Collision Repair

Flexible Instruction Day

Assignment #3

Learning Standard	1.2.11 read and understand essential content. 2.2.11.E recognize the degree of precision needed in calculating a number and environmental health and safety. 3.6.12 science and technology
Task # & Description	302 remove, reinstall and align bolts on panels

CONTACT INFORMATION/ASSISTANCE

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Instructor E-Mail: petersd@butlertec.us

I will be available by email from 7:40-12, and 12:30-3:10 to answer your questions. Please reach out if you are having difficulty completing your assignments.

INSTRUCTIONS

✓ All work is due on the day we return to school. This is counted towards your attendance **and** as a classroom assignment.

✓ Read supplied materials

✓Complete the quizzes on panel repair and replacement

Name: _____ Session: _____

_____/_____ **points**

Exterior Panel Repair And Replacement– Steel And Plastic Program 1

Textbook

I-CAR®

IMPORTANT NOTICE

This material provides general directions for collision damage repair using tested, effective procedures. Following them will help assure the reliability of the repair.

I-CAR cannot accept responsibility for any individual repair, nor can it warrant to the quality of such repair. Anyone who departs from the instructions in this program must first establish that neither personal safety nor the integrity of the repair of the vehicle is compromised by the choice of methods, tools, or supplies.

I-CAR does not endorse or recommend any brands or makes of vehicles, repair equipment and supplies or other products. The appearance of various makes and brand names in any I-CAR material is purely coincidental and is based on the availability of those products at the time of production.

All recommendations presented in this program are based upon research programs or upon tests conducted by laboratories, manufacturers, or selected collision repair facilities. If performed as outlined, these recommendations will provide the basis for a thorough, professional repair.

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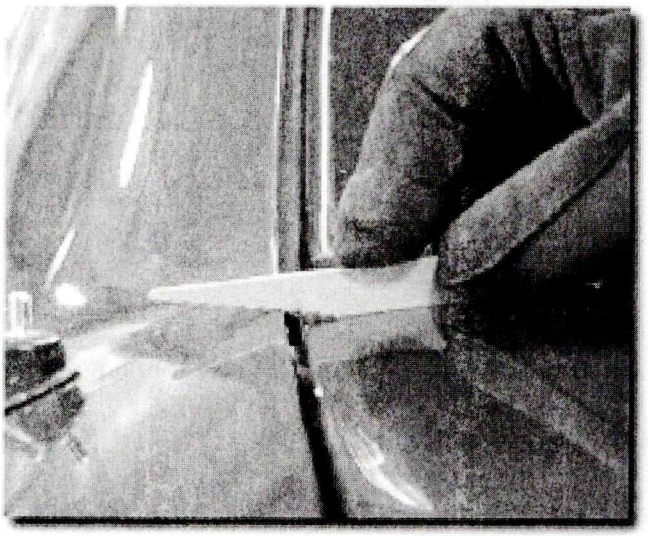
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MODULE 1–BOLTED EXTERIOR PANEL REPLACEMENT CONSIDERATIONS

Topic A. Panel Alignment

TRAINING PATHS
Select the Demonstration Icon found on screen A-1 of your CD-ROM for an example of the I-CAR recommended training paths.

EXTERIOR PARTS IDENTIFICATION
Refer to the Exterior Parts Identification hand-out and complete the Activity using screen A-2 of your Student CD-ROM as a reference.



A-3 A flushness gauge is used to compare this deck lid to the quarter panel.

Panel alignment plays a number of different roles. If the alignment between panels are incorrect, it may adversely affect the:

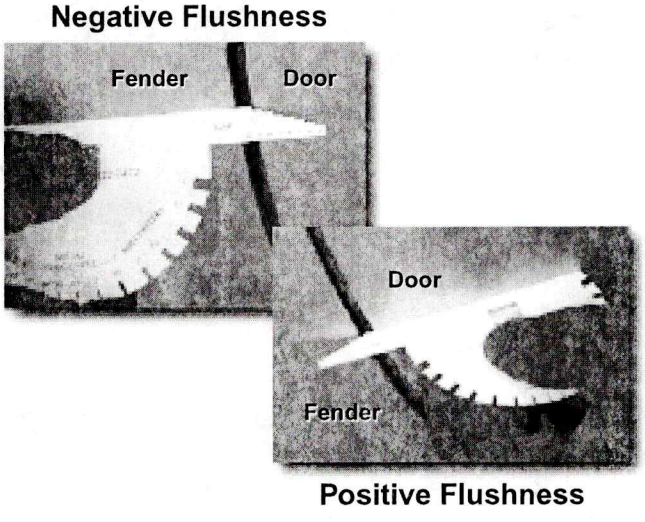
- appearance of the vehicle. This includes gaps and flushness. A gap is the width of an opening between panels and flushness is a difference in height between the two panels. This Program will use the term positive and negative flush when comparing panels.
- amount of effort required to open and close hoods, doors, and deck lids. If the gap between panels is tight, it may require more opening and closing effort than properly aligned gaps.
- amount of water leak and wind noise. Incorrect panel alignment is primarily responsible for leaks and noise.
- condition of the finish. If a door rubs on a fender, an adjacent door, or quarter panel every time it is opened, it will damage the finish.

There are gauges available to measure panel gaps and flushness.

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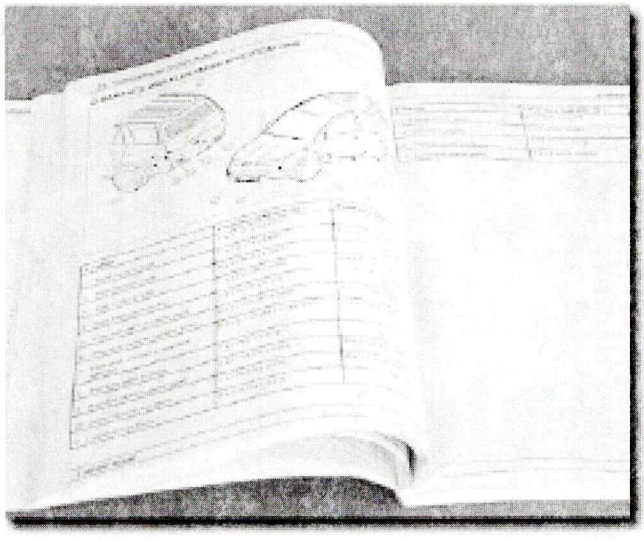
I-CAR PANEL GAP AND FLUSHNESS GAUGE

Select the Demonstration Icon found on screen A-3 of your CD-ROM for an example of the I-CAR Panel Gap And Flushness Gauge.



A-4 TOP: Negative flushness is when the fender is in from the door. BOTTOM: Positive flushness is when the fender is out from the door.

Positive and negative flushness are terms used to compare one panel to another. When checking flushness, start with the forward panel. Positive flushness from fender to door would mean that the fender is sticking out from the door. Negative flushness from fender to door would mean that the fender is inward from the door.



A-5 Panel alignment specifications may be found in some body repair manuals.

Panel alignment specifications from the vehicle maker:

- vary from part to part. There may be a different specification for the fender-to-hood gap when compared to the fender-to-door gap.
- may be found in a vehicle-specific body repair manual or service manual.
- are typically 3–8 mm for panel gaps and 0–2 mm for flushness. Some gap recommendations may be larger.

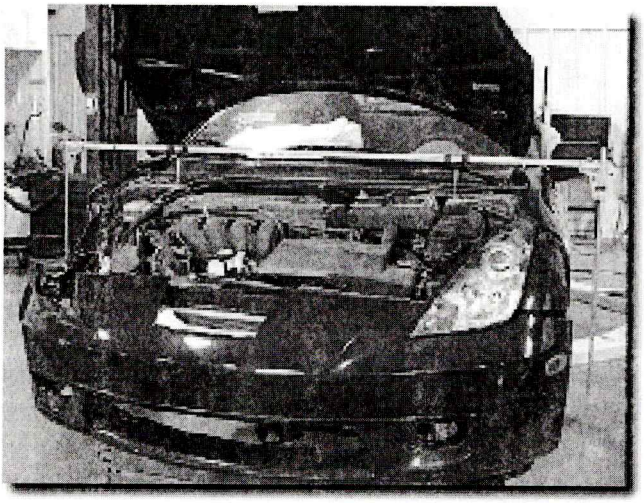
If there is no vehicle maker recommendation for panel gaps or flushness, compare the:

- panels to the opposite side of the vehicle.
- gaps from panel to panel. The gap between the front fender and front door should be similar to the gap between the front door and rear door or quarter panel.

BODY REPAIR MANUAL

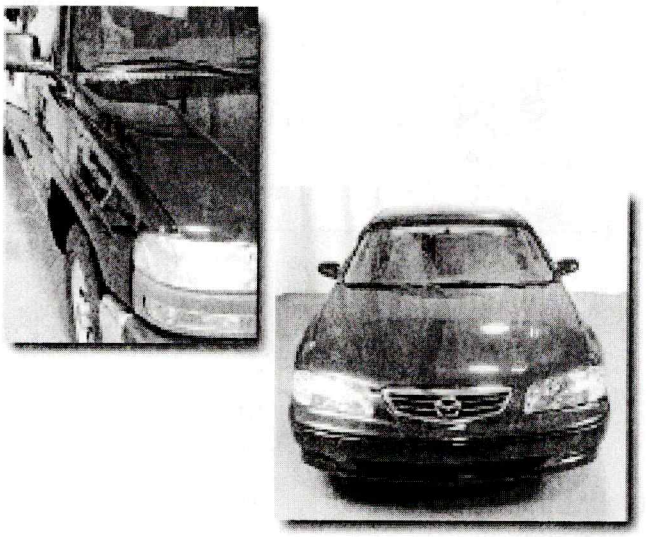
Select the Demonstration Icon found on screen A-5 of your CD-ROM for an example of a Body Repair Manual.

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A-6 Measuring the upperbody will verify that the structure is correctly aligned.

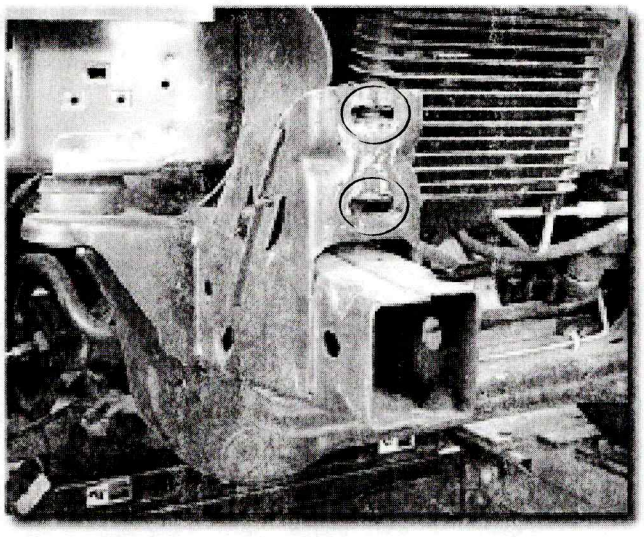
It is important to correctly diagnose the cause of the panel misalignment. The misalignment will either be caused by an out-of-specification vehicle structure or by the panel being installed out of alignment. To properly align panels, the vehicle structure must be correct. If the structure is not dimensionally correct, it will be difficult or impossible to achieve correct panel alignment.



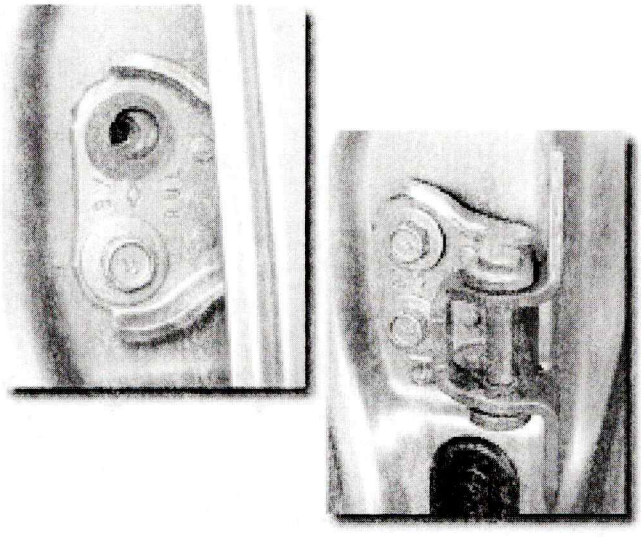
A-7 LEFT: A body-over-frame vehicle may have a bolted radiator core support. RIGHT: A unibody core support is usually welded to the vehicle structure.

If a bolted radiator core support is misaligned on a body-over-frame vehicle, it may give the appearance that the fender and hood are misaligned, but the hood to cowl is properly aligned. There may be no hood nor fender adjustments that can be made to correct the condition. The radiator core support will most likely need to be repositioned.

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A-8 The bumper mounting brackets on this truck are slotted for side-to-side adjustment.

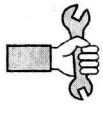


A-9 LEFT: The lack of paint on this door hinge can help during alignment.

Some of the different types of adjustments for bolted exterior panels include:

- slotted or elongated holes. These will be found on the parts or the hinges and allow for front-to-back movement on the vehicle structure and sometimes side-to-side movement.
- threaded mounting plates. These may also be called cage nuts. Threaded mounting plates are contained in an enclosed structure with some movement available. When a fastener is threaded and tightened into the mounting plate, it secures the hinge and the part together.
- adjustable stops. These are used for flushness alignment, particularly on hoods and deck lids. They are usually threaded and can be lowered or raised.
- shims. Shims are typically used for making height adjustments.

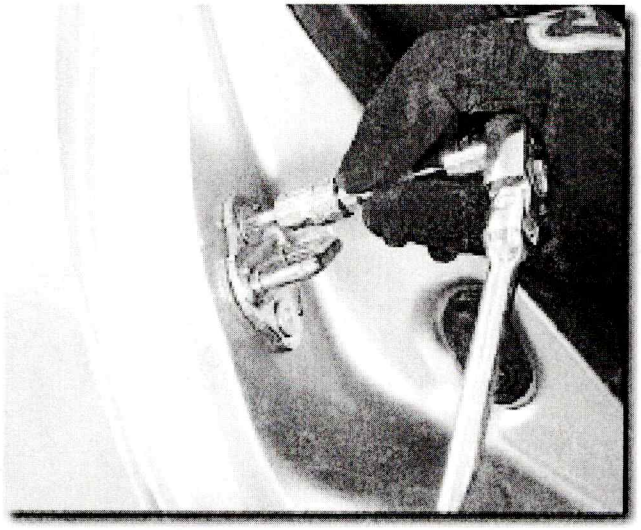
Note the finish condition around the mounting location. Because the vehicle was most likely finished with the panels attached, there will not be paint under the original mounting location. This will apply to the bracket mounting location on the vehicle and the fastener mounting location on the mounting bracket.



MOUNTING LOCATION FINISH CONDITION

Select the Demonstration Icon found on screen A-9 of your CD-ROM for an example of a panel mounting location finish condition.

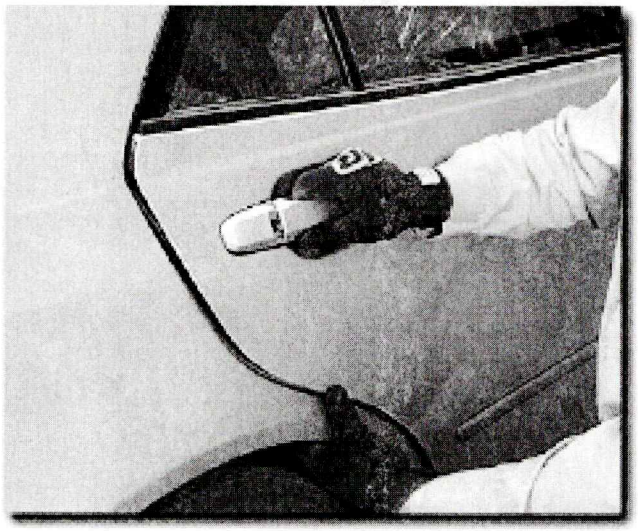
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A-10 A Torx® driver is used to remove this door striker.

Before installing replacement exterior panels, it may be helpful to remove the striker. Before removing the striker, check to make sure the attachment nut will not drop into the pillar. Removing the striker will allow the panel to open and close freely. This is not a required step, but may be beneficial. To align mechanically attached exterior panels:

- start with the panel closest to an undamaged welded panel when adjusting multiple panels.
- adjust multiple gaps on the same panel simultaneously. While fasteners are loosened, adjust forward-and-back, side-to-side, and top-to-bottom gaps whenever possible.



