Removing And Installing Exterior Trim, Pinstripes, and Decals

Self-study Narrations

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Module 1 - Trim And Moldings

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Learning Objectives

Various types of trim and moldings attached to the exterior of the vehicle may require removal. Module 1 will identify various types of trim and moldings, and discuss methods for removal and installation.

The learning objectives for this module include: locating and explaining vehicle trim code labels, identifying different methods for removing and replacing adhesively bonded emblems, identifying appliqués, moldings, cladding, and weatherstripping attachment methods.

Exterior Trim

Exterior trim includes emblems, appliqués, bodyside moldings, belt-line moldings, cladding, weatherstripping, pinstriping, and decals. Exterior trim pieces may be referenced differently by the vehicle maker.

Operations that may need to be itemized on a damage report or estimate include removing and installing or replacing cladding or antennas. Removing and installing original exterior trim, including cleaning and retaping if it is to be reused may also have to be itemized on the damage report.

Other operations that may need to be itemized on a damage report or estimate include installing pinstripes and decals, and drilling holes for installing exterior trim.

Removing and installing or replacing optional accessories, and installing new exterior trim are a couple more examples.

During damage analysis, always verify included and not included operations.

Some trim is impossible to remove without damaging the attachment method or part.

Labels

Identification of labels that must be removed and replaced should occur during the damage analysis process. Labels must be replaced. Do not remove a label from a damaged part without reattaching the original or new label to the replacement part. If applying a new label, verify that the information on the new label matches the information on the original label. Labels typically cannot be reused. If labels can be removed without damaging them and all information is legible, they may be reused by applying additional adhesive and reattaching. Typically, this is not possible and replacement decisions should not be overlooked during the damage analysis process.

Labels have their own part numbers and contain important vehicle information, such as emissions, specific vehicle parts, and refinishing codes. Labels may be located on replacement parts.

The vehicle maker may not provide some replacement labels. An independent company, such as Auto Data Labels, may provide vehicle information labels not provided by the vehicle maker.

Trim Code Locations

Trim code and paint code labels can be located in the engine compartment, in the trunk, in the doorjamb, in the glove box, on the center console, under the carpet, or under the spare tire cover.

Label location identification for specific makes and models can also be found in vehicle service information and collision repair estimating guides. These labels are used to properly identify the type of moldings and other trim used on a vehicle.

Mitchell publishes a Refinishing Materials Guide that references paint code label locations, paint code label explanations, and national and California material information.

Paint Code Label Explanation

Paint code labels are located in various locations on a vehicle and contain information to identify the color of interior and exterior parts. Not only are the paint code labels located in multiple locations, but they can be referenced in several different ways.

Paint codes may be referenced in service information. Service information is used to identify the location of paint code labels. Charts may be used to decode the paint code and identify the information within the label.

Always double-check the paint code, service information, and chart to ensure the correct paint code label location and letter/number combination have been identified.

Mechanical Fastners

There are various types of fasteners and fastening methods used to attach exterior trim and accessories. Fastening methods include: mechanical fasteners, plastic clips and retainers.

Mechanical fasteners include: screws, bolts, nuts, rivets and studs.

Mechanical Fastener Tools

Various types of tools are used to remove mechanical fasteners. Common tools used to remove and install mechanical fasteners include screwdrivers, socket wrenches, standard wrenches, and allen wrenches.

To prevent damage to the fastener or adjacent panels, use the proper size and shape of tool when removing or installing mechanical fasteners.

Vehicle makers provide torque specifications for many threaded fasteners on a vehicle. These must be observed to prevent damage and part failure. A torque wrench can be used to ensure fasteners are tightened to the proper torque.

Plastic Fasteners

Exterior trim and accessories may be attached using plastic fasteners. There are numerous shapes and sizes of plastic fasteners. Examples of plastic fasteners include clips, retainers, rivets, and grommets.

Plastic clips may be designed into a part or be separate. Plastic clips are used to snap into holes on exterior body panels, or adjacent parts.

Plastic retainers may temporarily deform during installation, such as a "Christmas tree" retainer. There are also mechanical plastic retainers that have moving parts, and may be removed and installed using standard tools.

Threaded plastic grommets may be used with mechanical fasteners, such as screws and bolts.

There are a variety of prying tools to remove plastic clips and retainers. It is best to use plastic tools during removal to reduce damaging the fasteners or parts.

Emblems And Nameplates

The emblem is the vehicle maker symbol and may be attached to the front or rear of the vehicle. A nameplate is any lettering, such as the model name or feature description. These are commonly found on the fenders or the rear of the vehicle. The term emblem is sometimes used as a collective term for both emblems and nameplates. Characteristics of emblems and nameplates include being used to identify the vehicle make, model, special edition package, or features.

Individual sizes, thicknesses, and details of emblems and nameplates vary from vehicle make, model, and trim package. Variations include recessed, body-colored, individual lettering, chrome, painted, and clearcoated.

Emblems and nameplates may be located on any panel except the roof. Even horizontal panels, such as the hood, are used for emblems. Emblems and nameplates may also be located in trim pieces such as cladding, grilles, and bumper covers.

Anodized gold or silver plating may be applied to emblems and nameplates. The vehicle maker may not have applied these platings. A dealership may have aftermarket companies apply anodized plating to trim pieces as a promotional or package deal.

