

CERTAIN 1999-2003 MODEL YEAR WINDSTAR VEHICLES OPERATED IN CORROSION STATES — SUBFRAME FRONT LOWER CONTROL ARM REAR ATTACHING FLANGES AND REAR BODY MOUNT ATTACHMENTS INSPECTION AND REPAIR

OVERVIEW

The service procedure involves inspecting four locations of the subframe. See Figure 1. These locations are the driver and passenger rear body mount sections of the subframe and the Lower Control Arm (LCA) rear attachment flanges that are welded to the subframe.

The purpose of these inspections is to determine if the vehicle subframe:

- is repairable and reinforcement brackets can be installed, or
- does not pass inspection and pictures must be sent to Digital Imaging (DI) for subframe replacement consideration.

A subframe may be beyond repair if a vehicle has any of the following conditions:

- **Subframe Rear Body Mount Area**

- a subframe with a crack or perforation (hole) that is forward of the decision line.
- non-factory welds or welded reinforcements on sections of the subframe near the mount area.

NOTE: The decision line is a reference line 50 mm (2 in) from the edge of the tooling hole to the rear. The tooling hole is located approximately 64 mm (2.5 in) forward of the subframe rear body mount.

- **LCA to Subframe Rear Attachment Flanges**

- both flanges at the LCA rear attachment point are completely missing.
- LCA rear attachment points that have non-factory welded flanges or non-factory flange reinforcements.

NOTE: If installing reinforcement brackets, at least a portion of one flange must be present to properly locate the reinforcement bracket.

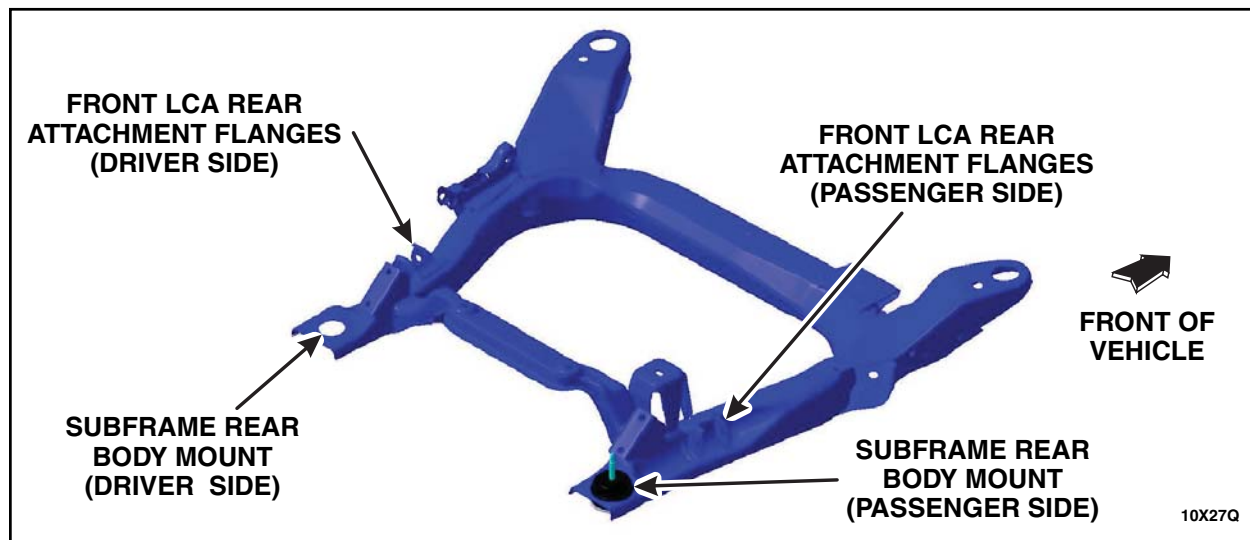


FIGURE 1

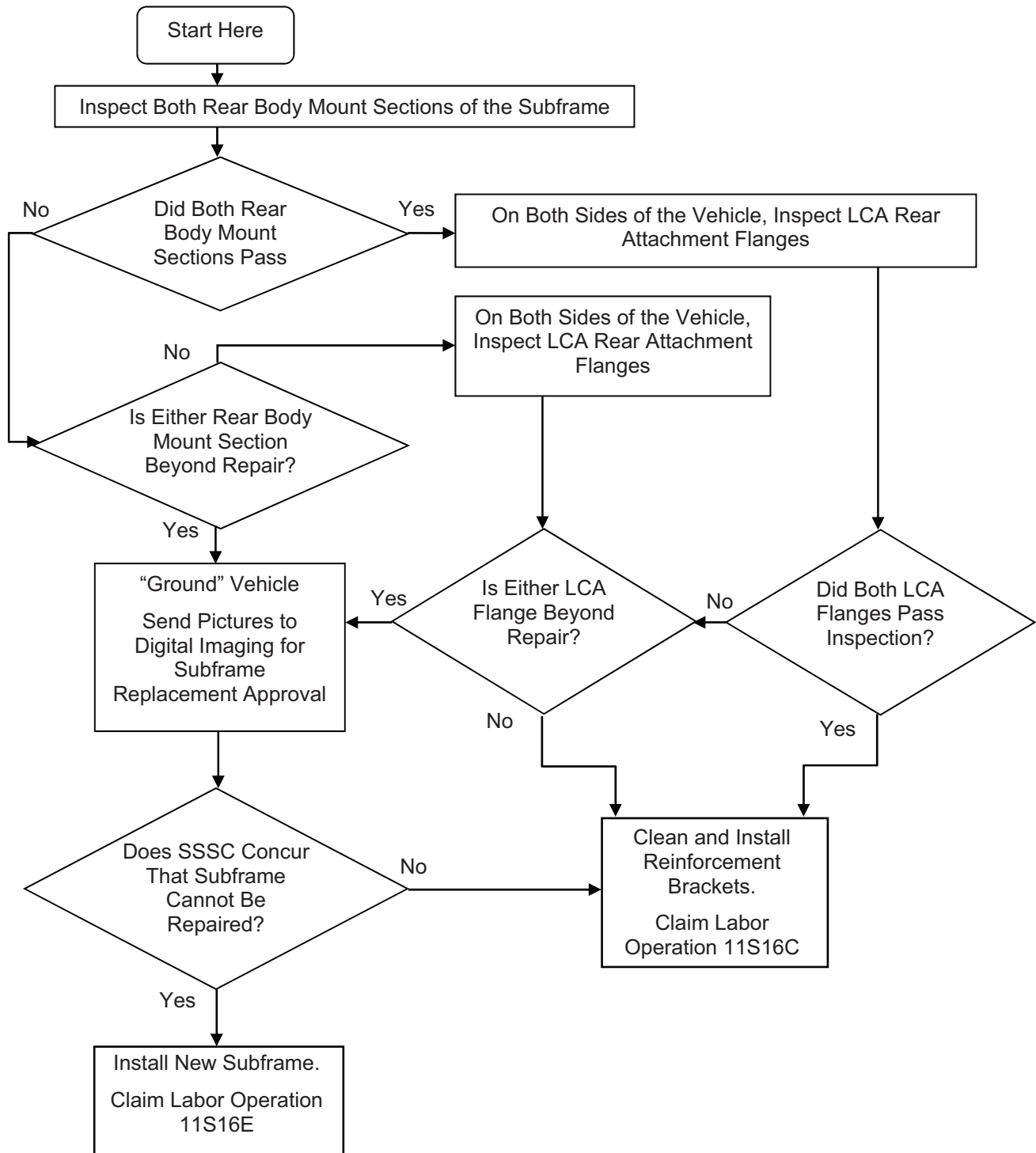


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I. REPAIR FLOWCHART



II. SUBFRAME REAR BODY MOUNT INSPECTION

1. With the gear selector in NEUTRAL, position the vehicle on a hoist and lift the vehicle. For additional information, refer to the WSM, Section 100-02.
2. Inspect the driver and passenger side of the rear body mount area of the subframe for cracks, perforations, gaps and any non-factory welds or reinforcements. See Figures 1, 2, 3 and 4.