A-11 The opening and closing effort is checked to verify proper alignment.

To determine the correct amount of opening and closing effort, compare the effort required to the effort required on:

- the undamaged opposite side of the vehicle whenever possible.
- another undamaged vehicle.

When checking the opening and closing effort on a door, watch for the door dropping down or jumping up off of the striker.

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Topic B. Repair Preparation



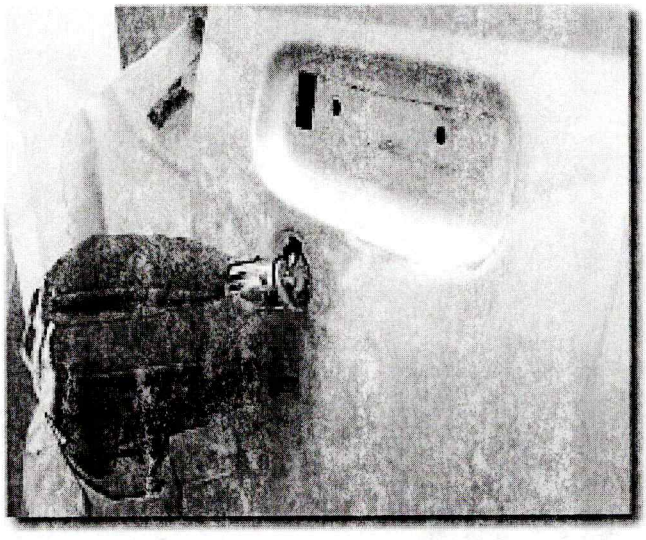
B-1 This plastic wheelhouse is removed to access hidden fasteners.

Before beginning repairs determine:

- if there are any undamaged adjacent panels that require complete or partial removal.
- which trim and hardware must be removed.
- if there are any other parts or accessories that require removal and installation (R & I) such as wiring inside of a door.
- if the panel requires removal for repair. This will be most common on a plastic part that requires a two-sided repair but has limited or no access to the panel backside.



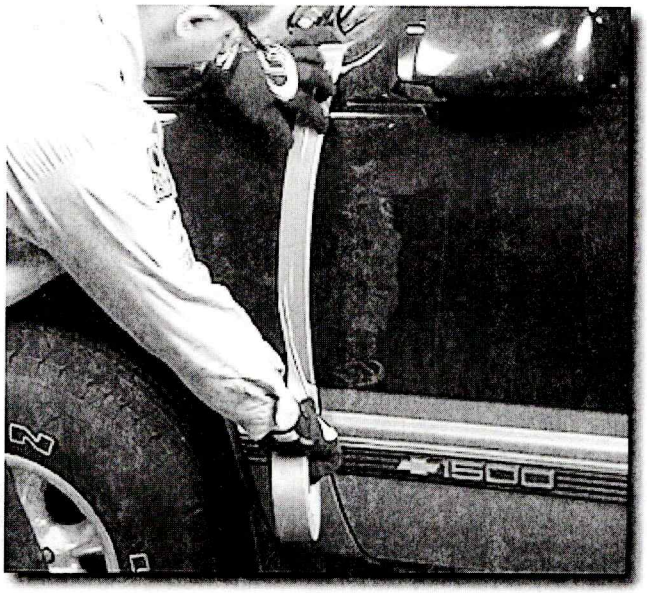
When removing doors, determine the location of side airbags and side airbag impact sensors, if equipped.



B-2 This lock cylinder is removed in preparation for refinishing.

It may be necessary to remove undamaged, adjacent parts to access hidden fasteners. It may also be necessary to remove moldings and door handles to allow for proper refinishing of parts that are being repaired. When removing undamaged, adjacent parts, store them in a clean, dry place to avoid damaging them.

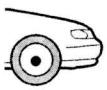
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B-3 Tape is used on the door panel edge to prevent paint chipping when the fender is removed.

One way to protect undamaged, adjacent panels is to carefully remove them and store them. Since this is not always practical:

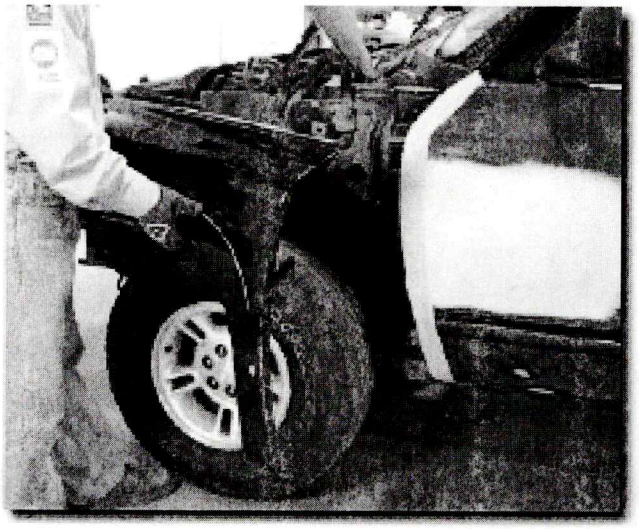
- adjacent part edges should be masked to avoid damage during part removal.
- use spark deflection paper to protect glass from any welding or cutting procedures. Glass damage by sparks will require replacement.
- use fender covers when leaning over the fender to access underhood parts or hinges.
- use blankets to cover glass when removing adjacent parts such as hoods and deck lids.



When storing vehicles outside, cover any openings that may expose the interior with plastic.

If parts are stored inside of the vehicle, it is critical that the seats be protected before placing the parts inside.

Topic C. Replacement Parts

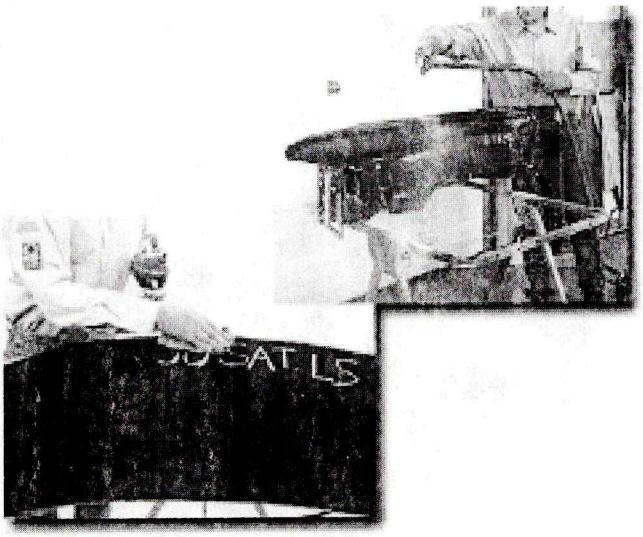


C-1 A recycled fender is temporarily installed for test-fitting.

When a replacement part is delivered, it must be inspected to verify that the correct part was ordered and shipped. This should be done before removing damaged parts whenever possible and before any edging operations are performed. Verifying the proper part includes comparing the replacement part with the damaged part for the same design, mounting locations, and any holes or openings for parts such as an antenna, side marker lamps, and emblems. Also inspect the replacement part for any shipping damage.

Before installing a replacement part, determine if the proper fasteners were provided with the part.

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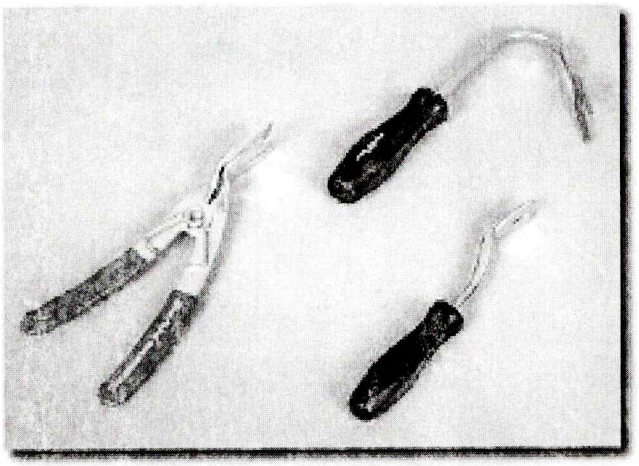


C-2 TOP: Soap and water are used to remove water soluble contaminants. BOTTOM: Wax and grease remover is used to remove the grease pencil labels on this recycled deck lid.

There are additional considerations for installing recycled parts. This includes:

- inspecting for any corrosion. Do NOT install recycled parts with corrosion that has caused pitting.
- verifying which parts can be transferred from the original part to the replacement part. This is important when installing recycled doors with different options than the original vehicle.
- repairing any minor damage and taking the appropriate steps to restore the corrosion protection.
- inspecting for any improper previous repairs.
- inspecting mounting locations for any cracks. This is especially important on composite parts. Composite parts with damaged mounting locations should NOT be installed.
- determining what steps will be required to prepare the replacement part for refinishing.
- anti-theft laws and record keeping requirements for installing recycled parts. These vary between each state or province. Check with local authorities for record keeping requirements.

Topic D. Tools And Storage



D-1 These tools can be used to remove a door interior trim panel.

The tools and equipment required for most bolted exterior panel removal will typically include:

- trim removal tools. This is especially true when removing doors. The door wiring must first be removed, which may require removal of the door interior trim panel.
- a socket set. The most common fasteners used for exterior panels are some type of hex-head bolts and/or nuts.
- screwdrivers. Although screwdrivers may not be commonly used for actually removing a panel, they will be required for trim and hardware removal such as door interior trim panels and fender flares.
- Torx® and inverted Torx® drivers. Torx® fasteners are becoming more common for many panel attachments.
- fastener storage containers. It is important to properly mark and store fasteners to ensure that they are replaced in the proper location.

An assistant may be required for removal of some parts to avoid damaging adjacent panels and glass.

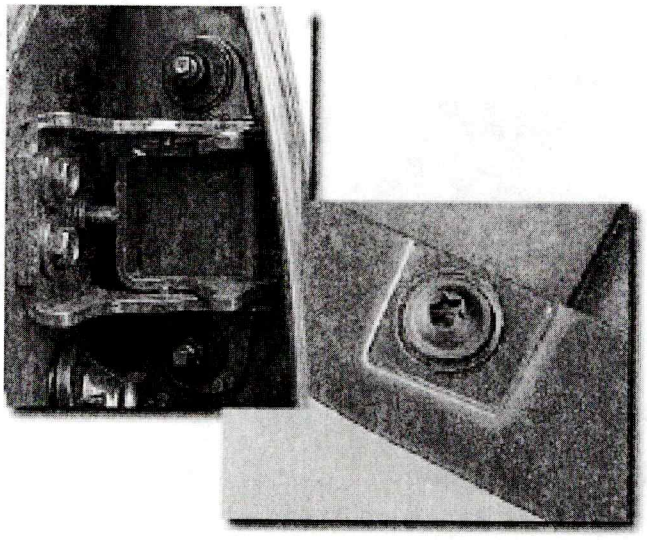
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D-2 When disassembling a vehicle, a parts storage rack will help keep fasteners and parts organized.

There are a variety of parts racks available for part storage. Some of these include:

- a utility rack. There are a few different types of utility racks available. Some may be stationary such as a folding utility rack. Others may be adjustable with arms that can be rotated and moved in and out. These types can be adjusted to fit a number of different parts.
- a parts caddy. These can be used to store a variety of parts as well as any tools required for removal. There may also be fastener containers available that can be attached to the parts caddy for fastener storage.
- bumper stands. Bumper stands are commonly used for refinishing bumpers off of the vehicle. Bumper stands can be used when repairing bumpers that require a two-sided repair. Bumper stands can also be used when refinishing panels off of a vehicle.
- bumper stations. Bumper stations can store multiple bumpers.
- a door rack or door hanger. These can be used for removal and installation of door shells when there is not an assistant available. These also work well when aligning doors following installation.
- truck bend stands. These can be used to hold a truck bed while it is removed from the vehicle.



D-3 LEFT: Flange nuts are used to attach this door shell to the hinge. RIGHT: A washered Torx® bolt is used to fasten this bumper cover to the headlamp mounting panel.

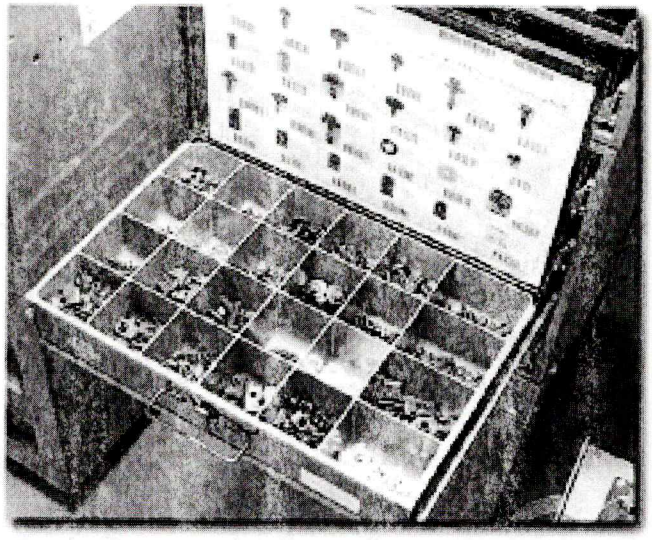
Some common types of fasteners that are used for exterior panel installation include:

- flange bolts that are threaded into either a stationary or movable threaded backing plate.
- flange nuts that are threaded onto a stationary threaded stud.
- plastic retaining clips and push pins. These are usually used to install bumper covers.
- sheet metal screws.

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D-4 Plastic bags and a marker will help keep fasteners organized.



D-5 It is helpful to have an inventory of common replacement fasteners.

Fastener organization is one aspect of panel replacement that is sometimes overlooked even though it is very important. Good fastener organization can increase productivity and reduce frustration when installing new parts or reinstalling parts that have been removed during repair procedures. Poor fastener organization can lead to extra or insufficient fasteners following repairs as well as the potential for installing fasteners in the incorrect position. Some ways to store reusable fasteners include:

- using plastic bags. The plastic bags can then be marked accordingly for ease of identification.
- attaching the fastener to a part if, possible. If a bolt or nut is removed and reinstalled on the part, there is no doubt about its correct placement.
- using storage bins and labeling the bin accordingly.
- using masking tape to identify fastener use.

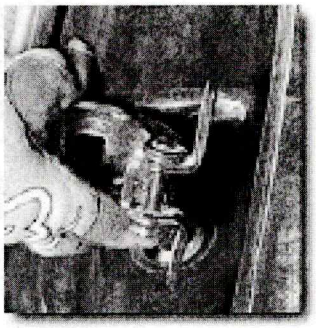
Since fasteners may be damaged during a collision or during collision repairs, it may be beneficial to have an inventory of common replacement fasteners.

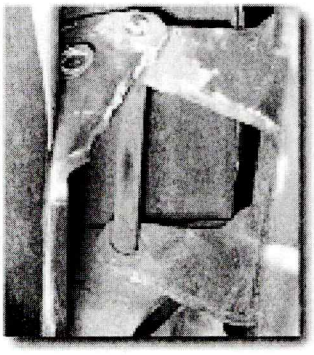
Some fastener considerations that must be taken into account include:

- the use of one-time fasteners.
- refinishing replacement or reinstalling painted fasteners in the proper location to duplicate the original appearance.
- the fact that some fasteners may require paint touch-up following installation.
- the torque specification. The service manual may have the recommended torque specifications for bolted exterior panels.
- missing fastener considerations. Missing fasteners should be replaced with the same type and size as the original.
- composite panel attachment concerns, such as thermal expansion and torque sequence.

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Topic E. Door Hinges

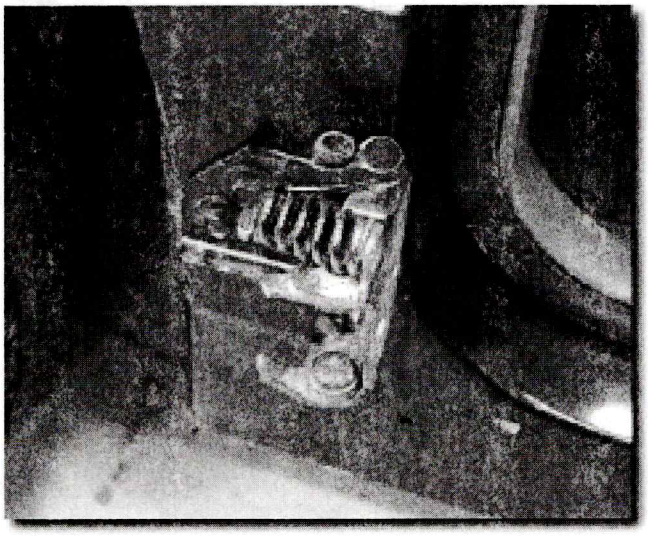




E-1 LEFT: This hinge uses a nonremovable pin as a pivot point. RIGHT: This hinge has pins and bushings that can be replaced.

