) What do we have here around the strut tower?

(MICHAEL MEDVEC) You can see this rippled kind of effect. This is probably an off-white material underneath there, painted body color. To get that ripple effect on both sides, the technician would have to use a technique to duplicate that look.

(HOST) Up here we have a real tiny bead, how would you duplicate that?

(MICHAEL MEDVEC) This is from the factory, a vinyl plastic material. We could duplicate this with either a urethane or a two-part epoxy, depending on the situation, with just a real small opening on the applicator tip. You just don't cut it open so much.

(HOST) Then we get down here, it gets a little wider. It almost looks like a tape.

(MICHAEL MEDVEC) Yes, it's kind of wide and flat. Again, it's the same type of material up here from the factory but you have an option. You could either use a tape material to duplicate this. It just depends on the situation and kind of user preference, in some cases, which way they go, what's most cost effective.

(HOST) Here, Mike, on this Suburban it looks like a tape-type sealer.

(MICHAEL MEDVEC) Right, you can see the edge of this tape comes down and around to cover, like a patch.

(HOST) Do you need a tape to duplicate that?

(MICHAEL MEDVEC) No, there's different ways of doing this. You could use a liquid sealer or a paste-type sealer that you can mask off an area and squeegee it across and get the same look and the same performance as a tape without using an actual piece of tape.

(HOST) Mike, how do you duplicate that flattened caterpillar look that you see under the hood of Toyota vehicles?

(MICHAEL MEDVEC) You kind of have to duplicate the action of a robot, and you can build it up higher or lower. You can go flat or more rounder.

What we have here is a simulated roof channel you might find typically on Ford products, Ford minivans and full-size vans. What we're going to use is a self-leveling, two-part product. You apply it about 3/16 to 1/4 inch deep, just fill the length of the channel. It'll fill side to side all by itself. It will level and fill and there's no tooling, no other work to do. You will generate some air, even if you're applying this product properly. It's very easy to fix with just a heat gun. If you can see these air bubbles here, just by passing the heat gun over it the bubbles are all gone. It will cure in about 12 minutes, it's ready to paint, and you're ready to go.

(HOST) Now for a completely different look, you have your sprayable seam sealers, tell us about those.

(MICHAEL MEDVEC) Spray sealers require special application equipment. You don't want to run crazy high pressures. Both of these guns work great at about 50 - 60 psi. They're rated higher than that but you can generally get the pattern you're looking for, and the performance at about 50 - 60 psi. (Demonstration)

(HOST) Where do you see these normally on a vehicle?

(MICHAEL MEDVEC) You're going to see patterns like this, a stippled ban like this, inside the trunk area, around the spare tire well, quarter panels where the rear wheelhouse seals against the floor of the trunk, that type of thing. (Another spray demonstration) More like a rubber undercoat. This is something you might see sprayed in the floor of a spare tire well or the floor of a trunk. It acts like an abrasive protection, a sealer, and in a lot of cases as a sound deadener.

Video: Adding Seam Sealer To Service Parts

(BOB HISER) Seam sealers is an interesting topic because you might think the service part ought to come with the seam sealer on it. If you thought that, I wouldn't blame you. The opportunity that a service dealer has to get a service part out of the plant is usually out of the body shop. We'll bring it into our own facility and put a coating on it there, put our ELPO (E-coat) on it there. When we do that, that's our only plan, that's our only way of accessing that part to make it available to the collision shops. And so what it skips is the sealer deck. The sealer deck is a place in the plant that seals entire bodies. They don't seal up parts.

Now when we make hoods for service, outside of the production setting, we have a hem sealer that we drop in-between the inner and the outer, and we'll do that manually at these out-source locations for a past-model hood. Someone will walk around the edge of that with a gun and apply that sealer, and the outer will come to the inner and the hem die will come down and that hood will be made and that sealer will be in there. We will apply those kinds of things if we're real sure that they're going to have to be there for the service part to be made properly. But most of your frame rails, and most of your body sides, and windshield pillars, and cowl panels and stuff like that aren't going to have any sealer from the factory on them. That's why it's very important before you begin your repair to understand exactly where all your sealer paths are so that when you're finished with the repair, that you have a good understanding of where you have to come back and apply a bead of sealer.

(DOUG CRAIG) During a repair, all seams need to be sealed. One of the key areas that's really important are service parts. Because of the way the parts are pulled in the production process to be a service part, we typically apply seam sealer in the paint process and the service parts being brought off line before there, so the service part will be E-coated, but may not be seam-sealed. Duplicating the existing sealer is perfectly acceptable. What we're basically saying is just go ahead and do a full 360° seam sealer to the hem flanges. It gives the customer back as good, maybe a little bit better, but you've definitely done your job.