Emblem Original Attachment Methods

Typically, vehicle makers attach emblems using adhesive, two-sided tape, and alignment pegs to position the emblem properly. Fasteners may be used to hold the emblem to the panel.

Because of the length and height of some emblems, it may be difficult to remove them without damage. Reattachment methods, correct alignment of individual letters, availability, and cost-effectiveness must be considered when determining whether to replace or reuse emblems.

Emblem Location

An emblem or nameplate must be attached to the vehicle in the exact location it was removed from. To ensure proper placement of emblems and nameplates, a template may be created by the technician, or a template may be provided with the replacement part. The vehicle service information may specify the location the emblem or nameplate should be positioned on the vehicle.

Adhered Emblem Removal Methods And Tools

Methods that can be used to remove adhered emblems include cutting the adhesive with fishing line, applying heat to loosen the adhesive, using a plastic trim removal tool, or separating with a trim removal air chisel attachment and lubricant.

The vehicle maker may specify to protect the surrounding areas with protective tape or several layers of masking tape during removal.

Use special protective tape or several layers of masking tape to protect the painted surface around the emblem during removal.

Heating To Loosen Adhesive
Heat can be used to loosen adhesive. Tools used to heat adhesive include a heat lamp, a heat gun, or an induction heater. When applying heat to loosen emblem adhesive, the vehicle maker may specify a maximum temperature that can be applied to the area of the emblem, or what temperature the area of the emblem should be before heating. Chrysler warns that the temperature should not exceed 52°C (120°F) when heating nameplates.

Use a circular motion when applying heat to loosen adhesive. This will allow even distribution of the heat and prevent the paint from blistering. The vehicle maker may specify the distance between the heat source and the part, and how long heat can be applied.

Pry the emblem at various angles to release it from the panel after heat has been applied.

Fishing Line
Fishing line can be used to remove emblems without damaging the painted surface or the emblem. Fishing line may be preferable over a plastic tool or air chisel attachment when removing large emblems, or when the emblem is positioned in a recessed area on the panel.

When removing emblems with fishing line, friction from the fishing line can cause it to break. To help prevent this, use heavy pound test line or braided fishing line. On large emblems, continuously use a new section of the line to prevent it from breaking. Positioning the line closer to the panel or emblem backing determines where the foam tape will be cut.

Protect hands by wrapping the ends of the fishing line around two small objects, such as pieces of paint stir sticks. Use a see-saw motion to cut through the adhesive.

Trim Removal Air Chisel Attachment
When using an air chisel attachment to remove emblems, identify the location of all alignment pegs and use caution around them. The air chisel attachment can be used by hand or with an air chisel. Apply lubricant before and while working with the tool if necessary, and use an air regulator to set the proper air pressure.

Use caution when applying lubricant. Wear safety glasses and proper respiratory protection. Refer to the product material safety data sheet (MSDS).

Emblem Adhesive Removal

Methods of removing emblem adhesive from the panel or the emblem include soaking with an adhesive remover, or scraping with a razor blade.

An eraser disc is another method for removing adhesive from the panel, but is not the best option for removing adhesive from the emblem.

Adhesive Remover

General-purpose adhesive remover is used to loosen and remove adhesive. When using an adhesive remover the surface must be cool. Soaking time may be required. Use an aerosol can or pump spray bottle on vertical panels. The area should be scraped with a plastic razor blade or squeegee to remove the adhesive residue.

Additional applications of adhesive remover may be needed to remove all of the adhesive residue. Clean the area with soap and water immediately after adhesive removal.

When applying a general-purpose adhesive remover, wear safety glasses, rubber gloves, and the proper respirator. Apply in a well-ventilated area.

Check with local, provincial, and state motor vehicle refinishing regulations that limit the use of the volatile organic compounds, or VOCs of surface prep solvents.

Use caution when applying adhesive remover on or near vinyl. Rubbing adhesive remover on vinyl parts can damage the textured finish.

Use caution when applying adhesive remover to some anodized emblems. Adhesive removers can remove the gold or silver plating from the emblem.

Eraser Disc

An eraser disc can be used to remove the adhesive that is left behind after emblem removal. When used correctly, an eraser disc will not damage the painted surface. When using an eraser disc, follow the product maker's speed recommendation. One product maker recommends their eraser only be used at speeds between 1,800 and 2,200 RPM.

Use horizontal and vertical movements, and apply light pressure. Heavy pressure will not assist in the removal efficiency. Work against the rotation of the eraser disc.

Residue from the eraser disc can be removed by lightly rubbing the area with general-purpose adhesive remover or isopropyl alcohol, if needed. If a film remains, rework the area with the eraser disc after it has dried.

The 3M "Stripe Off Tool" warns to never use it with tools that exceed 4,000 RPM.

Eraser discs should not be used on lacquer coatings or thermoplastic polymers like polyolefin bumper covers.

Razor Blades

Plastic or metal razor blades can be used to cut through the adhesive. When using a razor blade, protect the surrounding area with protective or masking tape. One type of razor blade holder includes a break-off razor blade tool. These types are designed to break off at a certain point to supply a sharp, clean edge and retract into a holder.

Another type of razor blade holder is a standard utility knife. Utility knives are typically retractable, and used to separate the adhesive around alignment pegs.