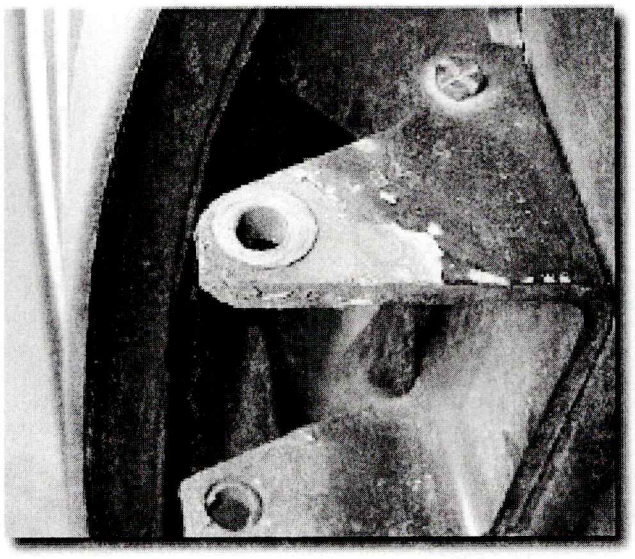
Hinges used to fasten movable exterior body panels to the body structure may have:

- replaceable pins and bushings.
- rivets that cannot be replaced.



E-2 This hinge has rivets that the door pivots on.

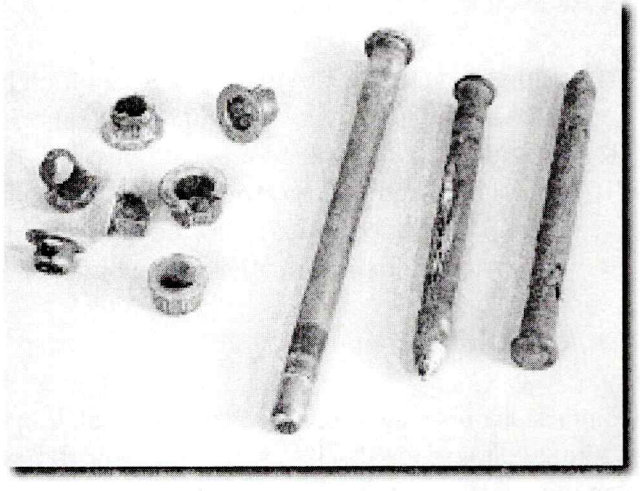
Hinges that use a rivet as a pivot point are bolted to the panel and body structure. Generally, these hinges are not repairable and must be replaced when damaged or worn.



E-3 Notice that the bottom bushing is broken and will require replacement.

On vehicles with replaceable pins and bushings, the hinge may be:

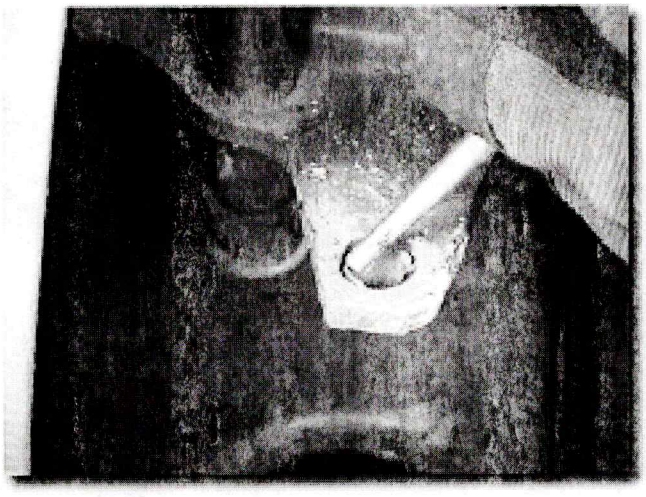
- bolted to the panel.
- bolted to the vehicle structure.
- welded to the panel.
- welded to the vehicle structure.



E-4 These are pins and bushings that were worn to the extent that they required replacement.

The pins and bushings are a pivot point that allows the panel to open and close. Depending on the amount of use, pins and bushings may be a wear item. Routine maintenance such as lubrication can prevent premature failure.

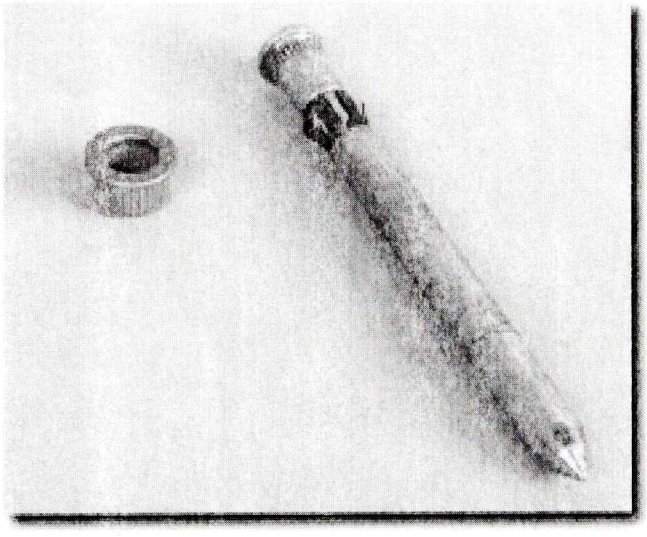
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E-5 A punch and a hammer can be used to remove worn bushings.

When the door pins and bushings need to be replaced, the panel will usually drop off of the striker, indicating that the pins and bushings are worn. When replacing pins and bushings:

- it may be necessary to remove the door spring.
- the panel should be supported.
- the adjacent panels should be protected to prevent damage.
- the pin can be driven out with a pin driver.
- the panel can be removed from the vehicle structure. It may also be necessary to disconnect the wiring to give enough room to replace the bushings.
- the worn bushings can be driven out of the hinges.



E-6 A replacement pin that has a retainer clip will prevent the pin from falling out of the hinge.

When replacing pins and bushings:

- the new bushings are installed with a bushing driver.
- the panel is reinstalled.
- the new pins are installed. The new pins may come with a pin retainer that must be installed also.
- the door spring is reinstalled.

REPLACING WORN PINS AND BUSHINGS

Refer to screen E-7v of your CD-ROM for a video on worn pin and bushing replacement.

Topic F. Review

REVIEW

Refer to screens F-1 and F-2 of your CD-ROM for review questions on bolted exterior panel considerations.

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Exterior panel repair and replacement/steel and plastic module #1 quiz

This is a preview of the draft version of the quiz

Started: Nov 8 at 10:38am

Quiz Instructions

Question 1 — 5 pts

Technician A says that an exterior panel may have adjustments for flushness.

Technician B says that panel gaps can be checked with a gap gauge.

WHO IS RIGHT?

- ○ A only
- ○ B only
- ○ Both A and B
- ○ Neither A nor B

Question 2 — 5 pts

An incorrect panel gap can cause all of these EXCEPT:

- ○ wind noise
- ○ water leaks
- ○ Damage to the finish
- ○ poor fuel economy

Question 3

5 pts

Replacement parts should be checked to verify that all of these are correct EXCEPT:

- ○ design
- ○ mounting hole location
- ○ side of the vehicle
- ○ which type of refinish material was used

Question 4

5 pts

Technician A says that a hood may be adjusted for flushness to the fender by an adjustable hood stop.

Technician B says that incorrect fender to hood flushness could be caused by structural misalignment.

WHO IS RIGHT?

- ○ A only
- ○ B only
- ○ Both A and B
- ○ Neither A nor B

Question 5

5 pts

When fitting a bolted panel a helpful tip is to:

- ○ tighten the front bolts first
- ○ tighten the rear bolts first
- ○ check the finish around the mountain location
- ○ alaign for flushness and then for correct panel gaps

Question 6

5 pts

When aligning a series of bolted panels, start with:

- ○ The forward most panel
- ○ The panel closest to the damage area
- ○ The first panel damaged in the collision
- ○ The panel closest to the nearest undamaged welded panel

Question 7

5 pts

Technician A says that riveted hinges can be repaired by replacing the pins and bushings.

Technician B says that riveted hinges should be replaced when worn.

WHO IS RIGHT?

- ○ A only
- ○ B only
- ○ both A and B
- ○ Neither A nor B

Question 8

5 pts

All of these can be used to protect adjacent panels and glass from from damage when removing a panel EXCEPT:

- ○ duct tape
- ○ blankets
- ○ spark deflection paper
- ○ liquid masking

Question 9

5 pts

The first step when replacing a part is to:

- ○ refinish the jamb
- ○ test fir the panel
- ○ drill all necessary holes
- ○ verify that the part is correct for the application

Question 10

5 pts

Technician A says that fasteners that are removed and can be reused for installation can be labeled and stored in a clear plastic bag.

Technician B says that damaged fasteners should be replaced with the same size and shaped fastener as the original.

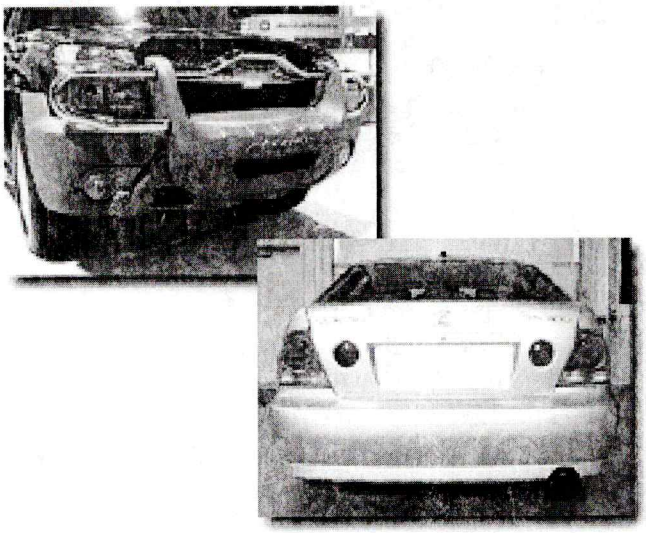
WHO IS RIGHT?

- A only
- B only
- Both A and B
- Neither A nor B

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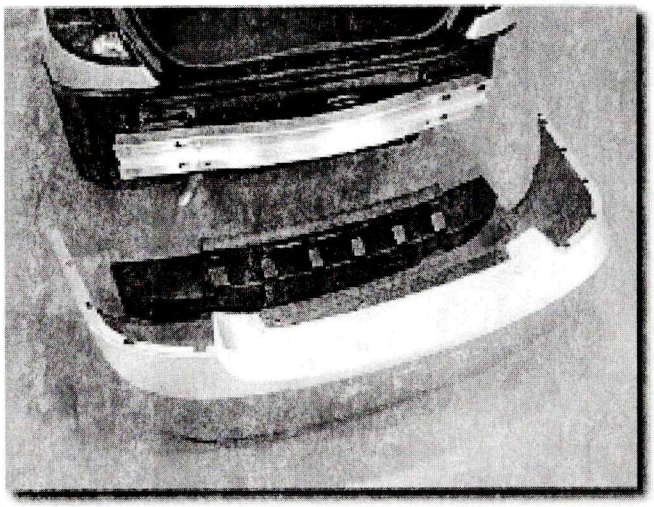
Topic A. Bumpers

BUMPER SYSTEM IDENTIFICATION
Refer to the Bumper System Identification handout and complete the Activity using screen A-2 of your Student CD-ROM as a reference.



A-3 TOP: Many bumper assemblies have attached accessories. BOTTOM: This rear bumper system has a plastic bumper cover and a tailpipe opening.

Many of today's bumper assemblies are designed to withstand very minor collisions with limited damage to the vehicle. In a moderate to severe collision, bumper assemblies assist in collision energy management through the use of energy absorbers and bumper reinforcements. It may be difficult to make a complete damage analysis of a bumper assembly during initial inspection due to damage that may be hidden behind the fascia or bumper cover.



A-4 This bumper assembly has an aluminum reinforcement, a foam energy absorber, and a plastic cover.

Bumper assembly types include:

- steel bumper systems. These are most common on trucks and SUVs.
- a combination of steel and plastic. This may include a painted steel bumper with a plastic fascia attached below it.
- plastic bumper covers or fascias. These have a plastic bumper cover over an energy absorber and bumper reinforcement. Bumper reinforcements may be made of ultra-high-strength steel (UHSS), aluminum, or a reinforced composite.

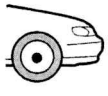
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A-5 This bumper has a plastic air dam attached to it.

When replacing a complete or partial bumper assembly, it may be necessary to remove some adjacent parts. This may include, but is not limited to:

- grilles or grille inserts.
- headlamps and driving lamps. Headlamps may have to be removed to access fasteners. If a driving lamp is installed on a bumper assembly, it may not require removal, but will have to be disconnected for bumper removal.
- air dams.
- the fender. Complete removal may not be required, but partial removal may be necessary to access hidden fasteners.



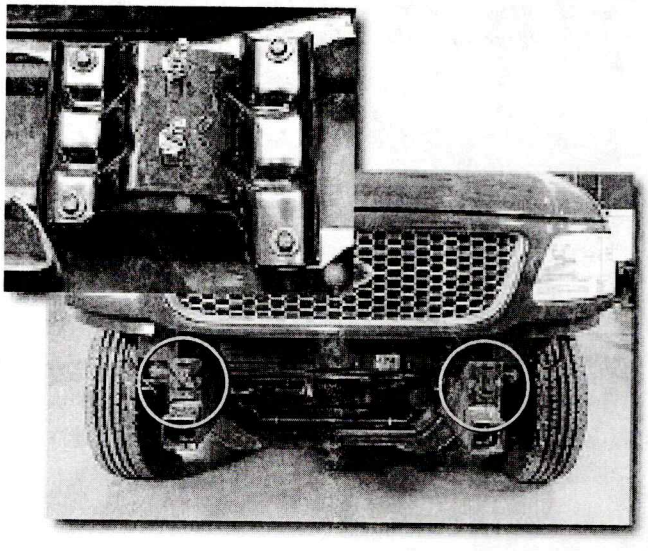
Properly identify and store the removed fasteners for proper reinstallation.

Topic B. Steel Bumpers



B-1 Trucks commonly use a steel bumper with plastic covers and air dams.

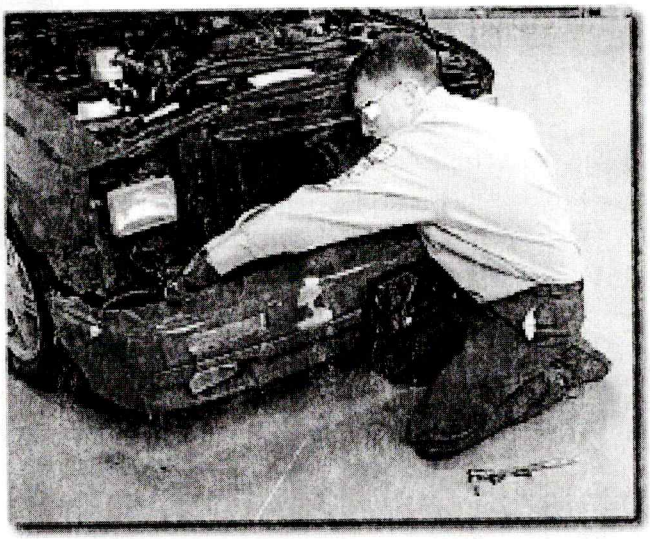
Steel bumpers are most often found on body-over-frame vehicles such as trucks and SUVs. Some steel bumpers may also have a plastic bumper cover or air dam attached to it. Some rear bumpers have a trailer hitch attached to it. These should be inspected for damage to the mounting area.



B-2 TOP: This bracket attaches the steel bumper to the frame. BOTTOM: These brackets are welded to the frame assembly.

Bumper brackets are used to attach the bumper to the frame. Adjustable bumpers are usually attached to the frame with bolts and U-clips. Bumper brackets are often collapsible and may be responsible for collision energy management and may affect airbag timing.