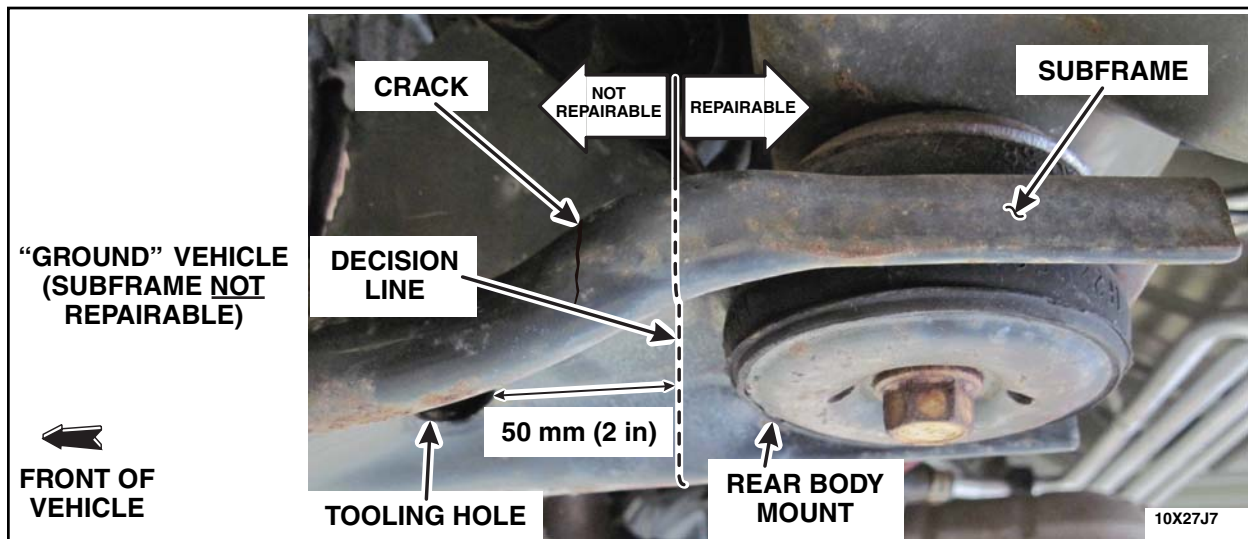


FIGURE 1

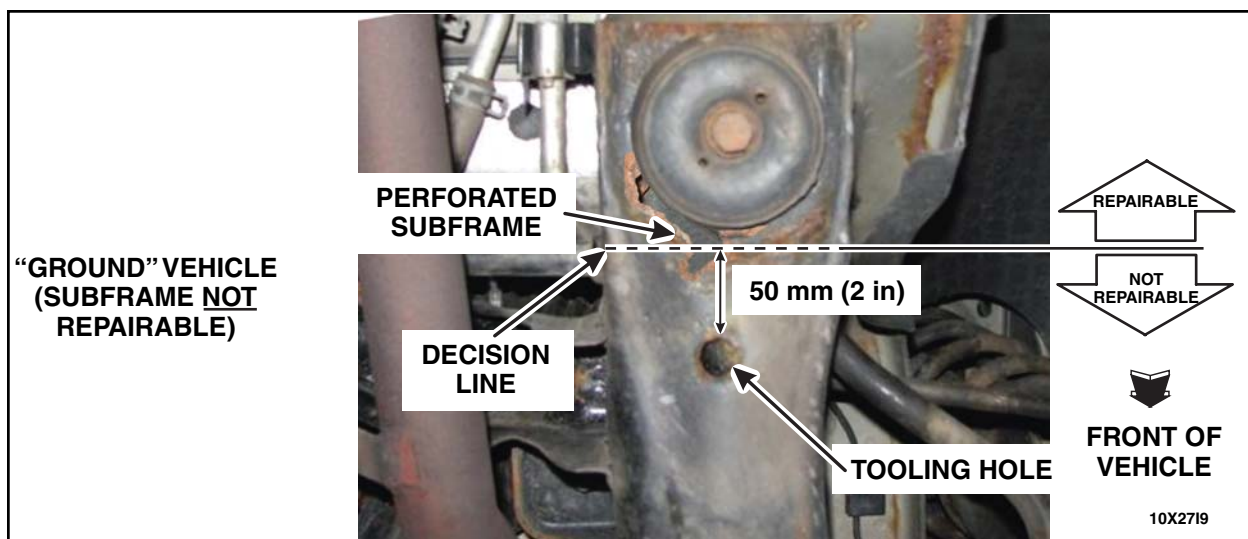


FIGURE 2



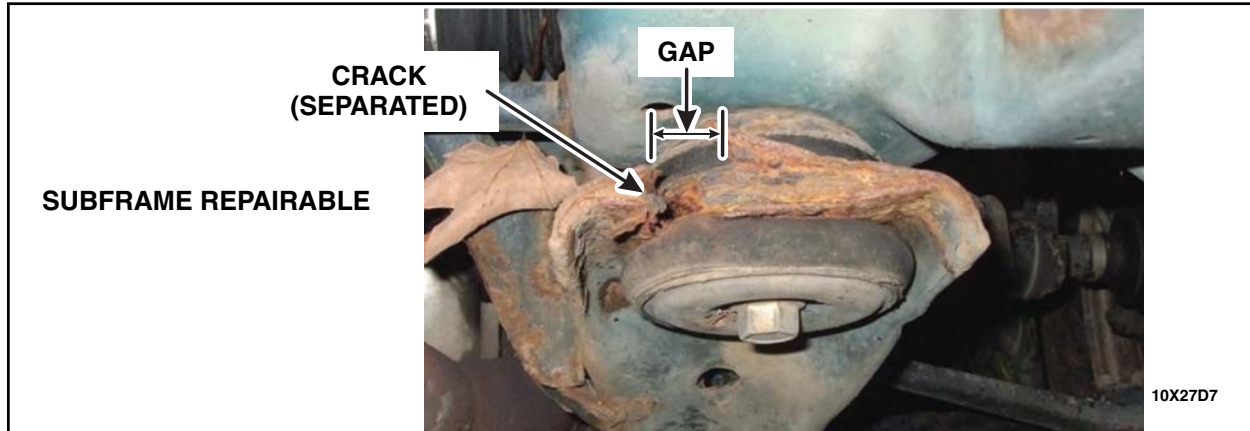


FIGURE 3

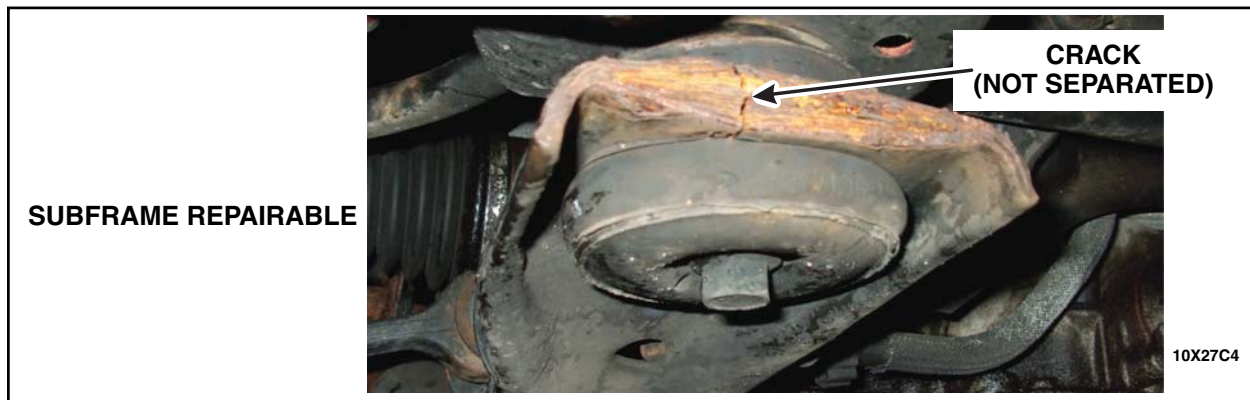


FIGURE 4

3. Inspection Results:

- If non-factory welds or reinforcements are found, the subframe may be beyond repair and pictures must be sent to Digital Imaging (DI) for subframe replacement consideration. Proceed to Digital Imaging Instructions on page 26.
- If a perforation or crack is forward of the decision line, the subframe is beyond repair and pictures must be sent to Digital Imaging (DI) for subframe replacement consideration. Proceed to Digital Imaging Instructions on page 26.
- If none of the above apply, proceed to Lower Control Arm (LCA) Rear Attachment Flange Inspection on page 6.



III. LOWER CONTROL ARM (LCA) REAR ATTACHMENT FLANGE INSPECTION

1. Remove both front wheels. For additional information, refer to the WSM, Section 204-04.
2. Using a hand-held wire brush, clean all loose rust, scale, and debris from both surfaces of the driver and passenger side of the subframe lower control arm (LCA) rear attachment flanges. See Figure 1.