Use caution when removing adhesives with a razor blade. Razors can get jammed in the emblem adhesive or alignment pegs and break, possibly propelling blade fragments into the air.

Razor blades are very sharp and can cut deep before you realize it. Do not hold the part in your hand when using a razor blade to remove the adhesive. Never cut towards the fingers on your other hand.

Use caution to not damage the finish or cut off any positioning pegs on the emblem.

Plastic razor blades can be used instead of metal razor blades to reduce the chance of damaging the finish and the emblem. When cleaning with a plastic razor blade the majority of the adhesive can be removed. Adhesive remover may be required to remove excess adhesive residue.

Applying Heat

Heat can be applied with a heat gun or heat lamp to soften the adhesive. When using a heat gun or heat lamp, avoid overheating the panel and damaging the paint film. This can be done by monitoring heat settings, staying a safe distance from the panel, and using a circular motion during application.

Wear gloves to avoid contact with the heated surface. A plastic razor blade or squeegee can be used to remove the warmed adhesive. After the panel has cooled, apply adhesive remover to remove excess adhesive.

Do not use chemical removers and a heat gun or heat lamp simultaneously.

Emblem Replacement Recommendations

When replacing emblems clean the surface and the emblem. Also, allow freshly refinished surfaces to cure. Vehicle-specific service information can be used to find the emblem location specifications. A template may be made with masking tape to ensure the emblem is replaced in the proper location.

Verify that the temperature of the panel and the emblem match the product maker recommendations during installation. Additional heating may be required to ensure proper adhesion. Chrysler recommends not exceeding 52°C (120°F) when heating the emblem or the vehicle surface.

Emblem Application Methods

Products that may be used to apply emblems include mechanical fasteners, two-sided tape on factory or reused emblems, emblem adhesive, and transfer adhesive.

Emblem Mechanical Fasteners

Mechanical fasteners used to attach emblems to panels typically use nuts that thread onto the emblem alignment pegs. When working with mechanically fastened emblems, verify that the emblem is mechanically fastened. A nut will be located on the backside of the panel.

Duplicate OEM attachment methods when working with mechanical fasteners. Adhesives can be used with the fasteners.

Two-Sided Tape

Two-sided tape is commonly precut or cut-to-size. Two different types of emblem application are new emblems using the OEM precut tape. Reusing emblems will require a piece of two-sided tape to be cut to the proper size. For example, a removed emblem with damaged foam tape cannot be reattached with transfer adhesive. Two-sided tape would be a better option for this type of situation. Common backing colors of two-sided tape include white, black, and gray.

It may be recommended to heat the surface when applying new emblems with adhesive or reusing an emblem with two-sided tape.

When using either of these types of application methods, do not touch or contaminate the exposed areas of tape. A primer may be available to increase adhesion between two-sided tape and the molding.

Chrysler specifies that a heat lamp or heat gun should be used to warm the emblem if the temperature is below 21°C (70°F).

General Motors specifies that the emblem and the panel should be 21°C (70°F) before installation. The vehicle should remain at that temperature for one hour after assembly to allow the adhesive to develop sufficient bond strength.

Emblem Adhesive
Emblem adhesive is typically a clear adhesive in a tube or brushable gel in a jar. When using emblem adhesive apply a thin layer directly to the emblem. Avoid applying an excessive amount of emblem adhesive.

Dip the part into a tacky puddle of adhesive, and then apply it to the panel. Avoid using excessive amounts of adhesive. This is because squeeze-out from the sides of the emblem will be difficult to remove.

Use tape to hold the emblem in place while the adhesive sets. If tape is not used, the emblem may slide down vertical panels leaving a trail of emblem adhesive.

Use caution when applying heat around adhesives. Some emblem adhesives are extremely flammable. Ensure that fire extinguishers are accessible and in proper working order. Wear safety glasses, gloves, and the proper respirator. Also, apply in a well-ventilated area.

Use caution when applying emblem adhesive. Some emblem adhesives contain solvents that can damage automotive finishes. Test a hidden area or removed damaged panel for possible marring or dulling. If adhesive comes in contact with painted vinyl surfaces, promptly clean the area.

Transfer Adhesive
The main factor in using transfer adhesive to apply emblems is that the foam on the emblem must be uniform in appearance. To achieve this, razor blade tools, fishing line, or a trim removal air chisel attachment and lubricant can be used to remove the emblem. During the repair, transfer adhesive can be applied immediately after removal, keeping the plastic strip attached to the emblem until it is time for application. This will help prevent contaminants from adhering to the emblem.

Transfer adhesive can be applied after all the repairs have been made. The emblem is stored during the repair process, then the plastic strip is applied and removed immediately, and the emblem is attached to the panel.

Appliqués

Appliqués are decorative pieces used on the exterior of the vehicle near the windows. Appliqués can be gloss or dull black, and made of a plastic material. Generally, plastic appliqués can be removed and reapplied. An applique can be a decal adhered to part of a panel. Decal-type appliques require replacement.

Appliqué Original Attachment Methods

Appliqué attachment methods include two-sided tape, clips, and hidden fasteners. Fasteners, such as screws, can be hidden behind other parts, such as seals or weatherstripping. Adhesive is used to attach decals.

Appliqué Removal

Appliqué removal depends on how they are attached. Removal can include removing seals or weatherstripping to reveal hidden clips or fasteners. Applique removal may require pulling plastic or peeling a decal-type away from the panel, or heating the area to assist in removing decal-type appliqués. The vehicle maker may specify a specific temperature for heating or removal.