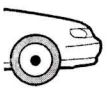
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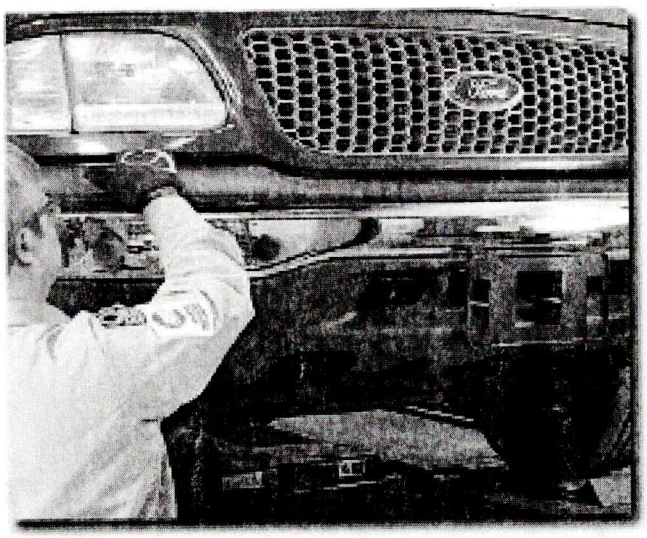
B-3 The turn signal wiring harness is disconnected so that this bumper can be removed.

To remove a steel bumper:

- protect adjacent panels to prevent damage.
- disconnect any attached lighting or accessories such as driving lamps. It may be necessary to remove the air dam for bumper removal.
- it may be necessary to remove some trim pieces or other attachments to gain access to hidden fasteners. If there are no hidden fasteners, trim may be removed following bumper removal.



Properly identify and store the removed fasteners for proper reinstallation.

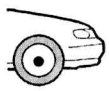


B-4 Use caution when removing bumpers to prevent damage to adjacent panels.

Continue the steel bumper removal by:

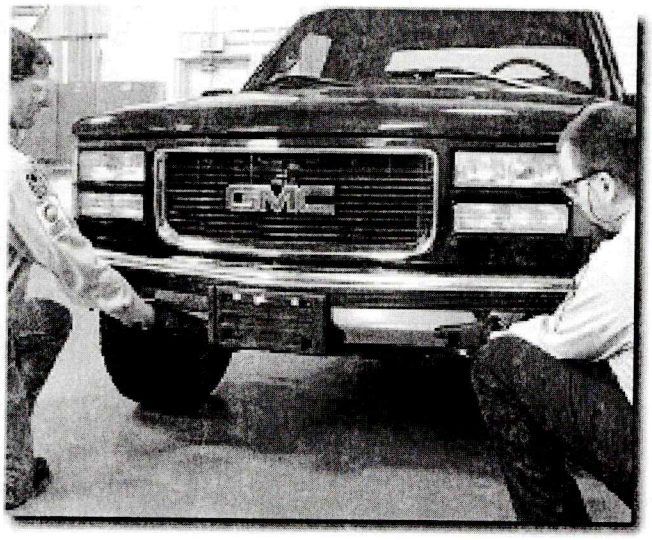
- removing the fasteners that attach the bumper to the vehicle. Depending on access, determine if the bumper will be removed from the bumper bracket or if the bumper bracket will be removed from the frame. When removing the bumper fasteners, note the location of mounting hardware. This will be beneficial when installing the replacement bumper.
- having an assistant help remove the bumper, if required.

After a steel bumper removal, closely inspect the bumper brackets and determine if the brackets and fasteners will require replacement or if they can be reused.



Properly identify and store the removed fasteners for proper reinstallation.

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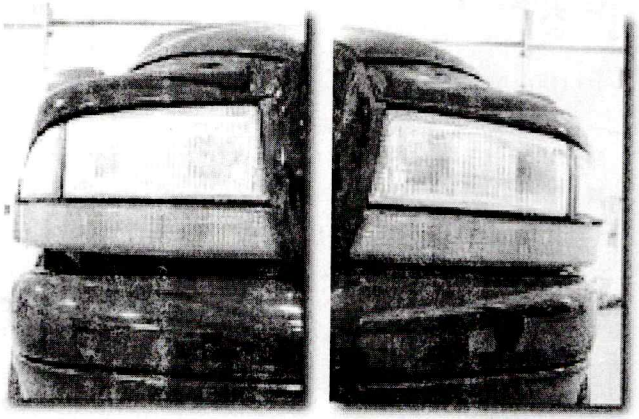
B-5 An assistant may be required when installing a bumper.

To install a steel bumper:

- install any trim that will not be accessible after bumper installation.
- protect adjacent panels. Since the bumper will usually be installed following repairs and refinishing, it is important to not damage the fenders. Masking tape or protective blankets may be used.
- use an assistant to help with installation to avoid damaging the bumper or adjacent panels, if required.
- temporarily install the fasteners based on the original location. Look for signs of where the fasteners were previously installed, such as missing paint.
- verify lamp operation, if applicable before permanently installing the fasteners.
- adjust the bumper as required.

When a replacement part arrives, verify that the replacement part is the correct one. Inspect the replacement along with the original noting the location of lamp openings and trim attachment locations. Also verify that all of the required replacement parts were ordered and delivered. A two-piece steel bumper with an attaching plastic fascia typically will not be ordered as an assembly.

Do NOT install recycled steel bumpers that have existing damage or corrosion that has caused pitting. Also inspect the finish or the chrome when receiving a recycled steel bumper.



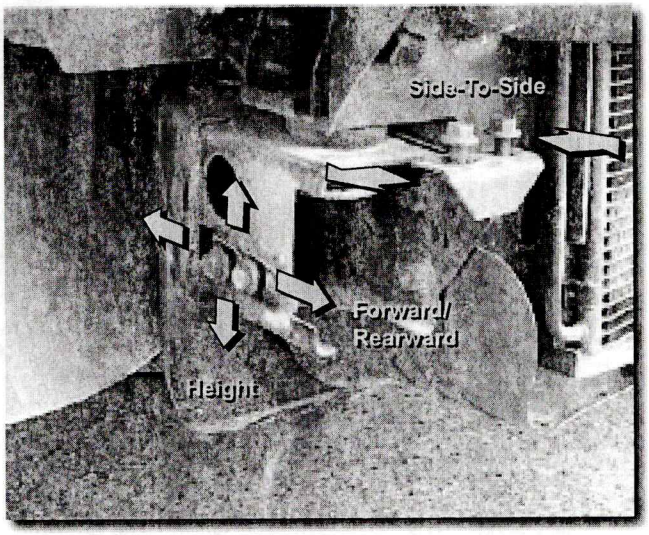
B-6 This bumper will have to be adjusted so that the gaps between the turn signal lamps and the bumper are consistent from side-to-side.

When adjusting a steel bumper:

- inspect the gaps from the bumper to the fenders, headlamps, and grille. The gaps should be uniform from side-to-side.
- filler or closeout panels should be installed to ensure proper fit.
- it may be necessary to adjust a bolted radiator core support for proper bumper alignment.
- an assistant may be helpful for raising and lowering the bumper while tightening.

After the bumper is aligned, any remaining trim can be reinstalled. Torque the steel bumper to specification when available.

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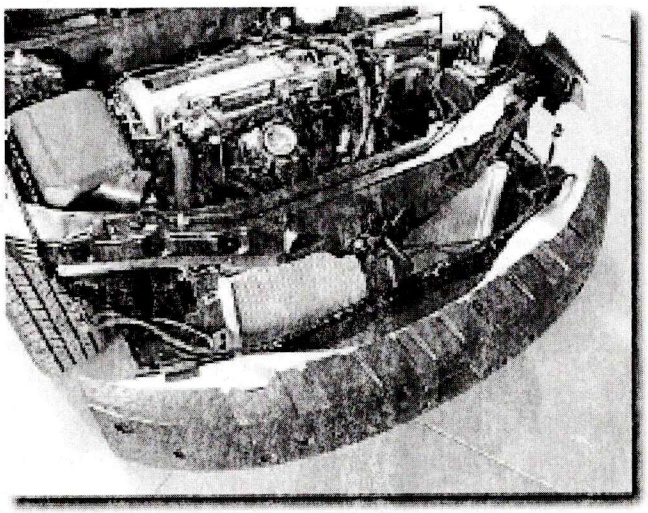
B-7 On this body-over-frame vehicle, adjustments are in the form of slotted holes.

Depending on the bumper, bumper brackets, and frame construction, steel bumper adjustments may:

- be limited.
- include height.
- include forward and rearward movement.
- include side-to-side movement.

STEEL BUMPER REPLACEMENT
Refer to screen B-8v of your CD-ROM for a video on replacing a damaged steel front bumper on a pickup truck.

Topic C. Bumper Assemblies



C-1 This foam energy absorber is attached to the bumper reinforcement with plastic clips.

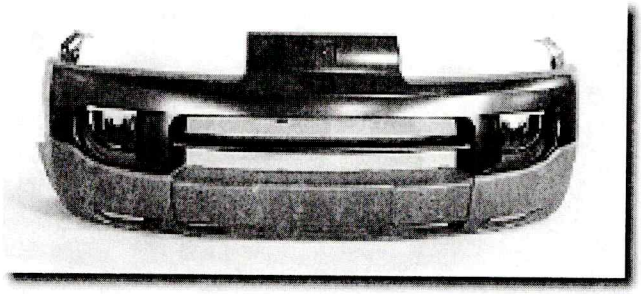
Bumper assemblies like those found on unibody and some body-over-frame vehicles are typically made up of:

- a plastic bumper cover or fascia.
- one or two energy absorbers.
- a bumper reinforcement.

Some bumper covers or fascias may have impact strips on them. Impact strips are the 25–50 mm (1–2") wide strips around the bumper cover or fascia. Inspect the damaged bumper cover to determine if the replacement part impact strips will require refinishing.

Some bumper covers and grilles are one assembly.

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C-2 Replacement plastic bumper covers will require refinishing before installation.

Bumper covers or fascias:

- are usually made of some type of plastic. Some are refinished by the vehicle maker, and some are color-impregnated.
- are cosmetic. Although bumper covers may have some energy absorbing qualities, they are typically a cosmetic panel.
- are designed to allow for airflow into the engine compartment.
- may have driving, or fog, lamps or side-marker lamps attached.
- will usually require removal for a two-sided repair. Even if the backside has limited access, it may be beneficial to remove the bumper cover for repairs and refinishing.

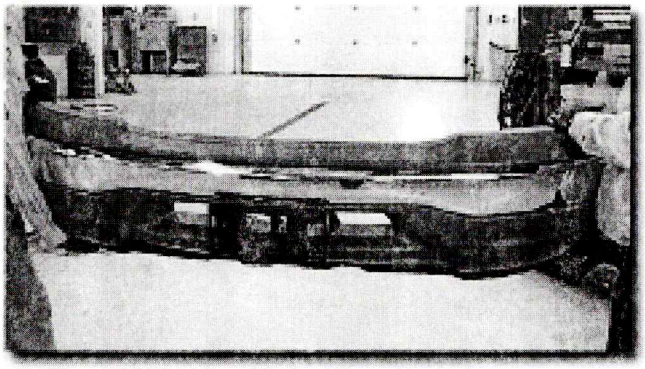


C-3 A rear bumper cover may have an opening for a trailer hitch.

Similar to front bumper covers, rear bumper covers will have energy absorbers and a bumper reinforcement. Other considerations for rear bumper covers include:

- the license plate mounting area and lighting associated with it.
- the condition of the step pad when applicable.
- verifying attachment locations and that the part is correct for the vehicle on which it will be installed.

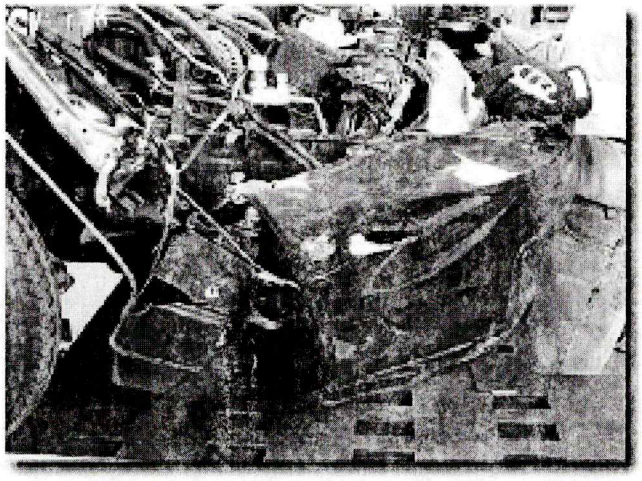
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C-4 Attachments to a steel bumper may include an air dam, a license plate bracket, and a cover.

Depending on the vehicle, some bumper or fascia attachments may include:

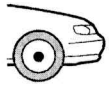
- impact strips. Impact strips may be designed into a bumper cover to reduce damage caused by bumping into an object.
- driving or fog lamps.
- grille inserts. Some grilles are separate from the bumper cover, some are molded into the bumper cover, and some are mechanically attached to the bumper cover.
- an air dam or air deflector underneath the bumper cover.



C-5 After removing this bumper cover, any hidden damage to the foam energy absorber will be revealed.

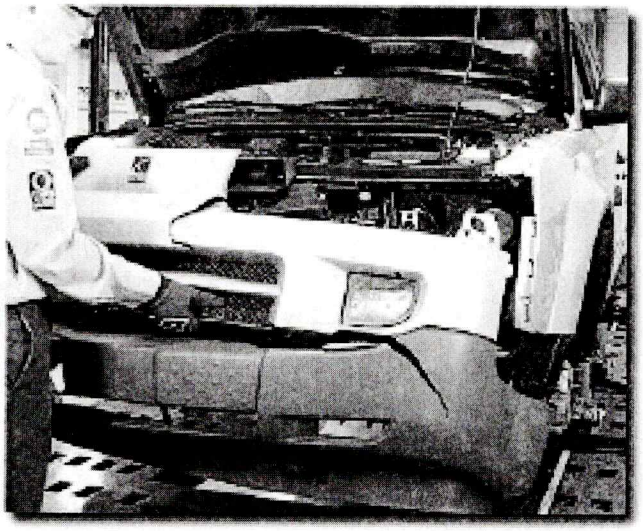
To remove a front or rear bumper cover or fascia:

- disconnect any wiring that is attached to the bumper cover.
- remove any required attachments for access to fasteners.
- remove the fasteners that attach the bumper cover to the bumper reinforcement. To avoid damaging plastic retaining clips, specialty tools may be required. Undamaged fasteners should be labeled and stored for reinstallation.



Properly identify and store the reusable fasteners for proper reinstallation.

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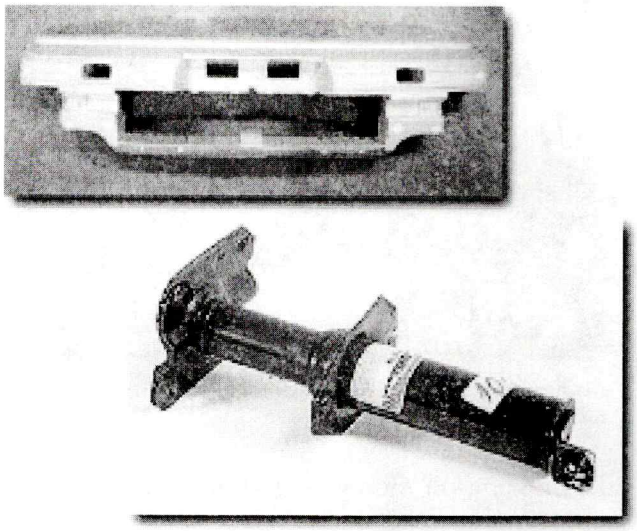


C-6 Due to the extent of damage, this bumper cover will be replaced.

When the fasteners have been removed, the bumper cover can be removed from the vehicle. If repairs are to be made, the type of plastic can be identified. Once all of the repairs have been completed on the vehicle, the bumper cover can be discarded. Before discarding, make sure that all parts have been removed such as license plates, clips, etc.



Bumper exchange companies will usually pick up damaged bumpers and repair them for reuse. This prevents them from going to a landfill.



C-7 TOP: This foam absorber will fit inside of the bumper cover. BOTTOM: This piston-type energy absorber is bolted to the rail of a unibody vehicle.

With the bumper cover removed, the energy absorber will be visible. Common types of energy absorbers include:

- foam. Foam energy absorbers are often made of polypropylene. Some vehicle makers have repair recommendations for minor damage to these types of energy absorbers.
- plastic eggcrate or honeycomb. If this type of energy absorber is stretched, but there are no breaks in it, it may be repairable with heat.