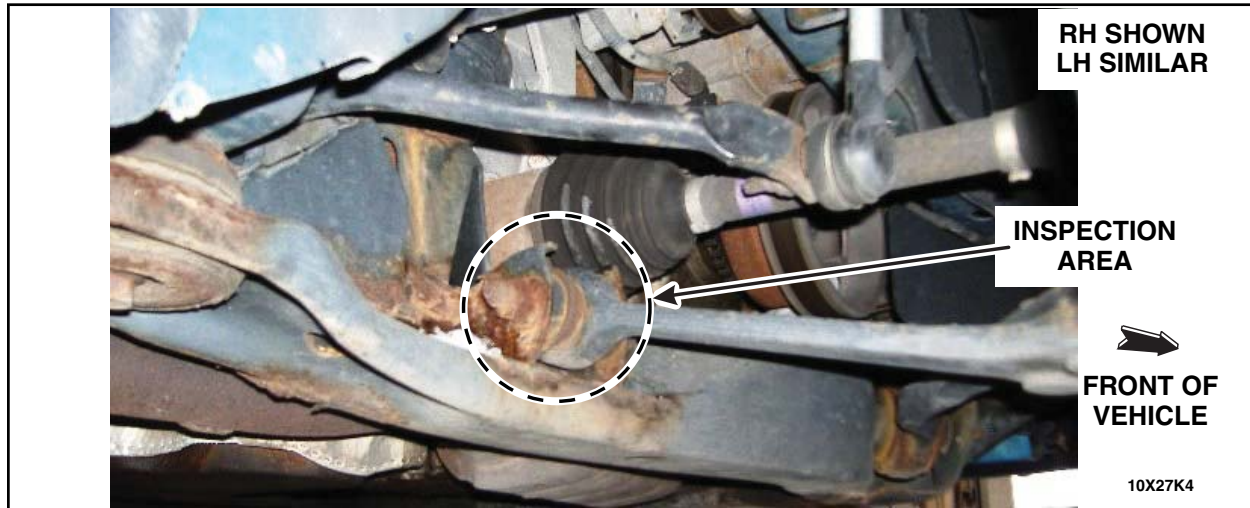


FIGURE 1

3. Inspect both surfaces of the LCA rear attachment flanges on the driver and passenger side of the subframe for cracks, perforations, excessive loss of metal, non-factory welded flanges or reinforcements. See Figures 2, 3, 4 and 5.

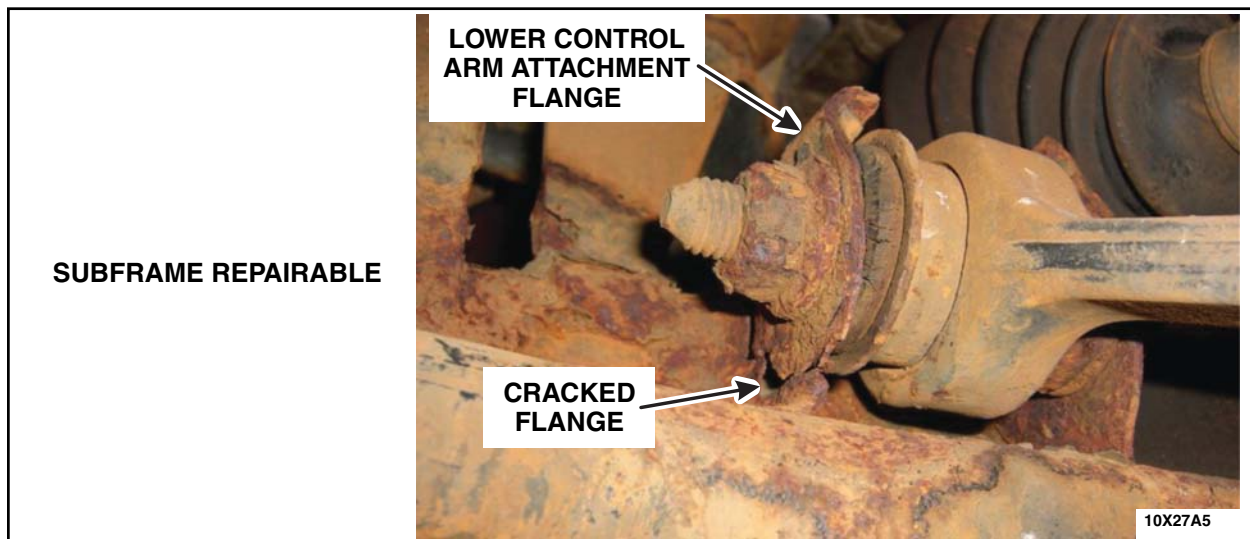
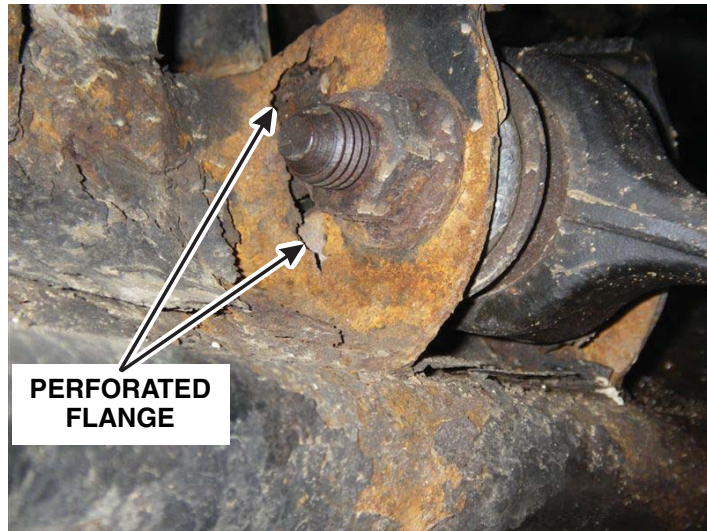


FIGURE 2



SUBFRAME REPAIRABLE



10X27G4

FIGURE 3

SUBFRAME REPAIRABLE



10X27B4

FIGURE 4



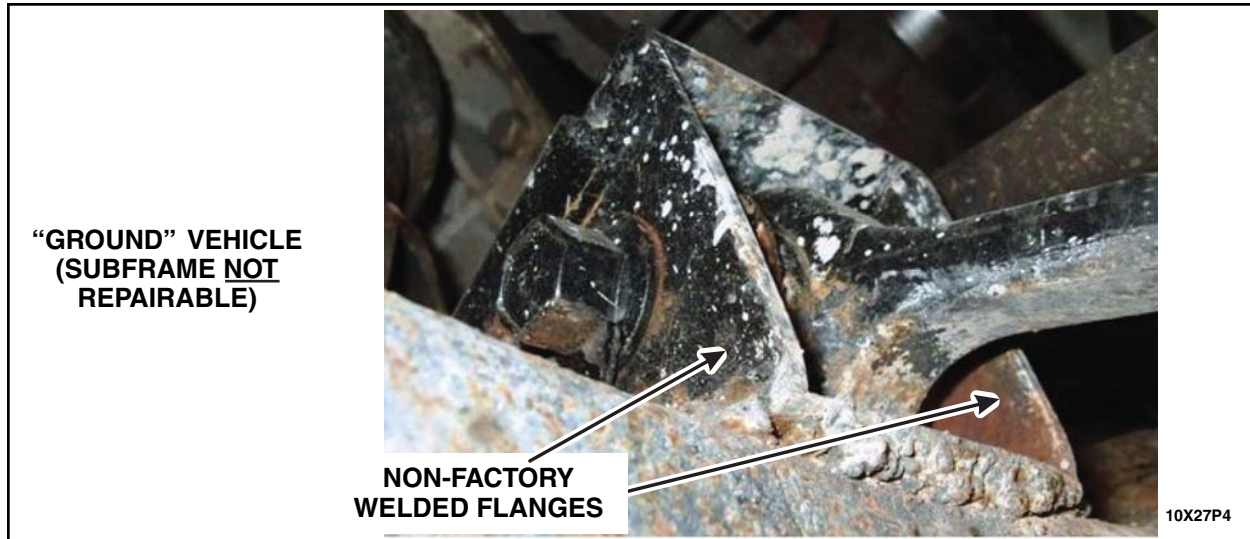


FIGURE 5

4. Inspection Results:

- If non-factory welds or reinforcements are found, the subframe may be beyond repair and pictures must be sent to Digital Imaging (DI) for subframe replacement consideration. Proceed to Digital Imaging Instructions on page 26.
- If both LCA rear attachment point flanges are missing, the subframe may be beyond repair and pictures must be sent to Digital Imaging (DI) for subframe replacement consideration. Proceed to Digital Imaging Instructions on page 26.
- If subframe can be repaired, proceed to Subframe Front LCA Reinforcement Bracket and Rear Body Mount Attachment Reinforcement Bracket Installation on page 9.



IV. SUBFRAME FRONT LCA REINFORCEMENT BRACKET AND REAR BODY MOUNT ATTACHMENT REINFORCEMENT BRACKET INSTALLATION

Important Repair Information

Several of the specified chemical products applied to the reinforcement brackets require special handling as indicated on the product packaging. Please ensure your Parts and Service department personnel access the Material Safety Data Sheets for guidance, and take the necessary precautions.

Metal bonding adhesive is used to secure the LCA reinforcement brackets to the subframe. Please read ALL of the Important Repair Information steps below before attempting any repair.