Appliqué Installation

Appliqué installation methods vary according to the attachment methods. For example, new decal-type appliqués are applied similar to regular decals with the possible addition of edge locators to assist in correctly positioning the appliqué. Ensure the area is completely clean before applying decal appliqués. Dirt nibs can distort the surface of the decal.

Clips and fasteners may also be used to attach appliqués. Fasteners typically require torquing. Remember to reinstall or replace any parts that were removed to access hidden fasteners, such as seals and weatherstripping.

Bodyside Moldings

Bodyside moldings are decorative pieces applied to the mid-section of the vehicle exterior. The appearance and attachment of these moldings vary by color, width, and texture. Width can affect the ability to remove and replace the molding without damaging it. Moldings may be color-impregnated or painted. Texture must also be obtained if refinishing a repaired molding. Textures, such as chrome, are difficult to remove without creasing the chrome plating and typically require replacement.

The locations of trim pieces also vary, such as the bodyside and rocker panel cladding.

The type of removal method may depend on whether or not the molding contains alignment pegs.

Bodyside moldings may also vary by the reusability factor. Some moldings cannot be removed without damage or may not be cost-efficient to remove and reinstall. Some moldings are metal-backed and difficult to remove and reattach.

Some moldings may require refinishing even if they can be ordered by color. The color that was used to refinish the molding may not be the same variance as the color on the vehicle.

Bodyside Molding Storage
When storing flexible moldings for reapplication, lay them flat and cover them with plastic in a clean and dry area. Some moldings contain metal inserts or a backing that may not allow for permanent repairs if they are twisted, bent, or have curled ends. Moldings can be prepared for reapplication after removal and before storage, or immediately before application.

Adhered Bodyside Molding Removal
Bodyside moldings may be adhered to the vehicle panels. Indications of an adhesively attached molding are a thin molding that is tightly fit to the panel. Methods of adhesion include two-sided, acrylic foam tape, and plastic and emblem adhesive on small pieces during reinstallation.

Adhered bodyside moldings are removed in the same way that adhesive emblems are removed. Methods of removal include cutting through the adhesive with fishing line, applying heat to loosen the adhesive and prying it away from the panel, or chiseling with an air chisel attachment and lubricant.

Use caution when removing adhered moldings with the air chisel attachment. Moldings can use positioning alignment pegs that can be sheared off with the tool.

Removing Adhesive
Adhesive must be removed from the panel surface. If the removed bodyside molding is going to be reinstalled, the adhesive must also be removed from the part. Methods for removing adhesive include soaking with an adhesive remover solution. However, the solution may warp some types of moldings. Refer to the product maker instructions for acceptable material types and recommended soaking times.

Other methods for removing adhesive include heating the adhesive, and scraping the adhesive with a razor blade or other tool.

Use caution when removing adhesives from moldings. Eraser discs generate excessive amounts of heat. Excessive heat can cause damage.

Adhesive Replacement

To ensure adhesion to the panel, do not apply moldings when the temperature is below 16°C (60°F). Ideally, the surface temperature should be 16-27°C (60 - 80°F). When replacing adhered bodyside moldings use masking tape as a guide to properly align long, flexible moldings. Apply a length of tape on the body parallel to the top edge of the intended molding position and apply the molding.

The body and the molding have to be heated for proper adhesion. Two-sided tape is commonly used for reapplying a molding. Apply pressure to adhere the molding to the panel.

During installation, verify proper clearance of door or other closure panel moldings to adjacent panels.

When using plastic or emblem adhesive, use similar application methods as emblem adhesive. Use small amounts of adhesive and tape to hold the molding in place.

Allow freshly refinished surfaces to dry before installing adhesively bonded bodyside moldings. BASF recommends waiting 48 hours after a finish has been applied before installing moldings with two-sided tape.

Clipped Bodyside Moldings

Bodyside moldings may be attached with clips. A clipped attachment is identifiable by a slight gap between the panel and the molding. When locating and identifying clips, remember that a variety of clips are available, and removal methods vary according to the type of clip. Clips may be attached to the molding or the panel.

When replacing clips use all replacement hardware. One-time use hardware may be included but unidentified. These types of fasteners must be replaced.

Use adhesives with clips when duplicating the OEM installation. Drill all holes before refinishing to prevent corrosion, and replace all clips that were damaged during removal. Order new hardware or remove it from inventory as soon as possible.

Fastened Bodyside Moldings
Bodyside moldings can be mechanically fastened. With this type of attachment method, clips and adhesives may also be used with the fasteners. Some fasteners are permanently fastened to the panel or the molding.

Determine whether the fastener should be attached to the panel or the molding for proper installation.

Removal and replacement of fasteners can be done with basic hand tools. When removing and replacing fasteners, duplicate OEM installation, and repair or replace any damaged fasteners or fastener threads.

Belt-Line Moldings
Belt-line moldings can be painted or chromed metal or a rubber piece. Belt-line moldings may be located on the window sill, framing the window, or inclusive of an applique. Removing a belt-line molding typically requires interior trim panel removal and possible window removal.