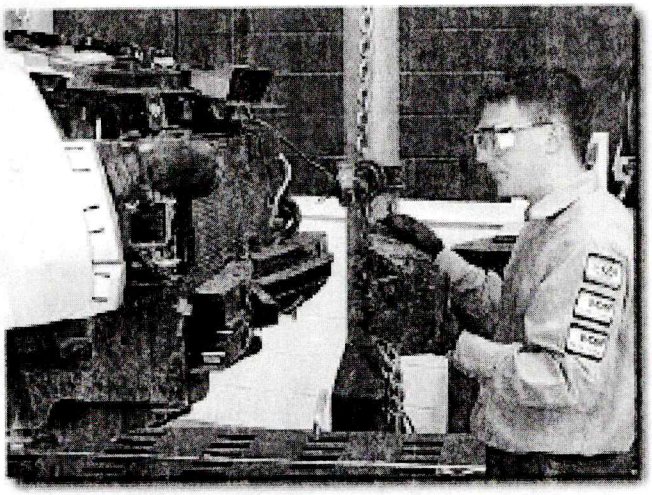
Although no longer common, there are also piston-type energy absorbers on some bumper systems.

Because a bumper cover may return to its original shape following a collision, damage to the energy absorber may not be evident during initial damage analysis.



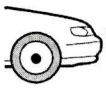
Piston-type energy absorbers may contain pressurized gases that can explode if heated.

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C-8 After removing this foam energy absorber, damage to the reinforcement is revealed.

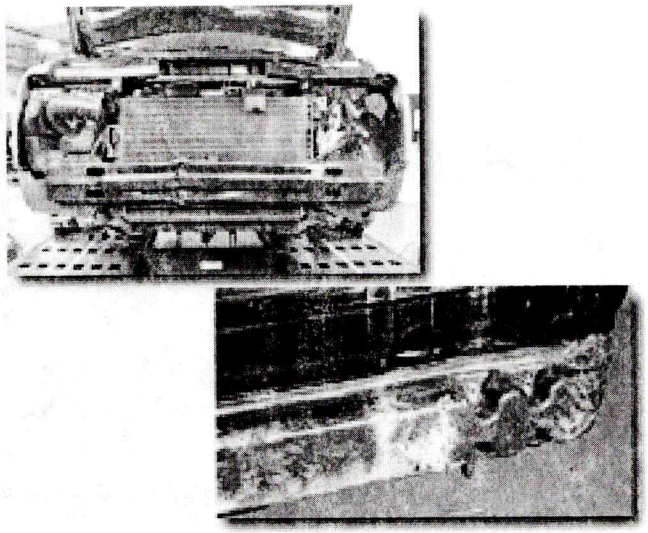
To remove an energy absorber, it should be unbolted or unclipped from the bumper reinforcement. If the energy absorber is unrepairable, it should be discarded.



Properly identify and store the removed fasteners for proper reinstallation.



When discarding a piston-type energy absorber, the fluid should be drained by drilling a 3 mm (⅛") hole. Follow local regulations for the disposal of hydraulic fluid.

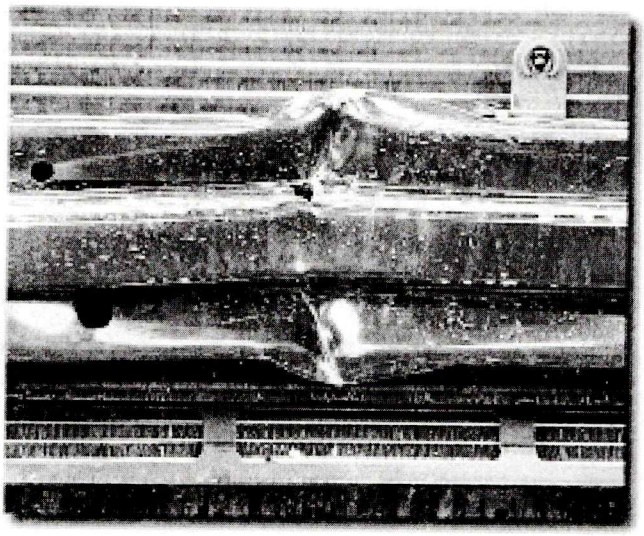


C-9 TOP: The bumper reinforcement prevented damage to this air conditioning condenser. BOTTOM: Some bumper reinforcements are made of a reinforced composite material.

With the energy absorber removed, the bumper reinforcement, or impact bar, is visible. The bumper reinforcement attaches the bumper cover and energy absorber to the lower rails on a unibody vehicle. Bumper reinforcements are very strong and assist in collision energy management. Bumper reinforcements may be made of:

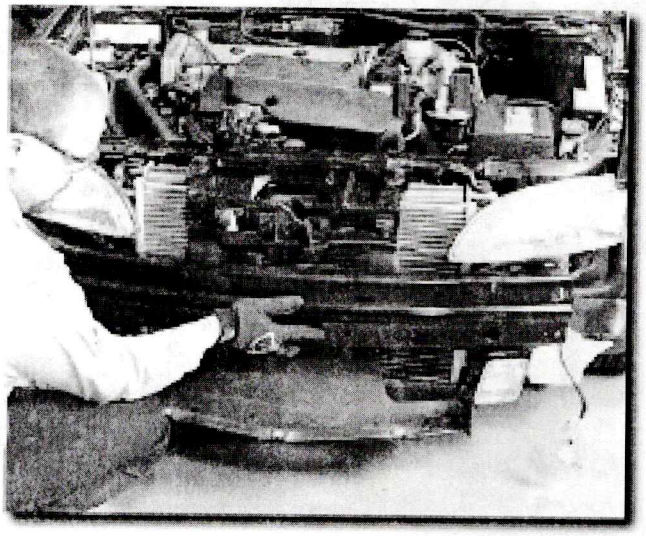
- UHSS.
- reinforced composite material.
- aluminum.

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C-10 Bumper reinforcements are usually not repairable. This one will require replacement.

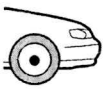
There may be hidden damage to the bumper reinforcement that is not visible with the bumper cover installed. Most bumper reinforcements are removed by unbolting it from the mounting area on the lower rail. Damaged bumper reinforcements should not be repaired.



C-11 The bumper reinforcement on this vehicle is being replaced.

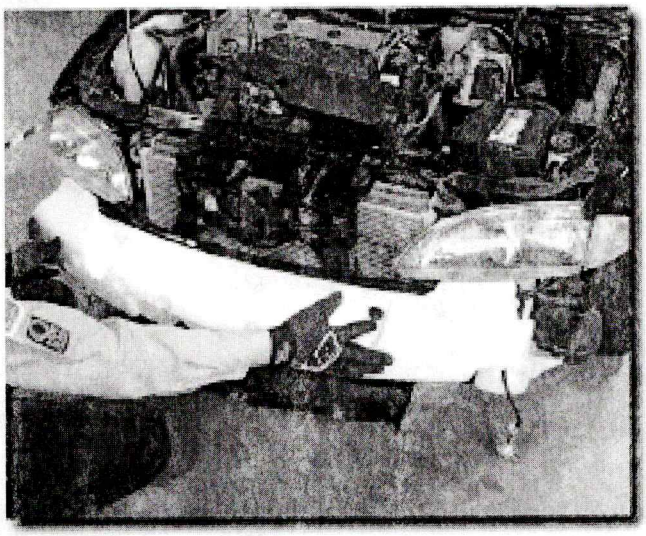
To install a bolted bumper reinforcement:

- refinish first if required. Bumper reinforcements that are visible through the bumper cover or fascia may require refinishing. To determine if the replacement bumper reinforcement should be refinished, inspect the damaged reinforcement.
- install the reinforcement in place and temporarily install the absorber and bumper cover.
- align the bumper reinforcement, if adjustable.
- tighten the fasteners to the recommended torque specification.



Do NOT install recycled bumper reinforcements that are damaged or have corrosion that has caused pitting.

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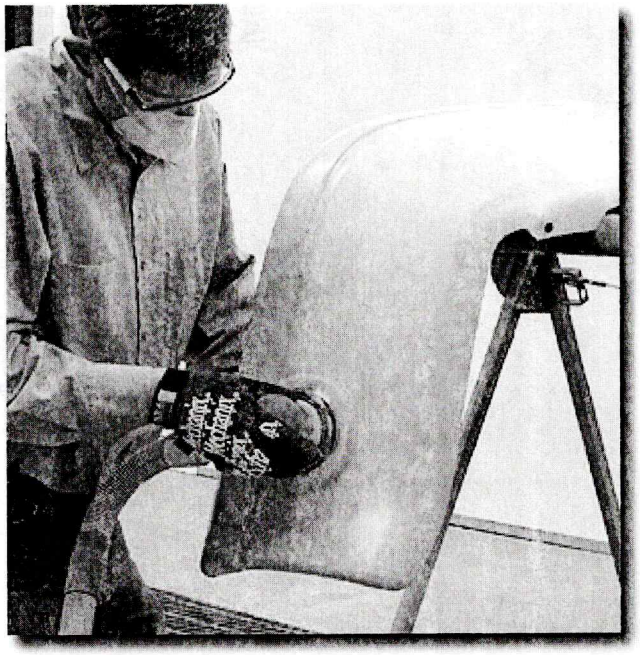
C-12 A foam energy absorber is installed on this bumper reinforcement.

Piston-type energy absorbers are installed to the rail before the bumper reinforcement. The absorber is aligned and the fasteners are tightened to the correct torque specification.

Foam or plastic energy absorbers are aligned and installed on the bumper reinforcement using the correct fasteners. Tape can be used to hold a friction-type foam absorber in position while the bumper cover is installed.

Do NOT install recycled piston-type energy absorbers with leaks, indication of previous collapse, or corrosion on the piston or tube that has caused pitting.

Do NOT install foam or eggcrate-type energy absorbers that have missing pieces, damaged mounting locations, or evidence of improper previous repairs.



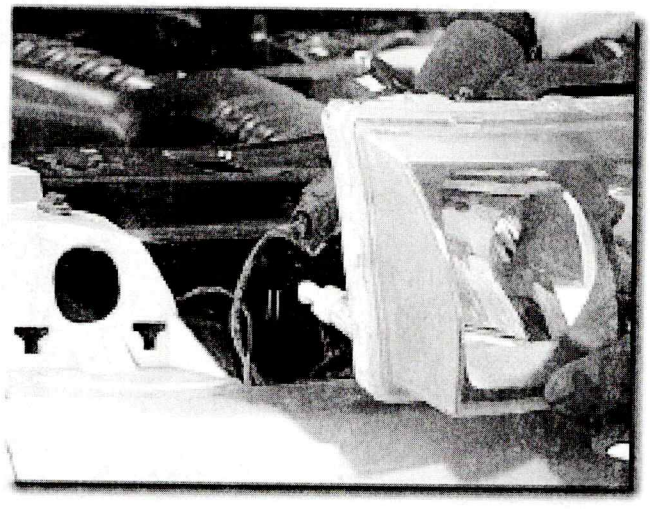
C-13 This bumper cover is sanded in preparation for refinishing.

After installing the bumper reinforcement and energy absorber, the bumper cover or fascia can be installed. Steps for installing a bumper cover include, but are not limited to:

- refinishing the replacement part. This should be done off of the vehicle to ensure complete coverage on areas that may be covered when the bumper is installed.
- installing any moldings, brackets, or lamps that have fasteners that cannot be accessed following installation of the bumper cover.
- installing the bumper cover or fascia and inspecting the alignment. Typically, there will be limited adjustment available.

Do NOT install plastic bumper covers or fascias that have unrepairable damage, damaged mounting locations, or evidence of improper previous repairs.

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C-14 After the bumper cover is installed, the headlamp can be reinstalled.

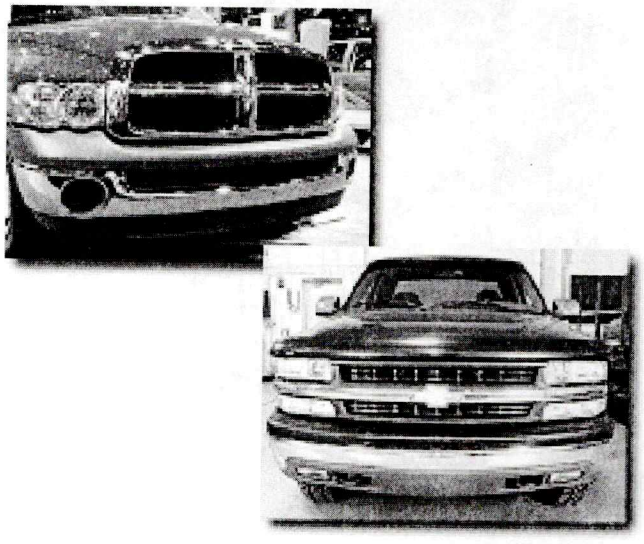
Complete the bumper cover installation by:

- reconnecting any electrical connectors and verifying that they operate properly.
- installing the required fasteners. These will usually be some design of plastic push pin, but may also include screws or bolts. Torque to specification whenever a specification exists.
- installing any additional trim as required such as moldings, license plate mounting brackets, and step plates.

BUMPER SYSTEM INSTALLATION

Refer to screen C-15v of your CD-ROM for a video on removing and installing a bumper system assembly including the bumper cover, energy absorber, and reinforcement.

Topic D. Grilles And Headlamp Mounting Panels

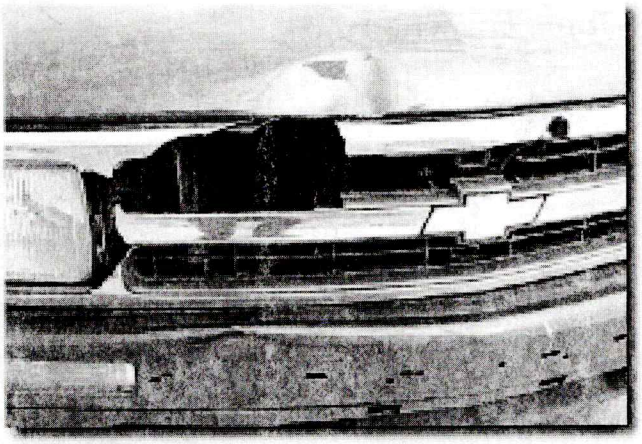


D-1 TOP: This grille is attached to the hood with a steel bracket. BOTTOM: This grille is attached to the radiator core support.

Grilles allow for airflow into the engine compartment and may be:

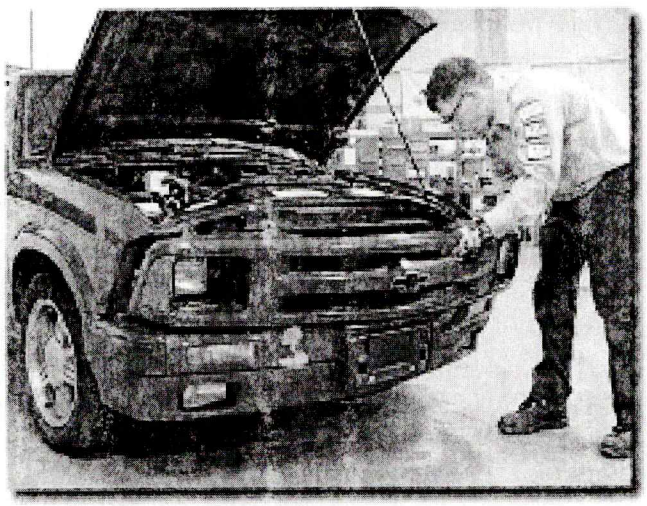
- a part of, or attached to, the bumper cover. Some grilles are molded into the bumper cover and some are mechanically fastened to the bumper cover.
- attached to the hood. This type will have a frame that is attached to the hood.
- attached to the radiator core support. This is common on some trucks and SUVs and typically have openings for the headlamps.

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D-2 This grille will require replacement.

Most grilles are made of plastic. Those that are attached to a hood have a steel mounting frame around it. Grilles come in a variety of designs and may have a mounting area for emblem attachment.

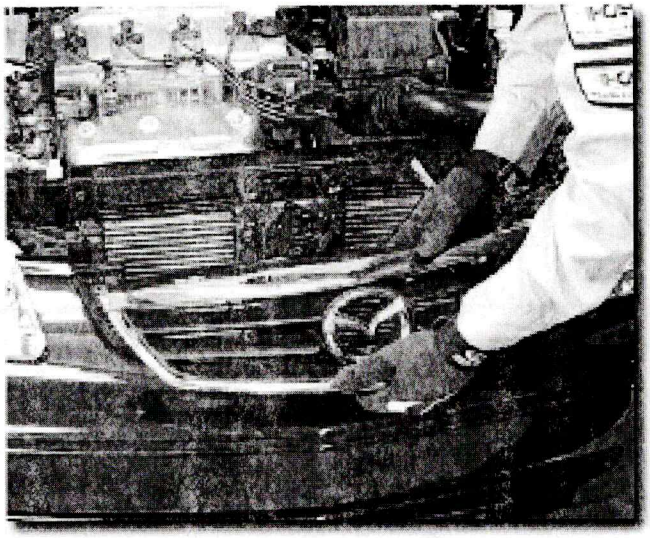


D-3 This grille has to be removed to access the bumper attachment fasteners.