1. The adhesive will only bond to clean, bare metal. When cleaning the subframe, all rust and E-coat must be removed. Any rust must also be removed from LCA reinforcement brackets. Metal should be shiny in appearance. Do not try to remove deep pits. This may affect the strength of the subframe.
2. After cleaning the subframe and LCA reinforcement brackets, wipe the subframe with Motorcraft® Metal Brake Parts Cleaner. Other brands of brake parts cleaner may leave a residue which could affect the bond strength of the adhesive.
3. The adhesive starts to cure as soon as it is mixed. For this reason, you should only apply the adhesive and install the LCA reinforcement brackets on one side of the subframe at a time. Install a new mixing tip before applying adhesive to the second set of LCA reinforcement brackets.
4. When applying adhesive, spread it evenly over the subframe and the LCA reinforcement brackets as specified. Make sure there is enough applied to fill gaps between the reinforcement brackets and the subframe. When applied correctly, there should be adhesive “squeeze out” from all edges of the LCA reinforcement bracket when the bolts are tightened.
5. After the bolts are tightened, use an acid brush to spread and smooth the adhesive. Make sure all gaps and voids are filled with adhesive.
6. Use only Motorcraft® PM-13-A for corrosion protection. Some corrosion protection chemicals and undercoating materials will prevent the adhesive from curing properly.
7. Obtaining the proper adhesive cure is a critical part of the subframe LCA reinforcement bracket repair. To ensure the adhesive cures properly, the following guidelines **must** be followed:
 - 2 hour cure time at 21° C (70° F) or higher shop temperature
 - 3 hour and 15 minute cure time at 16° C (60° F) shop temperature
 - If the shop temperature is lower than 16° C (60° F), the adhesive will need to cure overnight
 - **DO NOT USE HEAT LAMPS TO REDUCE CURE TIME AS EXCESSIVE TEMPERATURES WILL AFFECT BOND STRENGTH OF THE ADHESIVE**



Tech Tips - Reducing Exposure to Adhesive Fumes

To reduce exposure to the fumes released while using the adhesive, we suggest that technicians consider the following tips:

- Since the majority of fumes are released while applying and spreading adhesive on the reinforcement brackets, position shop exhaust vent hose(s) next to the work area to help reduce these fumes.
- After installing the reinforcement brackets on the subframe, position shop exhaust vent hose(s) next to the installed reinforcement brackets to help reduce fumes while the adhesive is curing.
- If possible, slightly open a shop door to increase air circulation or perform the repair in an area of the shop that is well ventilated.
- During the repair, clean up excess adhesive that may have dripped on the floor. Also, discard used mixing tips and brushes immediately or wrap them so fumes are contained.



Cleaning Subframe and Front LCA Reinforcement Brackets

1999 and 2000 model year vehicles (2001 - 2003 model year vehicles skip to step 4)

NOTE: The transaxle will need to be raised to provide clearance for the driver side reinforcement bracket installation. Steps 1 through 3 are only required on 1999 and 2000 model year vehicles.

1. Using a block of wood under the transmission pan, provide support to the transmission. See Figure 1.

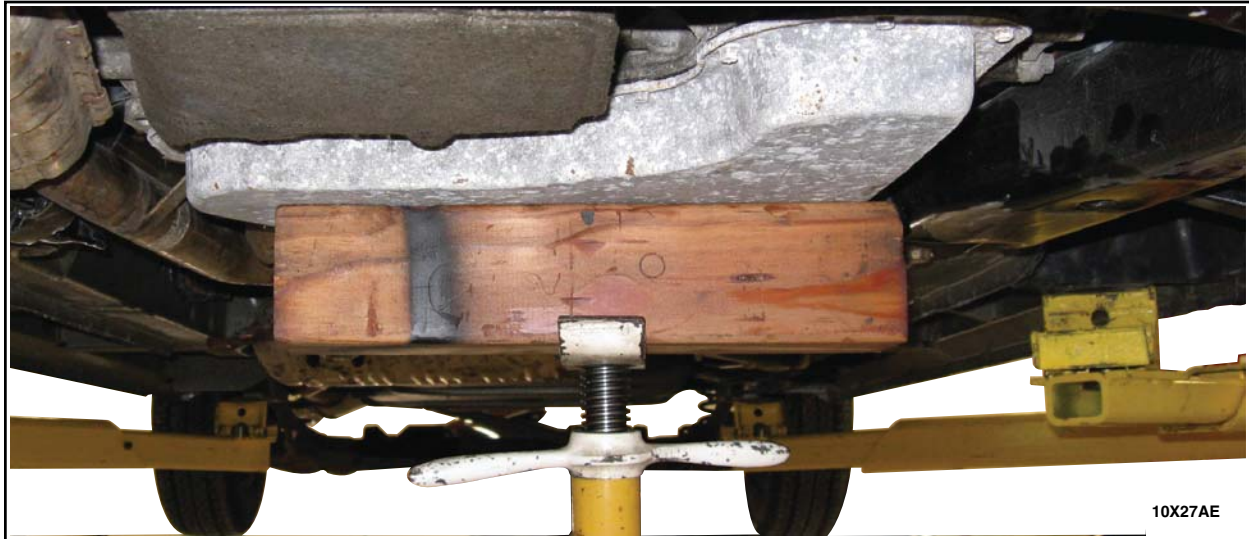


FIGURE 1

2. Remove the two bolts securing the transaxle support insulator bracket to the subframe. See Figure 2.

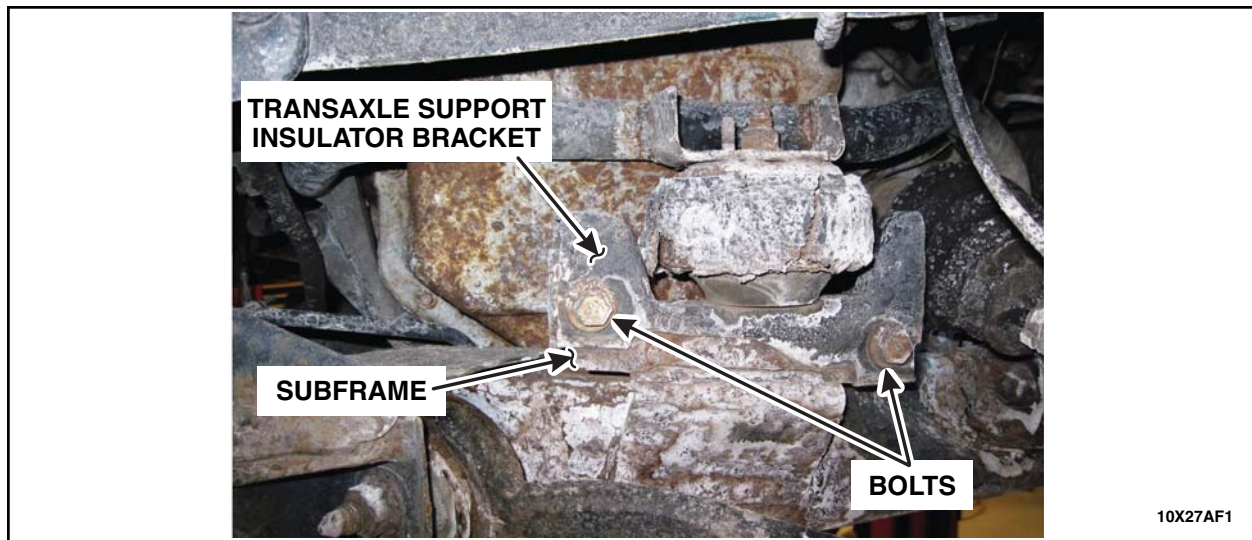


FIGURE 2



3. Raise the transmission approximately 25 mm (1 in). See Figure 3.



FIGURE 3

All vehicles

4. Remove and discard the LCA through bolt and nut from both the driver and passenger side of the subframe. See Figure 4.

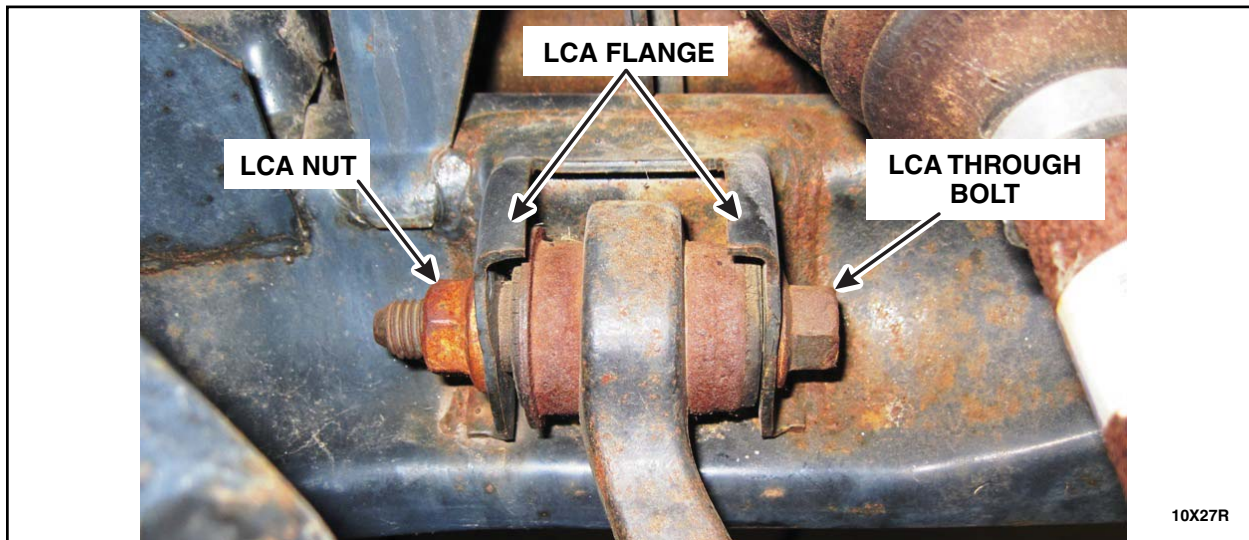


FIGURE 4

5. Remove protective film from all reinforcement brackets.



6. **NOTE:** If a portion of one or both flanges is missing or bent in a manner which would prevent a shim from laying flat against the flange, proceed to Subframe LCA Flange Cutting on page 25 for further instructions. Cutting off a damaged LCA flange will allow the shims to lay flat when installed between the LCA bushing and the reinforcement bracket.