Cladding
Claddings are decorative pieces that are attached to the vehicle in a variety of locations including the body, rocker panel, and tailgate. Claddings may be molded to fit vehicle contours. Claddings can also create contours in flat sheet metal. Claddings may be a smooth or textured finished piece, or a color-impregnated piece of plastic.

Cladding may be located on the bottom of the doors, vertical side panels above the rocker panel area, sail panels, edge of the roof panel, or rocker panel. Splash guards may also be attached to protect the body from road spray. Some rocker panel claddings extend to the wheelhouse trim.

Cladding may also be located on the tailgate.

Plastic Rivets
Plastic rivets may be used to fasten trim pieces to the vehicle exterior. Plastic rivets are one-time use fasteners and cannot be reused.

Some plastic rivets can be removed using a hammer and a punch to drive the center of the rivet inward, then prying it out of the hole. Another method for removing plastic rivets is using a side cutters to cut the rivet under the rivet head.

Rivet installation requires the use of a plastic rivet tool and replacement rivets. Replacement rivets should be the same size, and look similar to the original rivets. When

using a rivet installation tool, insert the rivet into the tool. Then, insert the rivet into the hole on the panel and squeeze the handles of the tool to set the rivet. Additional squeezing of the handles may be required to properly set the rivet.

Weatherstripping
Weatherstripping is a rubber material located around hinged panels and their mating surfaces. Weatherstripping is used to seal like a gasket to prevent wind, water, and dust leaks, and to prevent noise and vibration.

Weatherstripping can be attached with a combination of attachment methods or just one. Weatherstripping may be channeled to lock onto a flange. Adhesives can be two-sided tape or a liquid adhesive inside a channeled groove.

Weatherstripping may be attached with clips and fasteners. Clip attachment is staggered along the length of the weatherstripping. The heads of the clips are typically not exposed. Fasteners are typically in plain view and may be located at the ends of the weatherstripping for positioning.

Weatherstripping Removal
Removal methods vary according to the attachment method. Generally, to remove weatherstripping pull it from the mating surface after any clips or fasteners have been removed. Channeled weatherstripping is used by itself or in conjunction with an adhesive or fastened at each end.

Use a small forked tool or needle-nose pliers to remove weatherstripping that is attached with a series of clips. Remove the clips and weatherstripping carefully to avoid tearing the weatherstripping. Heat may be required for adhered weatherstripping that is attached with two-sided tape.

Weatherstripping Installation
Installation of weatherstripping varies according to the attachment method. Generally, to install weatherstripping excess adhesive from two-sided tape must be removed and new adhesive applied. Two-sided tape or weatherstripping adhesive can be used to duplicate an OEM weatherstripping application. New weatherstripping may already have the adhesive applied. If reusing a liquid adhesive, additional adhesive may be required.

Replace any damaged or missing clips and fasteners. If used with adhesives, adhesives should be applied before replacing clips and fasteners. Use the friction channel as a guide on the flange. Begin with a pre-formed area of channeled weatherstripping or the color-coded locator dot.

Some weatherstripping may require the application of heat for adhesion.

Roof Moldings

Roof moldings may be located in the gap between the roof rail and the outer roof panel. This area may be called the roof ditch.

Attachment methods include clip-on retainers, two-sided tape, and seam sealer. Re-application may require noting the amount of seam sealer used to ensure proper depth during installation.

Removal may require heating and prying the molding from the roof ditch, or unclipping the molding from retainers located in the roof ditch.

Module Summary

Module 1 identified various types of trim and moldings, and discussed methods for removal and installation.

Topics discussed in this module included: vehicle trim code labels, different methods for removing and replacing adhesively bonded emblems, appliqués, moldings, cladding, and weatherstripping attachment methods.

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Module 2 - Front, Rear, And Underbody Trim

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Learning Objectives

Module 2 will identify trim parts attached to the vehicle front, rear, and underbody and discuss removal and installation considerations.

The learning objectives for this module include: identifying trim attachment methods for the front of the vehicle, identifying trim attachment methods for the rear of the vehicle, identifying trim attachment methods for the underbody of the vehicle.

Underhood Insulation Pad

Underhood insulation pads are used to deaden the sounds of the engine. Typical attachment methods include flush-mount nylon retainers, and multiple types, sizes, and shapes of retainers.

A weatherstripping can also be attached to the insulation pad with nylon retainers.

A variety of clip removal tools can be used that will not cause damage to the insulation pad.

Caution: Broken retainer pieces can fall into the hood frame causing a rattling noise.

Splash Shields And Fender Liners

Splash shields and fender liners are plastic coverings that protect the underbody from road splash or debris. Splash shields and fender liners are fastened to the vehicle with bolts, screws, or plastic fasteners. Fasteners damaged during removal must be replaced.

Fender liner removal may require removing adjacent parts, such as the wheel assembly, mud flap, or splash shield.

Rubber Bumpers, Stoppers, And Grommets

Characteristics of rubber bumpers, adjustable stoppers, and grommets include adjustability, protection against dust and moisture, and cushioning to prevent noise and vibration.

Adjustable stoppers are typically located under the hood and help align the hood to the fenders.

Grommets prevent dust and moisture from entering enclosed panels and causing them to rust and work improperly. Some grommets must be replaced with new ones after they have been removed.

Rubber bumpers are used all over the vehicle to cushion a door, handle, or glove box door from slamming shut or creating a noise after it has been closed.