To remove a damaged grille, it may be necessary to first remove the bumper cover or fascia. Some may be accessible by opening the hood and will not require bumper cover removal. Depending on the attachment method, grilles are removed by unbolting, unclipping, or unscrewing the fasteners and removing the grille.



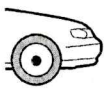
Properly identify and store the removed fasteners for proper reinstallation.



D-4 This grille uses a special clip that allows it to snap into the headlamp mounting panel.

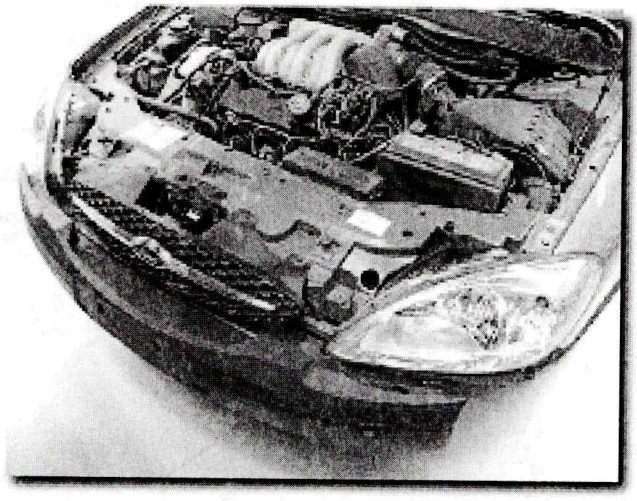
To install a grille:

- verify the correct replacement part upon delivery.
- refinish the grille as required. Although a grille may be ordered by color, it may require refinishing in order to achieve the proper color match.



When replacing grilles on 2000 and later Cadillac DeVilles equipped with Night Vision, verify that the correct grille is installed. The incorrect grille will adversely affect the Night Vision capabilities.

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D-5 This headlamp mounting panel is made from sheet molded compound (SMC).

Some vehicles have a headlamp mounting panel that attaches the grille, headlamps, and side lamps to the radiator core support. These are generally constructed of a composite plastic material. Some headlamp mounting panels have alignment pins to ensure correct fit between the grille and front lamps to the front body panels.

Topic E. Fenders



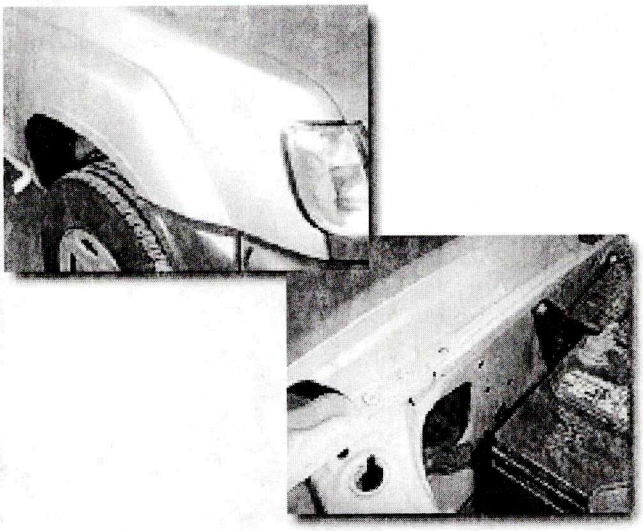
E-1 This damaged plastic fender is being removed from the upper fender rail.

The types of fenders that are included in this Program are bolted:

- steel fenders.
- plastic fenders.

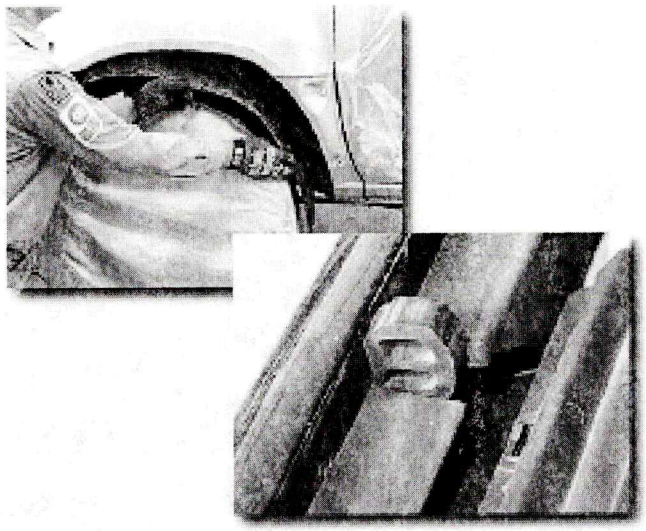
Fenders are usually flush with the hood and door. Some fenders may have slight positive flush with the front door to reduce wind noise. Positive flushness from the fender to the door means that the fender is positioned slightly outward from the vehicle when compared to the door. Another way of saying it is that the door has slight negative flush with the fender.

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E-2 This fender is bolted to the upper rails.

Although most fenders are of one-piece construction, there are some two-piece fenders available that have an inner fender that is welded to the outer fender. These will typically be found on trucks and SUVs.

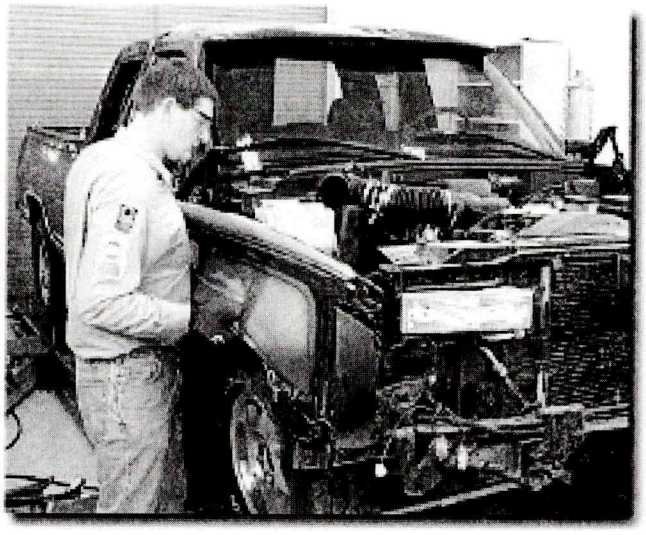


E-3 TOP: The wheelhouse on this vehicle is removed to gain access to hidden fasteners. BOTTOM: This hood cushion is attached to the fender jamb.

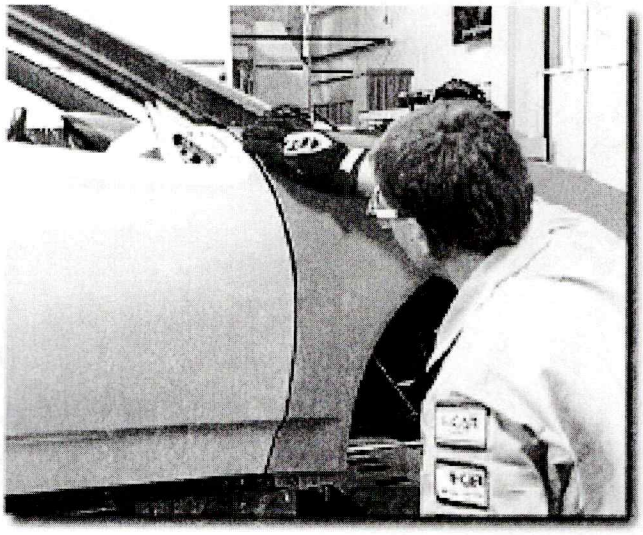
There may be a number of different parts attached to a fender including, but not limited to:

- a splash shield. Splash shields protect the engine compartment from road contaminants that are propelled by a rotating tire. Mud flaps are also often attached to the fender.
- moldings, emblems, and flares.
- side-marker lamps and reflectors.
- the radio antenna.
- underhood mechanical attachments and electrical grounds. Although not as common on unibody vehicles, many trucks and SUVs have mechanical parts attached to the inner fender.
- hood cushions. Hood cushions are used to support the center section on each side of the hood and protect the fender and hood finish.

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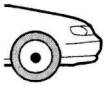
E-4 This damaged fender is removed from this body-over-frame vehicle.



E-5 The replacement fender is used to monitor the progress during straightening of the upper rails.

To remove a bolted fender from the vehicle structure:

- remove the splash shield from the wheelhouse area. The splash shield will require removal to access any hidden fasteners.
- remove any other required parts for access to hidden fasteners or parts that will inhibit fender removal, such as rocker moldings, cladding, underhood mechanical parts, etc.
- unbolt and remove the fender.
- remove any moldings, emblems, or other attachments that will be transferred onto the replacement part.

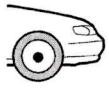


Properly identify and store the removed fasteners for proper reinstallation.

Before installing a fender on a vehicle, the inside edge or jamb should be refinished. Continue installation by:

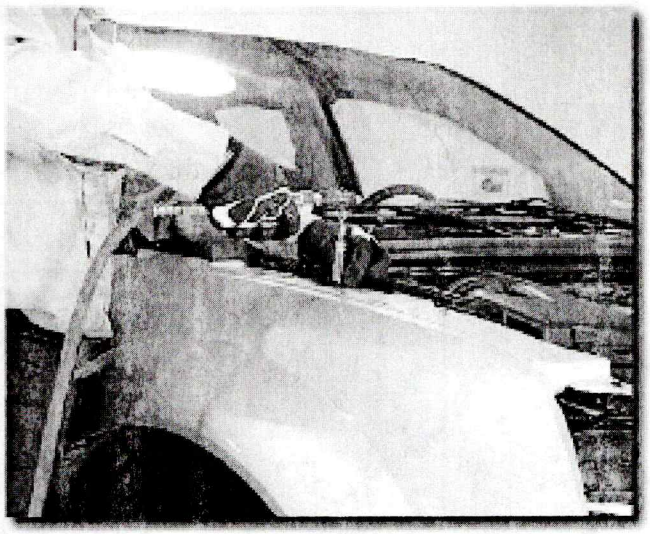
- installing any attachments that have fasteners that will not be accessible once the fender is installed.
- temporarily installing the fender and attachment hardware, usually bolts.
- adjusting the fender as required to the front door and hood.
- tightening the fasteners to the recommended torque specification.
- installing any remaining attachments.

After refinishing, duplicate the appearance and application of any necessary corrosion protection materials that were originally applied to the backside of the part.



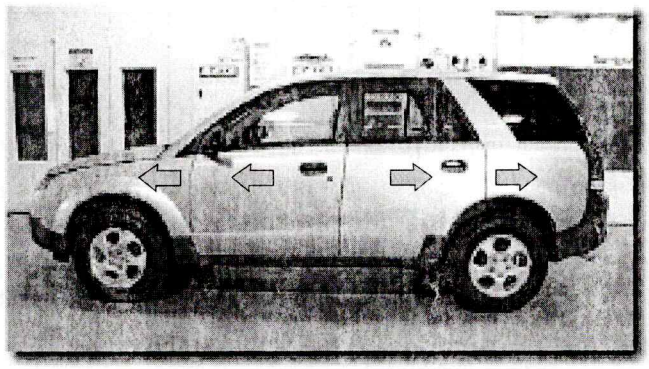
Do NOT install recycled fenders that have evidence of improper previous repairs, including excess paint or body filler. Before edging the replacement part, verify that the replacement part is the correct part by comparing mounting areas for the antenna, moldings and emblems, and lamps.

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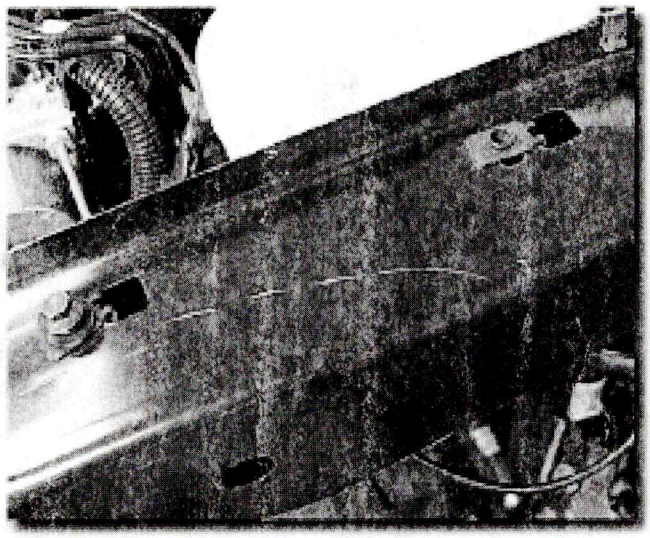
E-6 The fasteners on this fender must be properly torqued to allow for thermal expansion.

Some plastic fenders are designed and installed to allow for thermal expansion. These fenders may have special shoulder bolts and spring washers for installation as well as a specific tightening sequence and torque recommendations.



E-7 Some vehicles with composite panels are designed to allow for thermal expansion.

Thermal expansion is when a panel, or panels, expand and contract due to changes in temperature. To allow for thermal expansion, special fasteners are required. When thermal expansion takes place, the front door and the fender are designed to expand forward and the rear door and quarter panel are designed to expand rearward. If the incorrect tightening sequence or torque is used for installation, it could cause one or more doors to bind against the adjacent panel when opened.

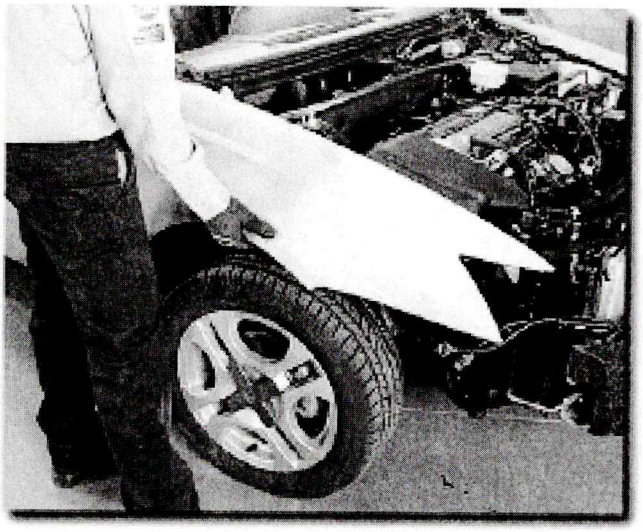


E-8 The U-clip in the slotted hole of an upper rail allows some adjustment in the fender.

Fenders may use slotted or elongated holes in the fender for adjustment, or they may be adjustable using U-clips in the upper rail. Fender adjustments include:

- forward or rearward. This allows for alignment to the front door and bumper.
- inward or outward from the engine compartment.
- upward using shims. Because the upper rail cannot be adjusted, the fender can only be raised by using shims.

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E-9 This plastic fender is temporarily installed to verify a proper fit.

To move the front of the fender inward or outward, loosen the front fasteners, adjust and tighten. To move the rear of the fender inward or outward, loosen the rear fasteners, adjust and tighten.



E-10 The front of this fender should be adjusted toward the hood.

To move the fender forward or rearward, loosen the fasteners, adjust and tighten. Determine if the hood needs to be adjusted to meet the flushness with the fender. If the hood is in alignment and the fender needs to be raised, shims may be used to raise the fender upward. Shims should not be used to compensate for structural misalignment.

FENDER ADJUSTMENT

Select the Activity Icon on screen E-11 of your CD-ROM for an interactive exercise on fender adjustment.



E-12 This splash shield is being reinstalled following fender replacement.

When installing fender attachments:

- replace damaged fasteners with the same type.
- two-sided tape or emblem adhesive can be used to install trim after refinishing.
- verify that underhood parts and ground connections are installed in the correct location. It may be necessary to remove paint coatings from ground attachment locations if the fender has been edged.
- it may be necessary to touch up the antenna nut following antenna installation. This is because many antenna nuts are painted and the finish may become damaged during removal and installation.

BOLTED FENDER REPLACEMENT

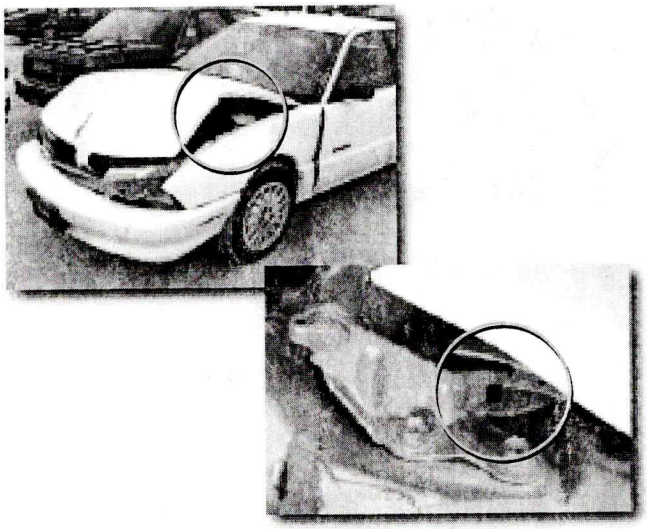
Refer to screen E-13v of your CD-ROM for a video on a procedure for replacing a damaged fender with a recycled replacement part.