One vehicle that's a real trick is the Wrangler. If you don't seam seal between the door shell inner and the exterior panel, you'll end up having water leaks, and the customer will come back and come back. It all has to be sealed up.

You may find, say, that a hood is only sealed on the front edge or it's only sealed 180° around. Go ahead and seal the whole thing. It's better for the customer in the long run and lack of concern for the shop.

Video: Application Of Chip-Resistant Coating

(DENNIS KEICHER) It's a coating that's applied on top of the E-coat and under the paint coatings. So generally speaking, it's going to be a liquid-based material that's sprayed on from the factory. It will have a different appearance than the smooth, finished appearance of the basecoat/clearcoat. It could be a textured coating. It's applied on the lower portion of the body side so it could be the rocker panel, lower doors, lower fenders, etc.

The coatings work because they generally consist of raw materials that have quite a bit of resiliency. When you think about a rubberized coating or a plasticized coating, it will resist the impact of the stone because of the toughness of that film. Whereas, a paint may be too brittle. It would tend to chip or crack, and then you expose the bare steel and it becomes a corrosion hot spot.

Some of the coatings are an appliqué. They are generally going to be a clear urethane-type of film with a pressure-sensitive adhesive on one side with a liner. They're applied at the factory as a last step on top of the paint. Those types of appliqués are placed in areas that are high impact zones on the outside of the body.

(HOST) Now on this rocker panel you have set up it looks like there's some very prominent texture and a smooth area and a straight line that separates the two.

(DENNIS KEICHER) Right, and this is really common, this type of texture and this application for many of the European vehicles, Bob. This defined edge is all about the masking products that you use.

(HOST) Dennis, if you were to section this rocker panel, would it be better to remove this coating and try to put the whole thing on at once, or is it more logical to try and blend into the existing coating.

(DENNIS KEICHER) People would commonly blend into a coating. It would depend on how much coating remained. One thing we need to be aware of is that if we sand into this type of coating, and sand it to a fine, thin, tapered edge, such as a featheredge, then that's the area I would recommend highly that you use an epoxy-based primer on the bare substrate and on that edge, on that feathered edge.

Let's say for instance I have to do a repair on this door. I've done some body filler work here, and now I have my coating that's sanded. This is a pretty common application. The one thing you have to be aware of is that this edge right here, and if you look closely at it you can see that it's very thin. It has a tendency to peel back relatively easily. This darker edge was actually the E-coat applied at the factory. They put this material on, which is polyvinyl chloride or a liquid type of plastic.

I wish I could give you Toyota in a can, but I can't, because the manufacturers change year to year and sometimes within a year they might spec a different type of texture or a different product because they find it works better for their application. It's really up to the technician and his skill level to understand what products he has available and how they will work in the shop environment.

Video: GM On Chip-Resistant Coatings

(BOB HISER) Europe's real big on having stone guard-type protection coatings on their rocker panels and you can see on that on many German products as a for instance. A lot of our vehicles are now applying these coatings here, even on stateside-built vehicles, because it's more of a global initiative to offer better stone-chip resistance on the lower extremities of the car.

When I was at Saturn, I got a chance to tour the actual paint deck at that plant, which was an unusual paint deck as manufacturing systems go. I asked a guy what one robot was doing as kind of a stand-alone thing and it was only spraying something on the front of the vehicle. And he says "Oh yeah, that's the stone protectant for the front of the hood, and the front of the fenders." And I said "I didn't even know we did that." He said "Most folks don't, it's a couple of passes and it's just one little bit of soft clear that we put in there that helps keep the stone chips down in the front of the car." We were writing the service manual and I didn't even know about it.

A lot of these coatings, you don't even see them, they're invisible. But more and more today, you're going to see coatings that are very visible on the bottom of your fenders.

(HOST) If you're replacing a hood, what do you put on the front of the hood to replace that one sweep that that robot took?

(BOB HISER) Right now, a good solid couple of coats of base / clear urethane and you're there. The reason I say that is because the stone impingement requirements are met even better by some of your refinish products because we have the ability to have an isocyanate two-package clear that is even better at stone resistance than some of the OE clears can be, especially when you add an extra coat. Most painters want to just make an extra pass in the front with a good two-package urethane type topcoat clear, they're going to have pretty much the same thing Saturn in Spring Hill was putting on the front of their Saturn hoods.

Video: Making A Test Panel

(DENNIS KEICHER) The texture's the most important thing and that's what we're trying to accomplish with these test panels. The other thing that we have to take into consideration is the masking portion. During the process, we're going to look at pressures and distances to achieve a certain texture. The other portion is going to be what kind of an edge do I want to create? What kind of an edge did the factory create? I have to recreate that same edge effect.