Dry fit the upper section of the passenger side reinforcement brackets on the subframe by installing over the flanges. Make sure the reinforcement bracket is snug against at least one of the flanges. If you have cut the flanges per the note above, position the reinforcement bracket so the flanges are centered within the bracket. Using a paint pen or marker, outline the outer edges of the base of the LCA reinforcement bracket. See Figure 5.

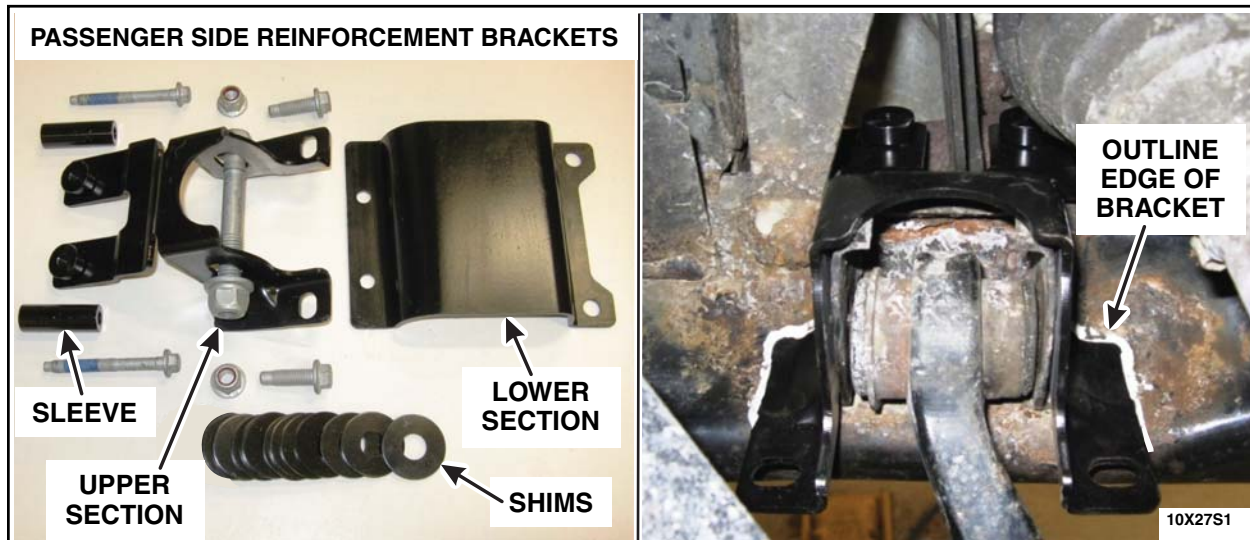


FIGURE 5

7. Dry fit the lower section of the passenger side reinforcement brackets on the subframe by aligning bolt holes with upper section. Using a paint pen or marker, outline the outer edges of the LCA reinforcement bracket. See Figure 6.

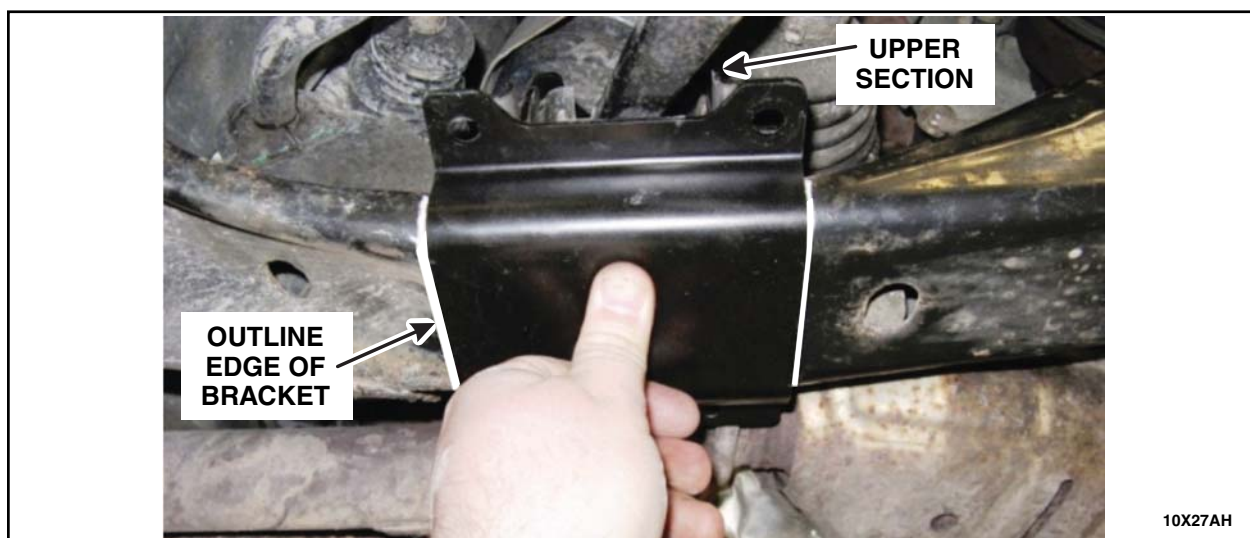


FIGURE 6



8. **NOTE:** If a portion of one or both flanges is missing or bent in a manner which would prevent a shim from laying flat against the flange, proceed to Subframe LCA Flange Cutting on page 25 for further instructions. Cutting off a damaged LCA flange will allow the shims to lay flat when installed between the LCA bushing and the reinforcement bracket.

Dry fit the upper section of the driver side reinforcement brackets on the subframe by installing over the flanges. Make sure the reinforcement bracket is snug against at least one of the flanges. If you have cut the flanges per the note above, position the reinforcement bracket so the flanges are centered within the bracket. Using a paint pen or marker, outline the outer edges of the base of the LCA reinforcement bracket. See Figure 7.

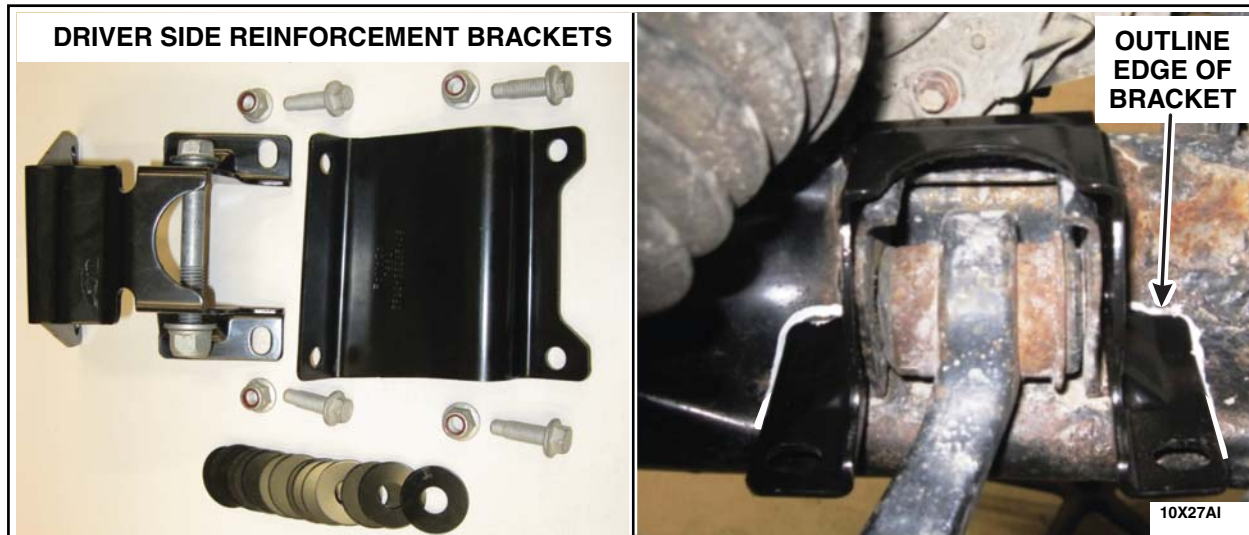


FIGURE 7

9. Dry fit the lower section of the driver side reinforcement brackets on the subframe by aligning bolt holes with upper section. Using a paint pen or marker, outline the outer edges of the LCA reinforcement bracket. See Figure 8.