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Topic F. Hoods

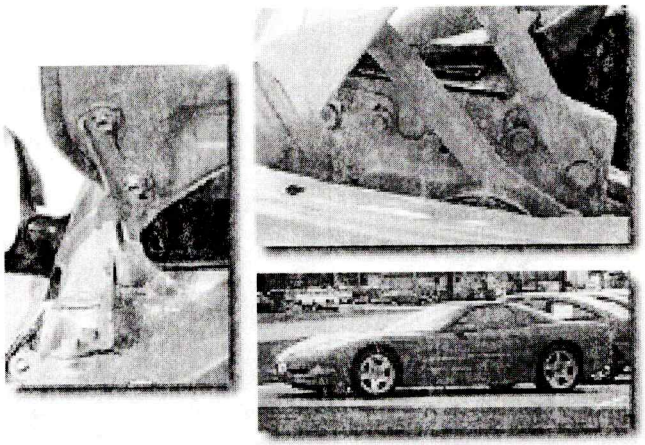
HOOD IDENTIFICATION

Refer to the Hood Identification handout and complete the Activity using screen F-1 of your Student CD-ROM as a reference.



F-2 This hood buckled in the middle because the safety catches on the hinge prevented it from going back into the windshield.

Hoods have safety features built in such as collapse zones and safety stops. Collapse zones and safety stops minimize the potential for the hood to intrude into the passenger compartment during a front-end collision. Hoods are equipped with hinges, latches, and props and usually have multiple vehicle information labels.

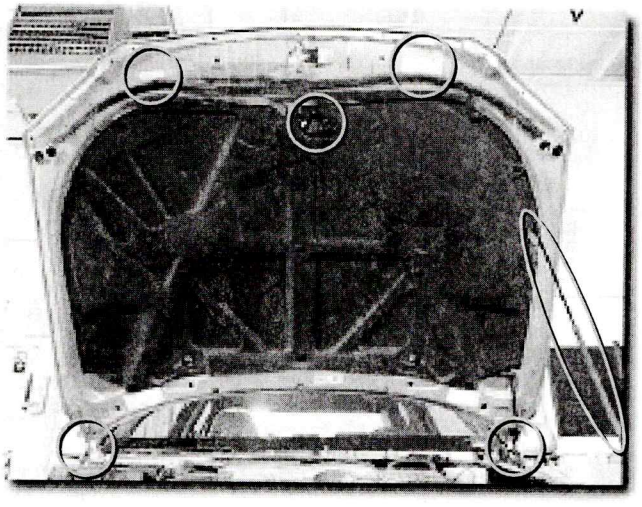


F-3 LEFT: This hood hinge is mounted at the cowl. RIGHT UPPER: Some hood hinges use a coiled spring to hold the hood in the open position. RIGHT LOWER: This vehicle has a composite hood.

Although some hoods have front-mounted hinges, where the hood opens from the back, most have rear-mounted hinges. Hoods may be made of:

- mild or high-strength steel (HSS).
- a composite material such as Sheet Molded Compound (SMC).
- aluminum.

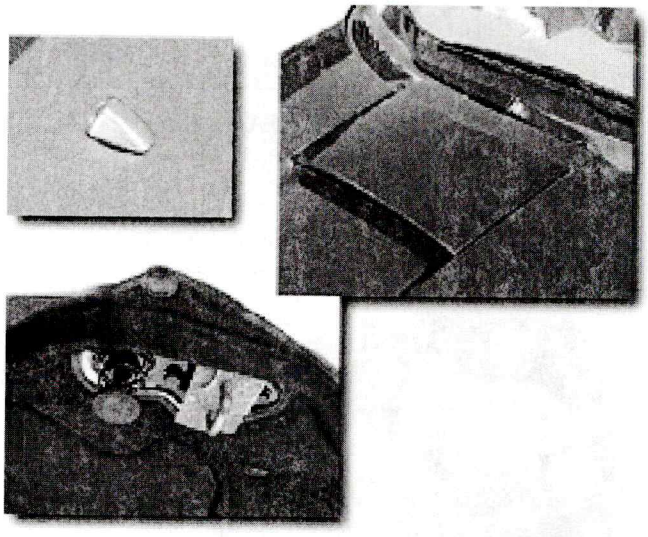
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F-4 This hood has several parts that will have to be removed and reinstalled on a replacement hood.

Common hood attachments include, but are not limited to:

- emblems. These are usually located in the front or middle of the hood.
- hinges. There are a number of different styles of hinges.
- prop rods. Prop rods are used to keep the hood open.
- latches. The latch secures the hood to the vehicle structure.
- lighting. When the hood is open, underhood lamps light to illuminate the engine compartment.
- a hood insulation pad.

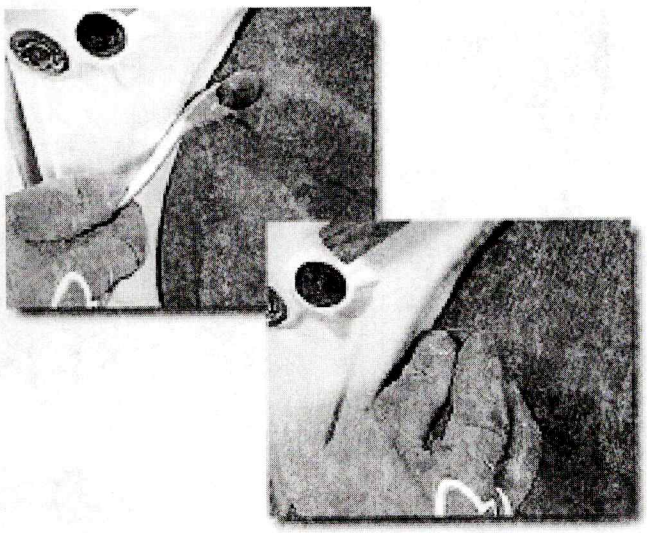


F-5 TOP LEFT: A windshield washer nozzle is attached to this hood. TOP RIGHT: This hood has an air scoop bolted to it. BOTTOM: The striker plate is bolted to this hood.

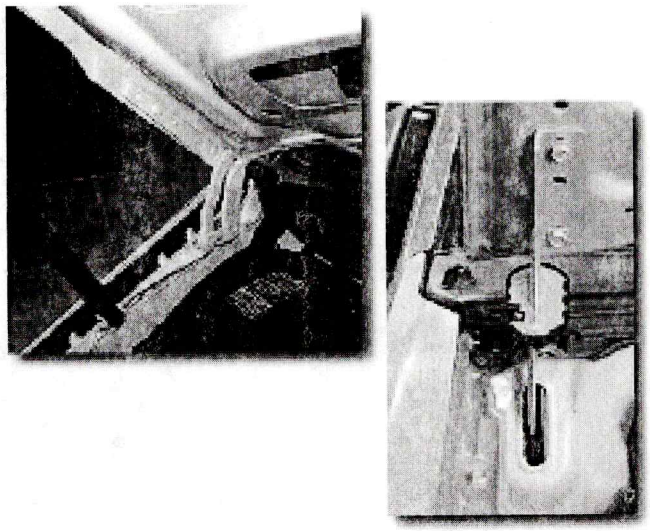
Other hood attachments include:

- grilles.
- windshield washer spray nozzles.
- hood scoops and hood scoop screens.
- adjustable stops. Adjustable stops are used to align the hood height to the fenders.
- aftermarket parts such as bug shields and cowl covers.

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F-6 The hood insulation blanket is fastened to the hood with plastic retainers.



F-7 LEFT: This hinge bolts horizontally on the hood. RIGHT: This hinge is mounted on the firewall of the vehicle and will require removal of the cowl vent panel for access.

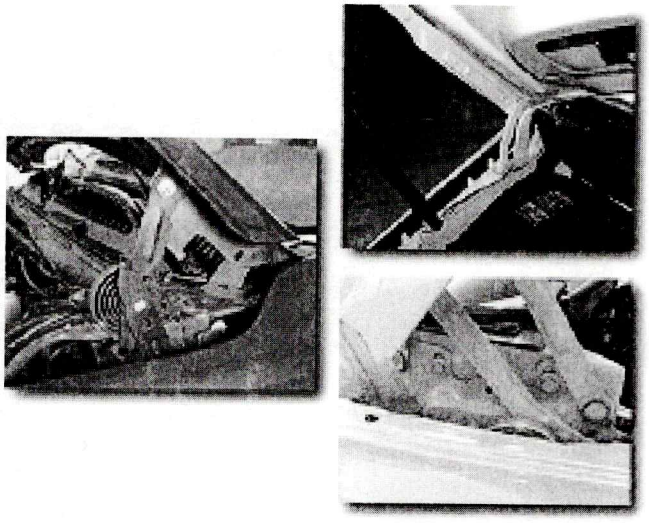
Some considerations for transferring hood attachments include determining when to transfer the parts. Should the parts be installed before hood installation or after? This may depend on personal preference and access. If the hood is large, such as a truck hood, it may be difficult to transfer some parts after the hood is installed. Other considerations include:

- removal and installation of the hood insulation pad. The fasteners that attach the hood insulation pad may be difficult to remove without damage. Extra fasteners should be available.
- ordering and installing replacement identification labels. It will not be possible to transfer the labels from the damaged hood to the replacement hood. Timely and accurate ordering of the labels will reduce the chance of the customer having to return at a later date.
- routing of the wiring harness. Note the routing of the underhood lamp and the location of any wire harness routing clips and fasteners.

Hood hinges may be mounted:

- at the rear of the hood on the upper rail, cowl, or fender.
- at the front of the hood on the radiator core support. Front-mounted hinges are not as common as rear-mounted hinges.
- vertically on the hood underside or the hood flange.

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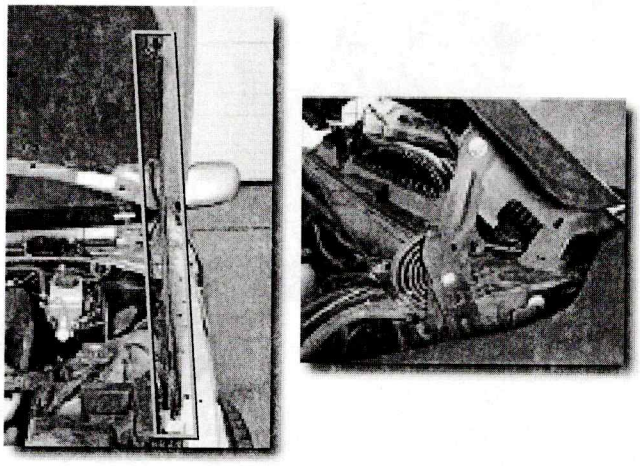
F-8 LEFT: This hinge is attached at the cowl and uses a coil spring to keep the hood open. TOP RIGHT: This hinge uses multiple pins for the hood to pivot on. BOTTOM RIGHT: Notice how this hinge has elongated mounting holes so that it can be adjusted.

There are a variety of different hinges, but most are constructed one of three ways. Hood hinges may have:

- a single pin at the hinging point.
- multiple, usually two, pins at the hinging point.
- a coiled spring as one pivot point. Excluding the spring, there may be up to three additional pivot points.

HOOD HINGES

Select the Demonstration Icon found on screen F-8 of your CD-ROM for an examples of hood hinges.



F-9 LEFT: A conventional prop rod attaches to the front of the vehicle. RIGHT: This coiled spring keeps the hood open.

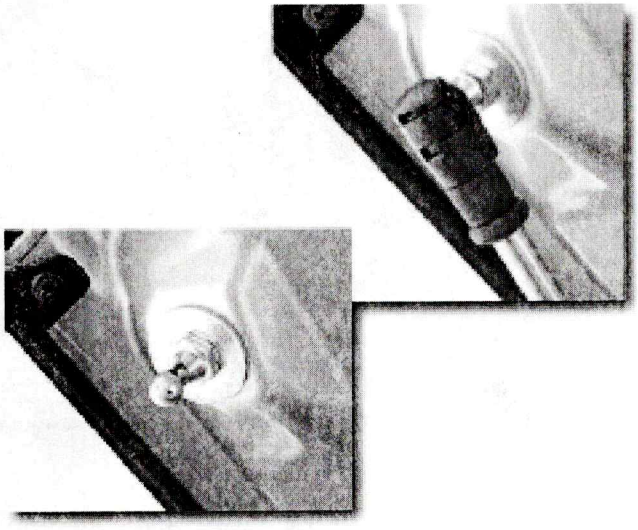
Hood props hold the hood in the open position. Ways to prop the hood open include:

- using a piston. Piston-type props require no manual operation. They extend automatically once the hood is released from the secondary latch.
- tension on a coiled spring hood hinge.
- a conventional hood prop located on the radiator core support, upper rail, or apron. This type requires unhooking and swinging the hood prop into position and inserting it into the hood underside.

HOOD PROPS

Select the Demonstration Icon found on screen F-9 of your CD-ROM for an examples of hood props.

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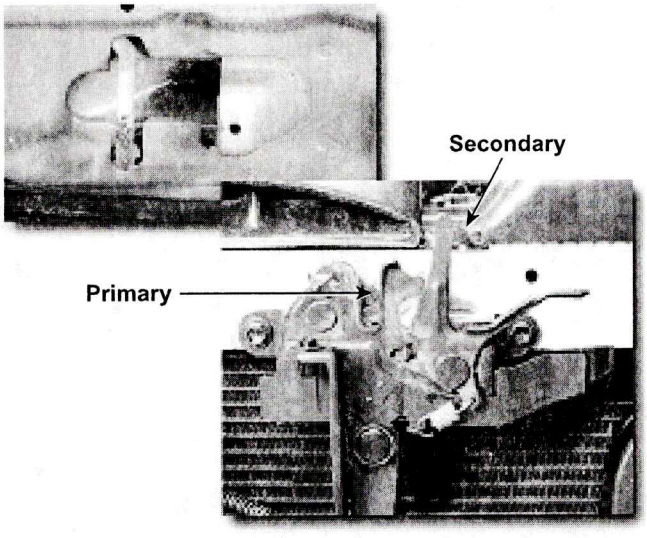


F-10 Piston-type prop rods may use a ball stud and a socket with a retainer clip to attach them to the hood.

To replace a piston-type prop rod:

- slightly pry the retaining spring clip outward. Try not to completely remove the spring clip.
- apply upward pressure on the hood to relieve pressure from the prop rod.
- remove the rod from the ball stud from either the hood or the fender.

To install a piston-type prop rod, reverse the removal procedure.



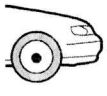
F-11 This hood latching system has a striker and a primary and secondary latch.

The hood latching system is responsible for keeping the hood closed. On most vehicles, the hood latch area is located in the middle of the hood on the radiator core support. A typical hood latch area consists of:

- a striker. The striker is usually located on the hood and is secured by the hood latch.
- the primary latch and a release cable. The primary latch is responsible for holding the hood in the closed position. The release cable is routed from the radiator core support into the passenger compartment. When the cable is pulled, the primary latch releases.
- a secondary latch. In the event of a primary latch failure, the secondary latch retains the hood and prevents it from opening.

There are other types of hood latch systems including a:

- spring striker and latch assembly.
- dual latch and striker system. With this system, there are two strikers and two latches located to the left and right of the hood center.

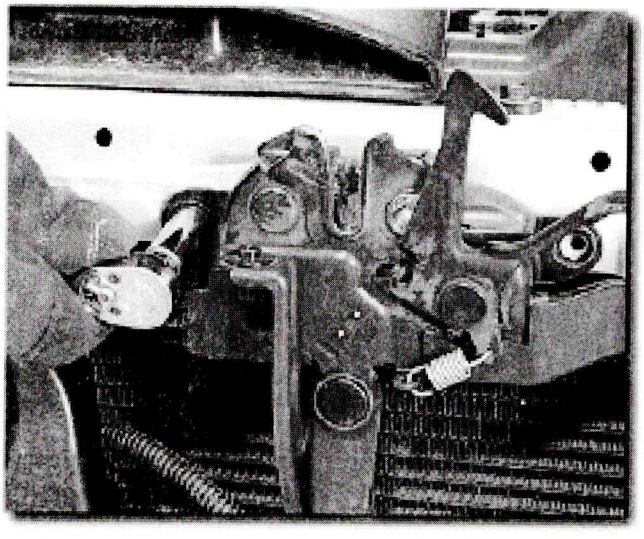


Inspect the area around a hood-mounted striker for any cracks.