I'm going to set my pressure down to about 25 - 30 psi. (Sprays)

Now what I'd like to do is, I know that I'm going to have to create a feature edge actually with the coating. From the Tundra door, we already understand that we have quite a heavy coating on the lower portion of the door. On the upper portion of the door we also know that we have a fine overspray that occurs in a short distance. I'm going to want to protect that area using some specialized masking materials.

So I'm going to adjust my pressure down to about 20 - 25 psi. (Sprays)

So I decided on the pressure that I needed and I applied two coats of material across here. I'm going to allow that to flash off and apply some more in an effort to build out the feature that the factory had applied on the original panel. After that I'll adjust, and continue spraying the bottom of this until I have a totally covered area. I'll remove the soft-edge masking tape, then take a look at what I have and compare it to the actual door and decide if that's what I really want. (Does what he said he'd do)

(HOST) Dennis, the texture appears matched, but we have this sharp edge here. What do we do about that?

(DENNIS KEICHER) That's a good point, and one of the most critical points about matching the texture and the edge is the sanding. So the final step that we're going to do here is a little bit of sanding with a finishing DA and some P400 abrasive. (Sands)

Probably the most common thing for a test panel would be a piece of scrap fender or door. They can cut a section out of it or they can literally use a scrap fender or door or hood or whatever that they may have in the scrap pile at their body shop. I guess the value is that they can save these then later, if they cut a section out. They can literally save that piece of sheet metal and use it as a matching panel for the next time they may have a vehicle in.

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Module 3 - Corrosion Protection After Repairs

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Video: Application Of Anti-Corrosion Compound

(TIMOTHY BRUNE) These anti-corrosion compounds are generally applied to inside cavities such as inside rocker panels, seams, any boxed-in areas. These products contain several different waxes and rust inhibitors that will seal the steel to keep moisture and the elements out, to keep it from rusting.

These are flexible coatings that will remain flexible throughout their life, so that they'll resist salt, magnesium chloride, calcium chloride. They'll resist flexing of the body and they'll flex with the body so they don't crack or peel off. We prefer to see the coating applied to as much of the area as possible. For example, if a rocker panel is repaired you don't know how much the damaged E-coat extends inside the rocker panel from the welding or grinding process. Also, you're going to possibly have metal shavings or welding slag throughout that entire panel, so it's best to coat as much of that panel as possible on the inside.

(HOST) Is there such a thing as too much?

(TIMOTHY BRUNE) Not really. There's a required amount. One to two mils of dried product is the amount that's required for it to work properly, but you can never put too much in there. You can unclog any drain holes if you do put too much in there by simply sticking something in there and removing excess product.

(HOST) This is the vehicle we're going to use to show the application of anticorrosion compound. There is a weld in this rocker panel right in this location. Let's use this borescope to look at the backside of that weld before he applies the anti-corrosion compound.

(TIMOTHY BRUNE) You want to watch your overspray so you don't get a whole lot in the vicinity of the fresh paint. What we're going to do is adjust our air pressure so we make sure we're not making too much overspray. We'll find the access hole in the panel. If there's easy access in the rear here we can take the long extended wand, slowly feed it in past the repair area, start spraying the product, slowly move it out, constantly pushing it in and pulling it out and moving the wand around in the cavity to make sure we have excellent coverage. You also notice some of the fog coming out of the different holes in the panel and that's how you know for sure you're getting good coverage inside that panel.

Another option for applying cavity wax in the repair area is through a smaller opening on the side. Simply insert the wand, begin spraying, constantly keeping the wand moving

in all directions, forwards, backwards, up and down, constantly keeping that fog moving inside that cavity. You also have another option of using a rigid wand, which can be inserted into the cavity through an easy access.

Before spraying an actual panel what you want to do is check your spray pattern before you actually spray the rocker panel, by squeezing the trigger and holding the wand down into a cardboard box or a garbage can, so you don't make a mess.

Start applying the product, and then slowly removing it again moving it real slow in and out, making sure we get good coverage past and around the repair area.

(HOST) Now that Tim has applied the anti-corrosion compound to this rocker panel, let's use the borescope again to look at the backside of that weld. And as you can see the weld is now protected from the backside.

Video: Application Of Undercoating

(DENNIS KEICHER) That undercoating generally is going to be a product that has a rubberized type of material, a synthetic rubber that's ground to a fine powder, as well as a solvent- or water-based carrier. We would find those in aprons, wheelhouses, outer frame rail areas. Those are the types of areas where we might find a true undercoating sprayed.

Choosing an undercoating would probably start out by identifying in your repair plan what the original coating appeared like. If I was doing a small area, I may just choose an aerosol. One of the big misnomers is that they don't work as well as another undercoating like a different application would be. That may or may not be true. Really what it boils down to is coverage with the aerosol.