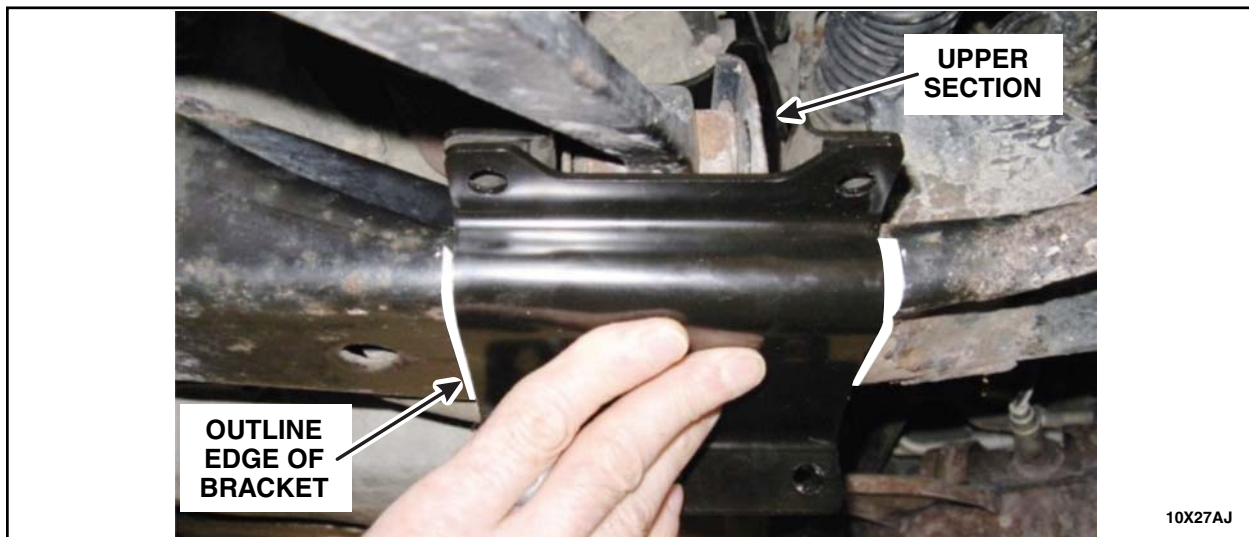


FIGURE 8



CAUTION: Wear safety glasses and proper body protection while cleaning or using any chemicals.

10. Using a 50 mm (2 in) diameter coarse Roloc™ Disc or equivalent, clean the subframe in the marked areas. Remove all E-coat and rust. Metal should be shiny in appearance. (Do not try to remove tool marks or marks caused by deep stone pecking or pitting.) See Figure 9.



FIGURE 9

11. On some vehicles, the exhaust hanger may protrude past the weld and interfere with the installation of the reinforcement bracket. If present, cut off the portion of the exhaust hanger that protrudes past the weld. See Figure 10.

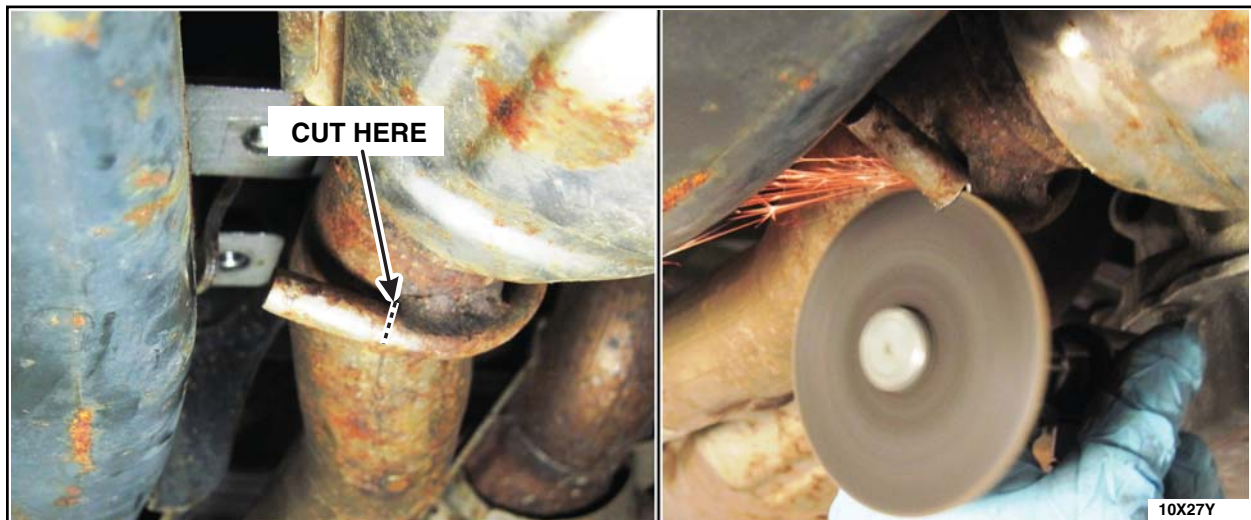


FIGURE 10



12. **NOTICE:** The adhesive will not bond properly if the reinforcement brackets have any rust on them. Failure to clean the reinforcement brackets will prevent the adhesive from bonding properly.

Using an air grinder and a 50 mm (2 in) diameter coarse Roloc™ Disc or equivalent, remove any rust from all 4 LCA reinforcement brackets. See Figure 11.

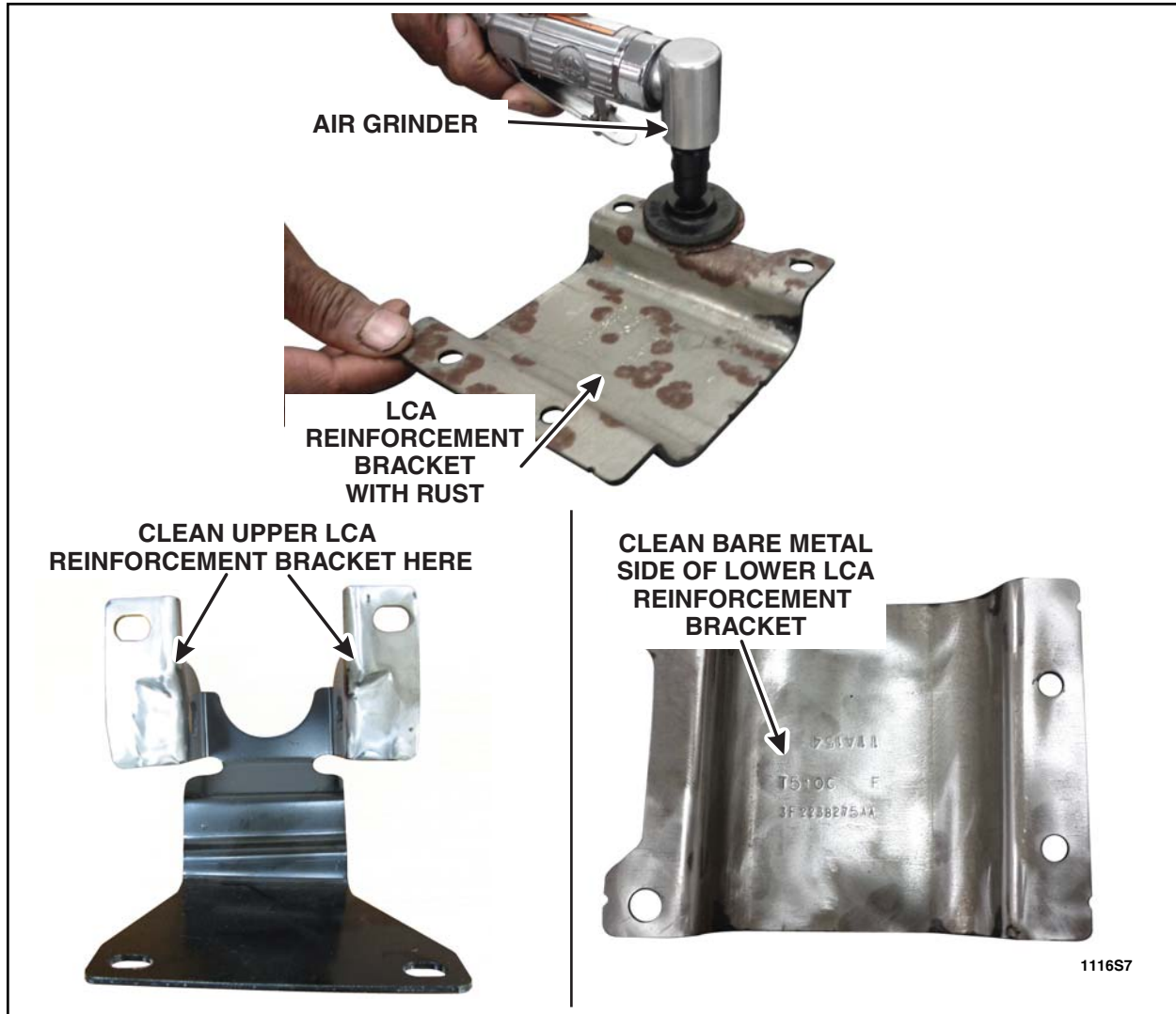


FIGURE 11

13. Wipe the LCA reinforcement brackets and the cleaned surfaces of the subframe with Motorcraft® Metal Brake Parts Cleaner using a clean paper towel.