Grille Attachment

The grille may be attached by studs on the grille where nuts are threaded through brackets onto the studs, or molded in with other trim pieces, such as the fascia.

Tail Lamp Attachment

Tail lamps may be attached with wing nuts or hex nuts. Tail lamp locations include being part of an appliqué, or as one panel stretching the width of the vehicle.

License Plates

License plates can be attached using nylon fastener retainers. Locations of license plates include being within an appliqué, with or without a lock cylinder, or within the bumper assembly.

Rear Wiper Arm And Rest Attachment

Rear wiper arm and rests are located above, below, or on the backglass. Removing the rest is similar to removing and installing windshield wiper arms, and may require interior trim panel removal.

Module Summary

Module 2 identified trim parts attached to the vehicle front, rear, and underbody and discussed removal and installation considerations.

Topics discussed in this module included attachment methods used for trim on the: front of the vehicle, rear of the vehicle, underbody of the vehicle.

Module 3 - Exterior Accessories

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Learning Objectives

Module 3 will discuss removal and installation methods for exterior accessories, as well as removal of some interior parts for access.

The learning objectives for this module include: identifying the difference between OEM and aftermarket bolt-on and adhered accessories, identifying general attachment methods for exterior trim.

Bolt-On And Adhered Accessories

Bolt-on and adhered accessories include, but are not limited to running boards, carriers, tonneau covers, brush guards, air deflectors, wheel flares, off-road accessories, and spoilers.

OEM Vs. Aftermarket Identification

Methods of identifying OEM and aftermarket accessories include looking for part numbers that would identify the manufacturer or ID numbers that would identify a conversion package and list accessories. ID numbers may be located in the doorjamb.

Decorative logos in the form of emblems or decals may indicate the manufacturer. The customer may be contacted to ask if the accessory was purchased that way, dealer installed, or an aftermarket installation. An estimating guide may also be referenced to determine if the accessory could be original equipment.

Before replacing adhered or bolt-on accessories, check part warranty. The part may be warrantied by the vehicle maker from the date of vehicle purchase. Also check conversion package requirements. Replacement parts, paint codes, and graphic packages may only be available through the conversion company.

Some accessories may only be available as a kit or for both sides.

Use caution when drilling holes. Some vehicle makers do not recommend drilling holes in the frame side rail top and bottom flanges. This can cause metal fatigue resulting in frame failure. Other hole drilling requirements may include staying a certain distance away from the edge of the nearest hole, flange, frame centerline, or existing bracket or parts of the frame.

Exterior

Other parts of the exterior include antennas, washer nozzles, mirrors, a high-mount stop lamp, door handles, and lock cylinders.

Antennas

Antennas may be located on a fender, the roof, or imbedded into stationary glass. Antennas are used for various devices located inside the vehicle, such as for AM/FM radio, television, satellite radio, cellular transmission, or a navigation system.

There may be multiple antennas located on the vehicle, such as one antenna for the AM/FM radio, and one for satellite and/or navigation systems.

Antenna Removal

Antenna removal requires accessing the backside of the panel it is mounted to. Antennas located on the roof typically require removing or repositioning the headliner to access the antenna mounting fastener, and antenna wiring.

Washer Nozzles

Washer nozzles are used to distribute washer solution onto the windshield, headlamps, or backglass. These nozzles can be located at the rear of the hood, on the bumper, or on the rear liftgate.

Typical removal of the hood-mounted nozzle includes removing the underhood insulation pad, disconnecting the washer solution hose, squeezing from the underside, and popping it through the top of the panel.

Exterior High-Mount Stop Lamp Locations

High-mount stop lamps may be attached to the exterior on the liftgate, above the liftgate, or above the rear window on a truck.

When removing and installing high-mount stop lamps, use caution not to damage the surrounding painted surface, gasket, or screw. Typically these lamps are attached with visible screws that should not be damaged during removal and installation.

Exterior Door Parts

Exterior door parts and trim that may require removal during the repair process include door mirrors, handles, and lock cylinders.

Removal of these parts may require removal of the interior door trim panel.

Interior Door Trim Panel

General parts to an interior door trim panel include hardware, such as visible and hidden screws and nylon retainers; and accessories, such as the handle bezel, window regulator handle, and power accessory switch panel.

Before removing the interior door trim panel, locate and identify clips and hidden fasteners. Some vehicle makers may require the replacement of specific clips to ensure that the trim panel is properly secured to the door frame. If all hidden fasteners are not identified and removed, the panel will not be able to be removed without damage to the panel or some other part.

It is also important to locate and identify removal procedures for each part or option. These procedures can be found in the vehicle-specific service information.

Use caution when operating power windows during repairs, especially around the regulator assembly. Most power windows have an express down mode, which causes the window to continue lowering even after the switch is released. To prevent injury, disconnect the power window switch when it is not being used.

Make sure the ignition is in the OFF position and the key is removed when removing the door trim panel switches. This will prevent the flat-bladed tool, awl, or another metal object from shorting out the switch.

It is also important to apply tape to sharp metal tools before inserting them. This will help protect the inner door trim panel from damage.

Dust And Moisture Barrier

The dust and moisture barrier protects the parts located between the door shell and interior door panel. This barrier:

- is located between the interior trim panel and the door frame and is adhered to the door frame. Adhesion must be restored during reinstallation.
- is made of clear or black plastic or a foam-type material.
- if plastic, may be repaired with waterproof tape.
- must be reinstalled or replaced.