A good general rule of thumb would be to follow the OE recommendations for any undercoating applications that they require on replacement panels. If you were to replace a floor pan, for instance, your best bet would be to go to the OE site and look for their recommendation for a type of undercoating that they may recommend for that. It may a rubber-based, heavy-bodied undercoating as a general description. They may or may not call out a part number.

The areas to avoid when applying undercoating are generally going to be limited to any moving parts, obviously such as brake calipers, brake rotors, suspension components, and any electrical connections, or exhaust or heat areas would be areas you would not want to apply an undercoating to.

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Module 4 - Vehicle Maker Recommendations

I-CAR®

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Video: Chrysler Recommendations

(DOUG CRAIG) We have a group called Materials Engineering that will do some evaluation. What Materials Engineering does is specifies products for the assembly process, so our side, the manufacturing side of the vehicle. When it gets to the repair side, they already have internal standards for what various materials must be tested to and meet. For the aftermarket products, we provide the information to the supplier, ask them to test to key points, because it's for repair, and we already have knowledge with companies like Fusor and 3M. We already understand their basic chemistry. We ask them to do key testing, just to confirm that the aftermarket product is in fact going to be the same as perhaps what we're using in assembly.

For repair, we've stated that if you don't know what's in a joint. You know there's a material there but you can't tell if it's an adhesive or a sealer, go ahead and use one of the approved structural adhesives. You're not going to do any damage to the overall vehicle by adding that, but you are going to provide extended corrosion protection.

The material specs and the testing specifications have been created literally over decades. Every auto manufacturer has its own proprietary specifications. They also tend to refer to ASTM specifications. They're created by the overall engineering industry, so they have a purpose. Say it's abrasion resistance. There are multiple standards out there to determine how a material coating of paint stands up to normal use. There's no one test that's going to be able to determine that. If you think about driving a car around all the various things that impact it, you have to have multiple tests to determine, to try and create real life so to speak.

Video: Ford Motor Company Recommendations

(GERRY BONANNI) When we look at some of the corrosion protection products that we've put into the Motorcraft chemicals line, particularly Motorcraft PM 24 and PM 25. The PM 24 is a cavity wax. The PM 25 is a premium undercoating. What we've done with those products, in particular, we actually did physical trials in which we sectioned up new door skins, rocker channels. We coated them with these products and put them through extensive Arizona Proving Grounds corrosion testing. So when you're looking at what we've done to trial them, it is extensive and following our OEM guidelines for service.

Ford does recommend weld-through primer, and we have some extensive study on it. But especially remember this, it is to be used only within the immediate heat-affected zone. Do not spray the backside of an entire panel with weld-through primer. What we found, is that it works very well in the heat-affected zone only. I would not recommend it, based on our extensive testing, to do it elsewhere.

The specifications for the entire body system for refinish materials, corrosion protection, aftermarket adhesives, and sealers all follow general guidelines of our OEM versions of the same. The difference being, many of these are air-cure or use light heat. The products that are used on the OEM side are primarily very high baked products, high-baked paint, high-baked seam sealers and adhesives. So when we look at aftermarket adhesives, sealers, corrosion protection products or refinish products, we develop those specifications to make sure that a robust product is given to the customer, the end user of the vehicle.

Video: GM Recommendations

(BOB HISER) The process that General Motors uses to establish and evaluate what coatings the body repair industry should use is one that we literally borrow almost straight up from our production painting coatings group. The expectation we have for the products available to the body shop is the same expectation of performance that the OE has for its production paint. When it comes to the aftermarket materials available like the undercoatings and enclosed cavity wax, we refer to the ASTM-B117 requirements, which is a testing method used to test these applied coatings that are more of an undercoating-type nature. The industry already has a very good test method for that and we want our recommended material to at least meet or exceed that testing method.

You see here this particular rail, this portion of the rail on this vehicle, is black. The E-coat that's on this is what we call service E-coat which is, by the way, the exact same primer that's used on this portion of the vehicle which is the factory E-coat.

(HOST) Except that it's black.

(BOB HISER) Except that it's a different color, sure. That's the only difference is its color. It's the same exact dip and rinse and wash and everything has been done. But the areas of the repair joint, we're now inside with areas of exposed metal from the welding process or what have you, we can't get in there like the plant got in there and get a coating on there as easily in the way of a liquid primer. So what we recommend is a closed cavity undercoating, if you will, that stays, it's self-healing, it stays sticky and gooey. We apply that with a wand and a little spray nozzle. It's something that the repair industry has had available, many good body shops have been using that for years to go down into these tunnel-cavity, closed-cavity areas and apply a coating, especially in the rust-belt areas.