Preparing Adhesive Cartridge

NOTE: Position the applicator gun, adhesive cartridge, LCA reinforcement brackets, sleeves, bolts, nuts, shims and tools near the work area.

14. Prepare the applicator gun and adhesive cartridge for use.
 1. Make sure the 2:1 plunger is installed on the applicator gun with the arrows pointing toward each other.
 2. Remove the black retaining nut and nose plugs from the adhesive cartridge. Insert the adhesive cartridge into the applicator gun.
 3. Squeeze out a small amount of adhesive to ensure both sides of the adhesive cartridge are flowing equally. See Figure 12A.
 4. Attach the mixing tip and replace the black retaining nut. Dispense a mixing tip length of adhesive onto a piece of scrap cardboard to ensure the product is evenly mixed and the color is consistent. The mixed adhesive should be grayish in color. See Figure 12B.

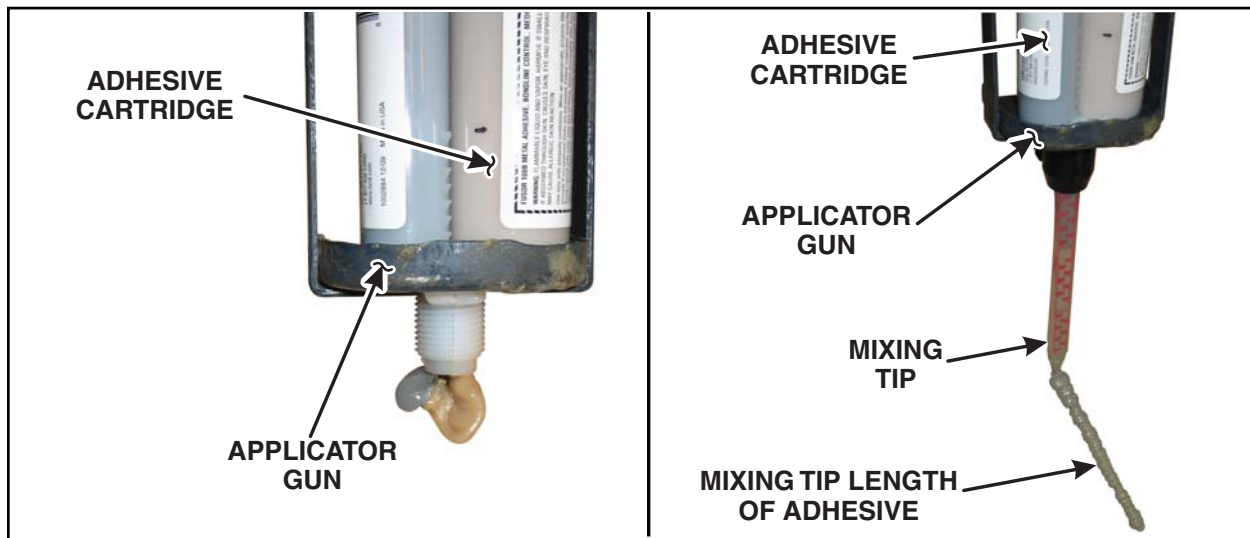


FIGURE 12A

FIGURE 12B



Applying Adhesive

15. **NOTE:** DO NOT ATTEMPT TO INSTALL BOTH THE DRIVER AND PASSENGER SIDE LCA REINFORCEMENT BRACKETS AT THE SAME TIME.

Using 10 mm (3/8 in) beads, dispense adhesive onto the lower section of the passenger side reinforcement bracket. Make sure to run a bead around the perimeter of the LCA reinforcement bracket. Also, dispense adhesive onto the subframe as shown in Figure 13. Spread the adhesive evenly with an acid brush. See Figure 13.

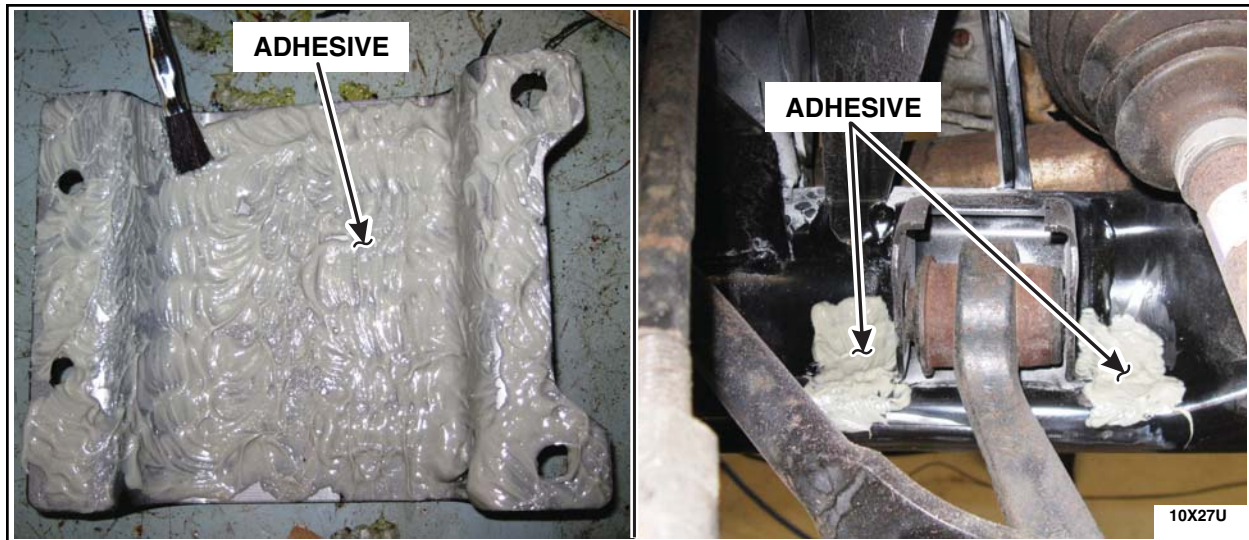


FIGURE 13

Installing LCA Reinforcement Brackets

16. Place the passenger side upper section of the LCA reinforcement bracket onto the subframe. Make sure the reinforcement bracket is snug against at least one of the flanges. If you have cut the flanges, position the reinforcement bracket so the flanges are centered within the bracket. After the LCA reinforcement bracket has been positioned, do not pull it away from the subframe. See Figure 14.



FIGURE 14



17. Align the lower section of the passenger side LCA reinforcement bracket with the upper section. While holding in place, install the bolts, nuts, sleeves and finger tighten. See Figure 15.



FIGURE 15

18. **NOTE:** Do not tighten the front suspension LCA through bolt and nut at this time.

When both flanges are present, check to see if the thinnest shim will fit between the reinforcement bracket and flange. If not, shims are not required. If so, fill the gap with supplied shims. See Figure 16.

If flanges were cut, install shims to evenly fill the gap between the LCA bushing and reinforcement bracket. Attach the LCA to the reinforcement bracket using the *new* LCA through bolt and nut. See Figure 16.