Some door assemblies have a cassette that houses mechanical parts, and may be sealed to serve as a barrier.

Door Mirrors

Door mirrors may be equipped with a variety of features. Door mirror assemblies may be heated, include turn signals, include lamps for a blind spot detection system, or include a camera.

During damage analysis, it should be determined if the parts of the mirror can be replaced or if the complete assembly will require replacement. Use caution while handling electronic parts of the mirror assembly and make note of them on damage reports.

Door Mirror Removal

Exterior mirrors that mount to the interior of the vehicle typically use studs located on the mirror and nuts fastening it to the door frame. Exterior mirrors mounted to the vehicle interior typically require removal of the interior door trim panel and/or belt-line moldings and appliqués.

A special tool may be required. Breakaway mirror assemblies are typically friction-fitted.

Door Handles

Door handles have many different designs and can be attached to the door panel with studs and nuts, rivets, bolts, and retaining clips.

Typically, interior door trim panels and dust and moisture barriers must be removed to remove the door handle. Door handle removal may also require repositioning or removal of the door glass.

Lock Cylinder Locations

Lock cylinders may be located in the handle assembly, an applique, or an individual hole in the panel. Ignition, door, deck lid, and rear hatch lock cylinders may be coded to the key with replacement lock barrels, tumblers, and tumbler springs.

Many door locks are electrical and primarily function with a key fob. The lock cylinder may be concealed behind a cover that can be removed in case of power failure.

Rod Retainers

Rod retainers are used to connect rods to the linkages they operate. Rod retainers come in a variety of designs and are used in several door locations including interior and exterior door handles to the opening mechanism.

Rod retainers may be used for the interior lock knob to the lock actuator, or the exterior lock cylinder to the lock actuator.

Door Lock Cylinder Removal

Avoid repairing a damaged lock cylinder or attaching lock parts. Removing door lock cylinders may require removal of the handle assembly, interior door parts, such as the window glass, or a retaining clip.

Deck Lid Lock Cylinder Removal

Removing deck lid lock cylinders may require removal of the tail lamp assembly, a retaining ring, a plastic clip, or rivets.

Module Summary

Module 3 discussed removal and installation methods for exterior accessories, as well as removal of some interior parts for access.

Topics discussed in this module included: OEM and aftermarket bolt-on and adhered accessories, exterior trim attachment methods.

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Module 4 - Pinstripes And Decals

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Learning Objectives

Pinstriping may be painted or applied as a decal. Module 4 will discuss methods for removing and installing painted pinstripes or decals. Considerations for applying decals over fresh refinish will also be discussed. The learning objectives for this module include: identifying different methods of applying painted pinstriping, identifying different methods for removing pinstriping and decals, applying taped pinstriping, performing wet applications of an adhesively bonded decal, and identifying different methods of pinstriping application.

Painted Pinstripe Removal

Painted pinstripes can be OEM or aftermarket applications. In areas requiring refinishing, to remove painted pinstripes use a dual-action (DA) sander. Feather out the area to create a smooth area. While keeping the repair area as small as possible, if areas are not feathered out properly the edges of the pinstripe will show through.

Painted Pinstripes Using Tape

Paint striping tape is available in different widths. There are two different methods for applying painted pinstripes using tape. When refinishing the pinstriped area, the paint can be applied so that the first color applied is the pinstripe color. Then, the exact location of the pinstripe is taped off with paint striping tape or fine line tape and the basecoat color of the vehicle is applied. Finally, the paint striping tape is removed revealing the pinstripe. Highly complex pinstripes, with multiple colors, may be more easily replaced by applying the pinstripe color one step at a time, masking off, then applying the basecoat color to the panel. Pre-positioned paint striping tape is available. Generally, plastic paint striping tape is used to create a clean, straight line.

Another option is to apply the basecoat of the vehicle first. Then, all areas except the pinstripe lines are masked off and the pinstripe color is applied. Finally, the masked area is removed and the pinstripe color appears on the surface of the basecoat color.

Painting Pinstripes Using A Brush

Painted pinstripes can also be applied by hand with a brush. There are two methods that can be used: freehand or stenciled. When stenciling, paint striping tape or fine line tape is used as a guide and is removed after the finish has partially dried. Removing the tape reveals a clean stripe. Using the freehand method requires practice, a steady hand, and specialized brushes. Special care and maintenance of brushes is important to apply a straight line.

Sikkens Autoclear HS + LV suggests painted pinstripes and lettering be applied within 48 hours of finish application for good adhesion.

Painting Pinstripes Using A Wheel Striping Tool

A wheel striping tool can be used to apply painted pinstripes. The striping tool uses an application method similar to a rubber stamp, and includes various attachments for width and number of stripes.

Taped Pinstripe Removal

One method for removing taped pinstriping is to apply heat with a heat gun or heat lamp to loosen the adhesive. Heat may be required to bring the surface to a recommended temperature or to loosen the adhesive. When using a heat gun, use a circular motion, and pull the taped pinstripe away from the panel while applying tension near the panel.

Taped pinstriping may be removed using a chemical remover, such as a general-purpose adhesive remover or similar material. Chemical removers, such as a general-purpose adhesive remover or an adhesive release agent, can be used to remove taped pinstripes. Test the chemical remover on a small, hidden area or on damaged panels that have been removed before applying chemical removers to the repaired panel.