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HOOD LATCH

Select the Demonstration Icon found on screen F-11 of your CD-ROM for an example of a hood latch.

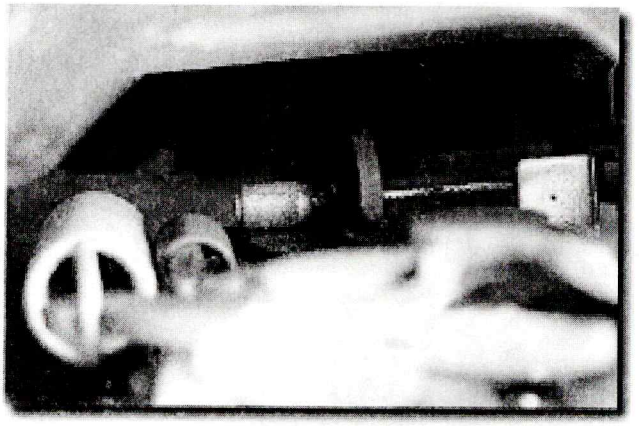


F-12 Shoulder bolts attach this latch to the radiator core support.

To remove a hood latch:

- mark the location of the latch for installation.
- remove the fasteners, usually shoulder bolts that are threaded into the radiator core support.
- remove the release cable and secure it to the radiator core support. If the cable is being replaced, make note of the routing.

Properly identify and store the removed fasteners for proper reinstallation.



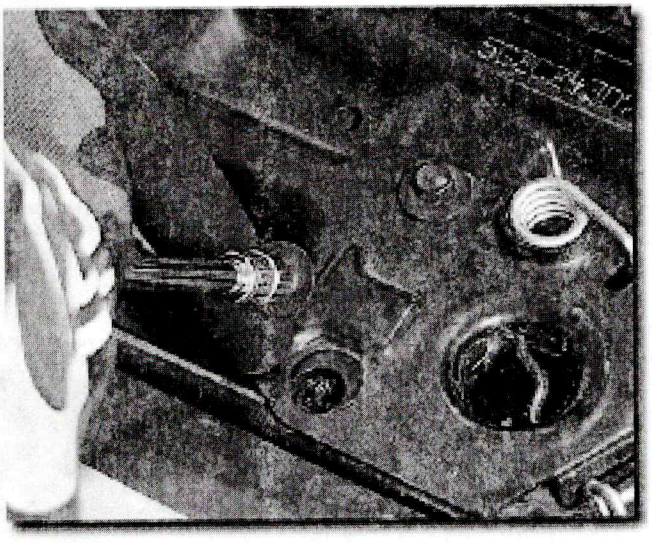
F-13 This cable is used to pull the release lever on this latch.

To replace a worn or damaged release cable:

- remove the release cable from the latch mechanism. It may be necessary to remove the latch to remove the release cable.
- note the routing of the cable and remove the cable from the engine compartment.
- remove the release mechanism from the vehicle interior. This will usually be located beneath the instrument panel and fastened with shoulder bolts or screws.

To install a hood release cable, reverse the removal procedure.

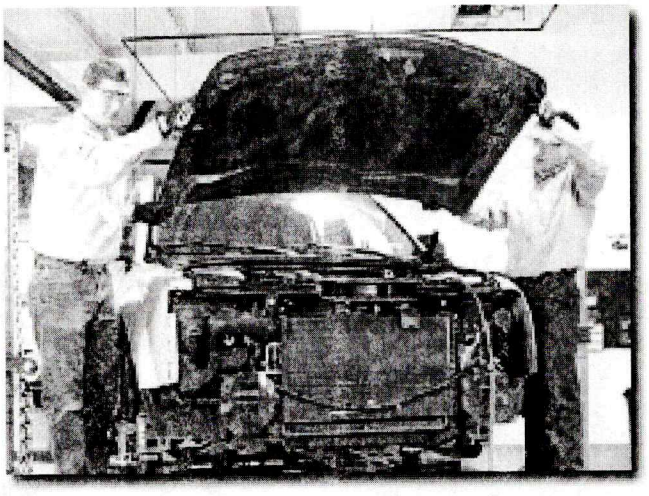
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F-14 This hood latch is installed horizontally in the radiator core support.

To install a hood latch:

- install the release cable into the latch.
- position the latch according to the marks on the radiator core support.
- temporarily install the fasteners.
- align the latch and torque the fasteners following the vehicle maker's recommendation.



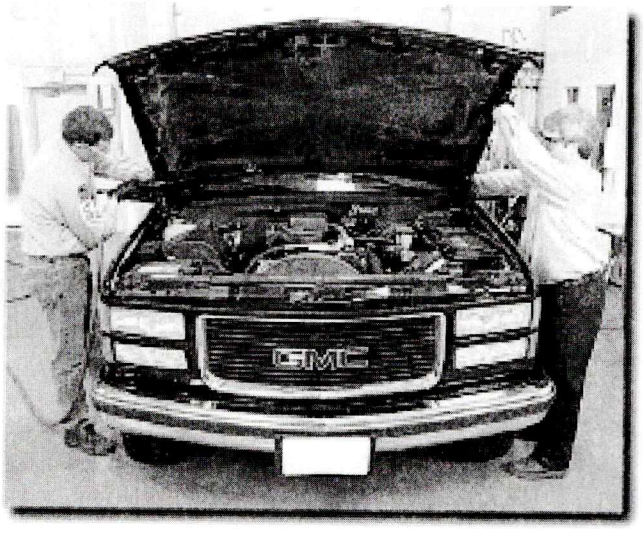
F-15 Most hoods will require help from an assistant for removal.

To remove a hood:

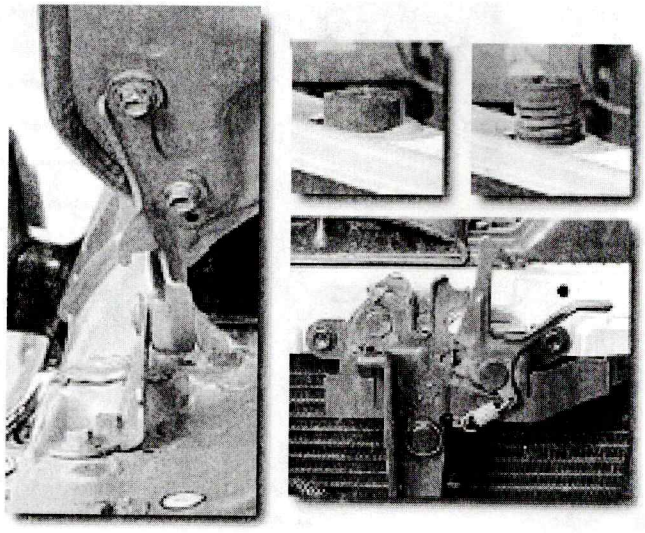
- an assistant will be required.
- begin by removing the prop rod, if it is a piston-type prop rod.
- determine which fasteners will be removed. Depending on access and damage, either the hood fasteners or the fender or upper rail fasteners can be removed.

After removing the fasteners, the hood can be removed and stored. Damaged hoods can be discarded after all repairs are complete.

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F-16 This hood is installed with the attachments already installed.



F-17 Hoods can be adjusted on the hinges by adjusting the hood stops or by moving the latch.

To install a replacement hood:

- have an assistant help position the hood in place. Depending on the removal procedure, this may include positioning the hood on the hinges or the hinges on the fender or upper rail.
- temporarily install the required fasteners.
- align the hood and tighten the fasteners. Note that additional adjustment may be required.
- transfer any undamaged hood attachments to the replacement hood and install all required replacement labels.

Do NOT install a recycled hood with:

- damage to the collapse zones.
- fire damage.
- damaged mounting or latch areas. Closely inspect composite hood mounting and latch areas for cracks.
- loose or damaged hood braces.

Depending on the design of the hood, alignment may be done by adjusting the:

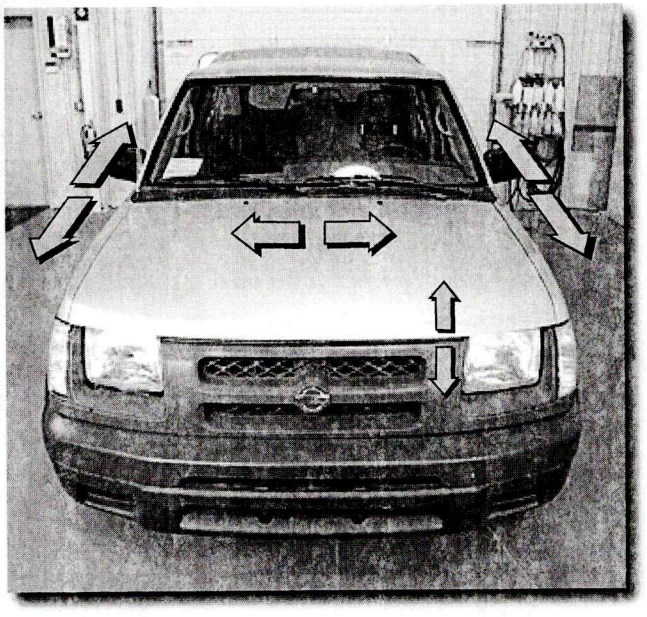
- hood hinges.
- adjustable stops.
- striker and latch area.

To properly align a hood, it may be necessary to make adjustments to any combination of these.

There is a special tool available that can be used to release the primary hood latch. This eliminates the need for the technician to pull the hood release mechanism in the passenger compartment during alignment.

When aligning hoods, verify that there are adequate gaps before closing to prevent damage to adjacent panels.

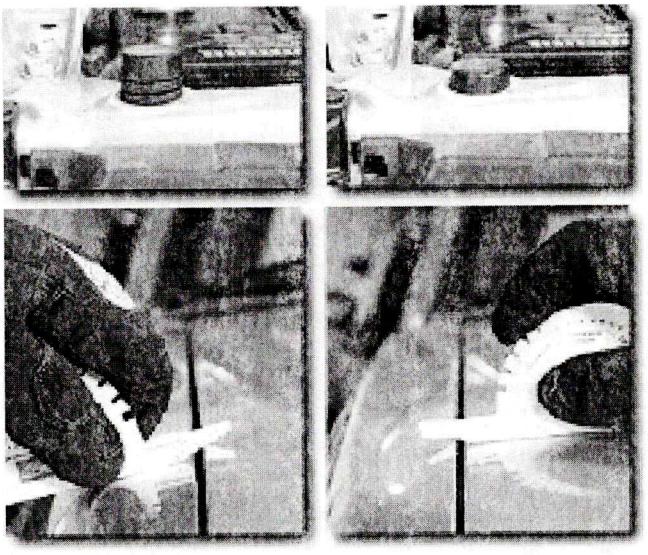
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F-18 Most hoods can be adjusted forward or backward on both sides, from side-to-side, and for flushness with the fenders.

Depending on the mounting position of the hinges, it may be possible to adjust the hood:

- frontward or rearward. This is a gap adjustment between the cowl and bumper assembly. This adjustment is common on most hoods.
- towards the driver or passenger side. This is a gap adjustment and is common on most hoods.
- for flushness either up or down. This can only be to the rear of the hood on those with hinges that are mounted vertically.



F-19 Adjusting the stops will change the flushness at the front of the hood.

Adjustable stops:

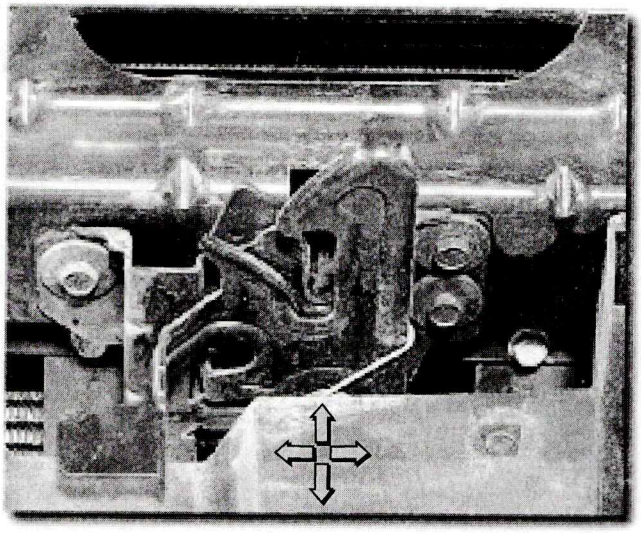
- are used to raise and lower the front portion of the hood in order to accomplish zero flushness with the fenders.
- may be mounted on the hood.
- may be mounted on the fender or structure, either the upper rail or radiator core support.



HOOD ADJUSTMENT–ADJUSTABLE STOPS

Select the Demonstration Icon found on screen F-19 of your CD-ROM for examples of hood adjustment stops.

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F-20 This latch can be adjusted up and down and to the left and right.

The hood and fender gaps should be adjusted with the latch removed. When the proper gaps are obtained, the latch can be installed so that the striker and latch operate smoothly and the hood is not pulled to either side. The latch may be adjusted in combination with the hood bumpers to align the flushness with the fenders. Installing the latch to pull the hood to obtain fender-to-hood gaps may result in the hood and striker binding and could cause the latch to be inoperative.

BOLTED HOOD REPLACEMENT
Refer to screen F-21v of your CD-ROM for a video on hood replacement.

HOOD ALIGNMENT
Select the Activity Icon on screen F-22 of your CD-ROM for an interactive exercise on hood alignment.

Topic G. Review

REVIEW
Refer to screens G-1 and G-2 of your CD-ROM for review questions on front body panels.

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Exterior panel repair and replacement/ steel and plastic module #2 quiz

ⓘ This is a preview of the draft version of the quiz

Started: Nov 8 at 10:39am

Quiz Instructions

Question 1 — 5 pts

Technician A says that the fenders should be protected when installing a steel front bumper.

Technician B says that help from an assistant will help prevent damage to adjoining panels when removing a bumper.

- ○ A only
- ○ B only
- ○ both A and B
- ○ Neither A nor B

Question 2 — 5 pts

All of these designs of energy absorbers EXCEPT:

- ○ foam
- ○ eggcrate
- ○ piston-type
- ○ pneumatic

Question 3

5 pts

A bumper reinforcement may be constructed with all of these materials EXCEPT:

- ○ aluminum
- ○ steel
- ○ wood
- ○ reinforced composite

Question 4

5 pts

A negative flushness condition between a front fender and a door would mean the fender is:

- ○ sticking out from the door
- ○ lower then the door
- ○ higher then the door
- ○ in from the door

Question 5

5 pts

Technician A says that the gaps on the undamaged opposite side of the vehicle should be used for comparison.

Technician B says that gaps will not affect the appearance of the vehicle.

WHO IS RIGHT?

- ○ A only
- ○ B only
- ○ Both A and B
- ○ Neither A nor B

Question 6

5 pts

The fender to hood gaps on a body over frame vehicle are wide at the front on both sides of the vehicle. in order to correct this condition, the technician should:

- ○ move the radiator core support untill the fender gaps are consistent.
- ○ adjust the hood until the gaps are consistant.
- ○ adjust both fenders in until the gaps are consistent.
- ○ move the hood latch toward the center of the vehicle.

Question 7

5 pts

Technician A says that the labels on the inside of a hood should be removed and applied to the new hood.

Technician B says that the new labels should be applied to match the ones on the damaged part.

WHO IS RIGHT?

- ○ A only
- ○ B only
- ○ Both A and B

- ○ Neither A nor B

Question 8

5 pts

The safety stops on a hood are used to:

- ○ make adjustment easier
- ○ keep the hood from hitting the fenders
- ○ raise the hood for correct panel flushness
- ○ prevent the hood from entering the passenger compartment

Question 9

5 pts

When installing composite body panels, the panel should be:

- ○ installed with a torque wrench
- ○ tightened with an impact wrench
- ○ tightened with an air-powered ratchet.
- ○ attached with metal screws

Question 10

5 pts

A hood has the correct gaps when the latch is removed. When the latch is installed, the front fender to hood gaps get tight on the driver side and wide on the passenger side. The likely cause is the:

- ◯ latch is positioned too far to the passenger side.
- ◯ latch is positioned too far to the drivers side.
- ◯ hood is too far forward on the passenger side.
- ◯ radiator core support needs adjustment

Not saved Submit Quiz