An eraser disc can be used to remove the pinstripe and the adhesive residue. Use similar techniques with the eraser disc to remove pinstripes as when removing emblem adhesive. This should be done by applying light pressure, and using horizontal and vertical movements. Residue should be removed from the eraser disc by lightly rubbing the area with general-purpose adhesive remover or isopropyl alcohol.

Do not use chemical removers and a heat gun or heat lamp simultaneously.

Taped Pinstripe Application

To apply taped pinstripes, verify that the surface temperature is 16 - 27°C (60 - 80°F). Pinstripes should not be applied when temperatures are below 16°C (60°F).

Properly clean the surface before applying taped pinstripes. This can include a chemical to remove water-soluble contaminants and a chemical to remove oil-based contaminants. This may not be required on newly refinished panels.

Also, verify that the surface is smooth. Wet sanding may be required to remove dirt imbedded into the finish. Following wet sanding, the surface should be cleaned properly.

The taped pinstripe should be cut a length longer than needed as a precautionary measure, and use as an alignment reference when extended onto adjacent panels. Remove the backing, if required, and do not overstretch the pinstripe tape.

Align the pinstriping and temporarily apply it to the vehicle. Then, use a squeegee to apply firm pressure to adhere the pinstripe to the panel. If a protective film requires removal, remove it at a 180° angle to the panel. Some taped pinstripes may not contain a protective film.

Use a pin to pop the air bubbles. This will prevent breaking through the paint film, which can cause future problems. Do not use a metal razor blade.

Decals
Decals are most commonly called graphics, transfers, or overlays. Decals are applied to the exterior of the vehicle and come in various sizes, shapes, and colors. Some graphics packages may only be available as a kit that includes both side and additional pieces that may not require replacement on the damaged vehicle.

Decals can also be designed and created by aftermarket suppliers. The supplier should be referenced for specific application of these types of decals. Aftermarket suppliers can also be valuable if they can duplicate a graphic that has been discontinued or is only available in a kit.

Vehicle Wraps
A vehicle wrap is typically a printed vinyl film that adheres to exterior body panels, and glass, and is an alternative to custom painting. Vehicle wraps are commonly used for advertising on company vehicles, and cover a large area or the entire exterior of the vehicle.

Decal Removal
Decals can be removed similar to how pinstriping is removed, such as applying heat with a heat gun or heat lamp to loosen the adhesive. Be careful not to overheat the area.

Decals may also be removed by cleaning with an eraser disc chucked into the correct size drill motor, or using a chemical remover, such as a general-purpose adhesive remover. Test the chemical remover on a small, hidden area or on a damaged panel before applying chemical removers to the repaired panel.

Vehicle wraps should be removed from damaged panels and panels where blending may be necessary. Vehicle wraps are removed by applying heat and peeling the wrap from the panel.

Following repairs, vehicle wraps are typically replaced at the facility where it was originally installed. This may be handled by the collision repair facility as a sublet, or returned to the vehicle owner to have the wrap replaced.

Vehicle wraps should not be applied until the refinish has fully cured. Refer to paint maker recommendations to determine the proper amount of time before the vehicle wrap can be replaced. This may require communication with the facility that originally installed the vehicle wrap, or the vehicle owner.

Vehicle wraps can be replaced for individual panels. The graphics are generally digitally stored by the installation facility or supplier, and can be replaced as necessary.

Decal Application

Before application, align and measure the desired location of the decal. To apply decals, maintain a temperature between 16 - 27°C (60 - 80°F). Decals should not be applied when the surface is below 16°C (60°F). The surface should be properly cleaned. This can include a chemical to remove water-soluble contaminants and a chemical to remove oil-based contaminants. This may not be required on newly refinished panels.

Decals may be applied apply wet or dry. When using a squeegee, work from the inside to the outside of the decal or into recessed areas.

Remove the protective film that covers the decal and keeps the pieces in alignment. Use a pin to prick bubbles. This will prevent breaking through the paint film, which can cause future problems. Do not use a metal razor blade.

Apply heat to contour the decal into recessed areas or to evaporate residual moisture during wet application. Allow freshly refinished surfaces to dry before installation. Residual solvents can cause blistering after decal application. The recommended cure time before applying decals may vary depending on the width and thickness of the decal. For example, Glasurit recommends waiting at least 48 hours before applying taped pinstripes, and one week before applying large or thick decals.

Factory decals or graphics are typically adhered to painted surfaces by a pressure-sensitive adhesive. The use of a wetting solution aids in the lifting and the positioning of the decal during installation and is particularly helpful when applying large decals.

A wetting solution can also be used to apply stripes or decals that are applied to flexible surfaces. The solution helps prevent the forming of air bubbles under the decal due to outgassing of the flexible material. It may not be recommended to use a wetting solution on color-impregnated TPO plastic.

Follow the paint maker recommendations for proper cure time before applying decals. This may require the customer to return at a later date to have the decals installed.

Module Summary

Module 4 discussed methods for removing and installing painted pinstripes or decals. Considerations for applying decals over fresh refinish were also discussed. Topics discussed in this module included different methods of applying paint pinstriping, for removing pinstriping, and decals, for applying taped pinstriping, and for applying wet applications of an adhesively bonded decal.

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