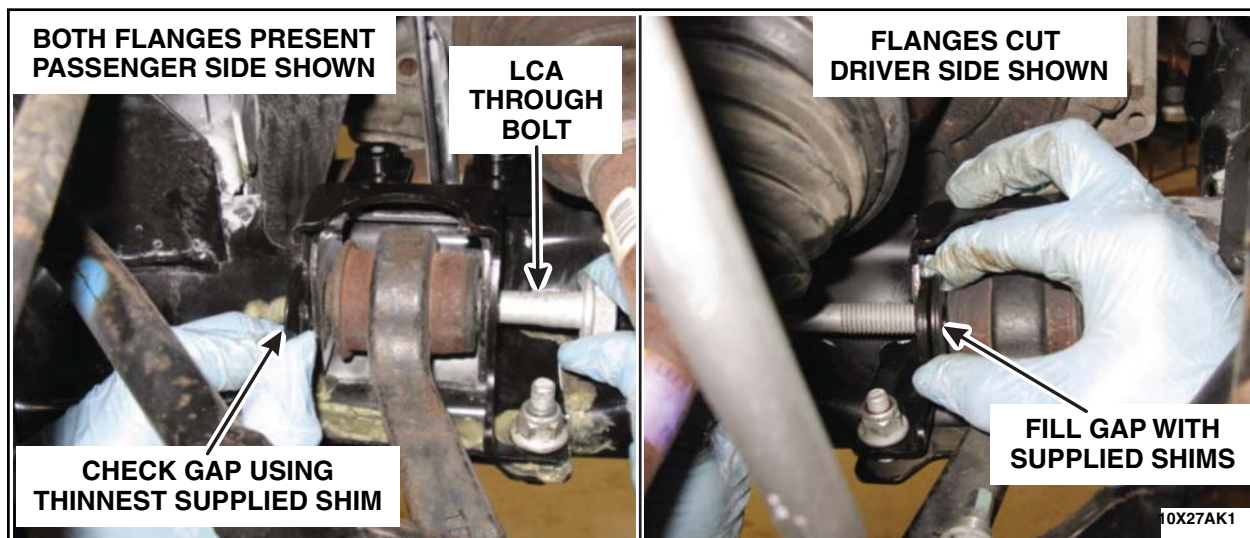


FIGURE 16



19. Tighten the fasteners evenly on the LCA reinforcement brackets. Tighten fasteners as indicated below:
- Passenger side (See Figure 17): Inboard fasteners 30 Nm (22 lb-ft).
Outboard fasteners 55 Nm (41 lb-ft).
 - Driver side: Tighten all fasteners to 55 Nm (41 lb-ft).
20. Brush the "squeezed-out" adhesive around all edges of the LCA reinforcement brackets with an acid brush to ensure all openings are completely sealed. See Figure 17.



FIGURE 17

21. Install a new mixing tip on the adhesive cartridge. Dispense a mixing tip length of adhesive onto a piece of scrap cardboard to ensure the product is evenly mixed and the color is consistent. The mixed adhesive should be grayish in color. Repeat steps 15 through 20 on the driver side of the subframe.

1999 and 2000 model year vehicles (2001 - 2003 model year vehicles skip to step 24)

NOTE: Steps 21 through 23 are only required on 1999 and 2000 model year vehicles.

22. Lower the transmission.
23. Install the two bolts securing the transaxle support insulator bracket to the subframe. Tighten to 80 Nm (59 lb-ft).
24. Remove support from under the transmission pan.

All vehicles

NOTE: **LOADING THE SUSPENSION** - Do not tighten the front suspension LCA through bolts and nuts until the vehicle's suspension is supporting the vehicle's weight. This may be done by lifting the outboard end of the LCA until the weight of the vehicle is supported by the suspension.

25. Load the front suspension and tighten the *new* LCA through bolts and nuts to 133 Nm (98 lb-ft).



26. Install approximately 20 cm (8 in) of 19 mm (0.75 in) diameter convolute tube over the power steering hose to protect it from wearing on the reinforcement bracket. Ensure convolute tube is oriented with slit facing up as shown. Secure in place. See Figure 18.

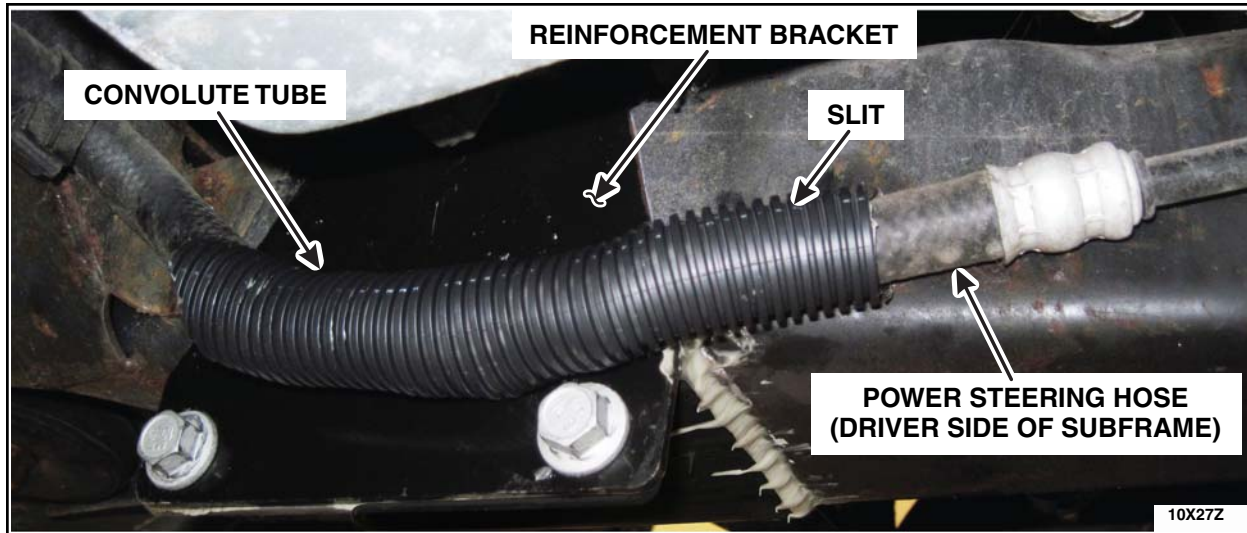


FIGURE 18

Applying Anti-Corrosion Coating

NOTICE: Use only Motorcraft® PM-13-A Anti-Corrosion Coating for this repair. Other products may affect the cure time and strength of the adhesive and may not provide adequate corrosion protection.

1. Obtain one (1) can of PM-13-A Anti-Corrosion Coating and a Preval® sprayer.
2. Vigorously shake the can of PM-13-A Anti-Corrosion Coating.
3. **NOTE:** Do not shake the Preval® sprayer once fluid has been added to the container.

Pour PM-13-A Anti-Corrosion Coating into the Preval® container.

4. **NOTE:** Observe all warnings and cautions included with the Preval® sprayer.

Spray PM-13-A Anti-Corrosion Coating on the brackets ensuring all bare metal and adhesive is coated.

5. Clean Preval® sprayer with brake parts cleaner.
6. Proceed to Subframe Rear Body Mount Attachment Reinforcement Bracket Installation on page 22.



Subframe Rear Body Mount Attachment Reinforcement Bracket Installation

1. Support the subframe using a suitable support.
2. Remove the passenger side subframe rear body mount and bolt. Discard bolt. See Figure 1.

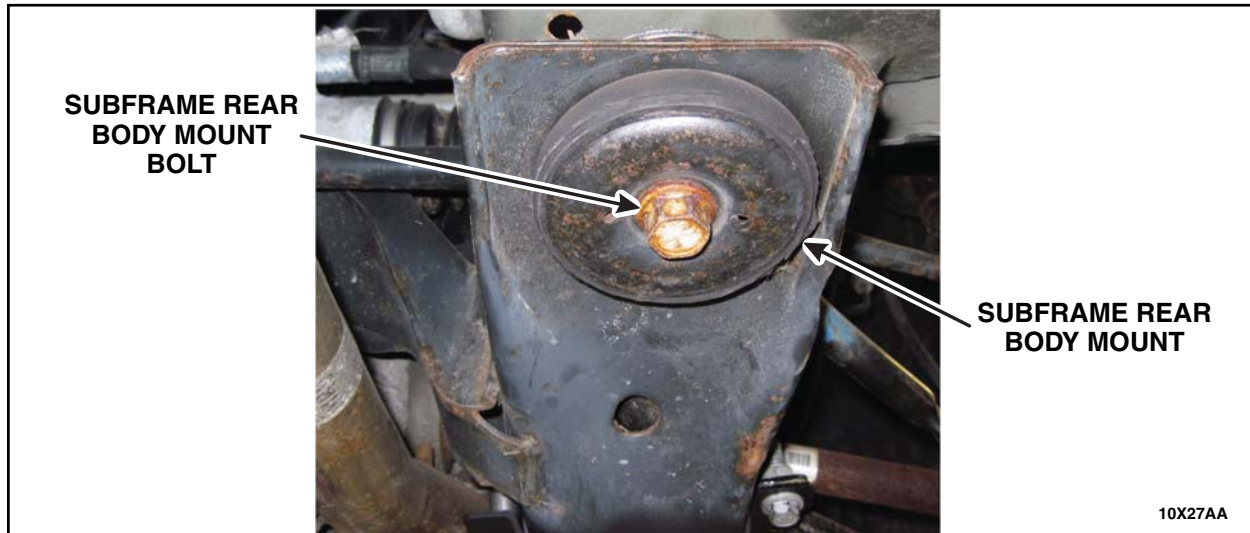


FIGURE 1

3. **NOTE:** Do not tighten the U-bolt nuts at this time.

Install the subframe rear body mount reinforcement bracket and U-bolt. Make sure the reinforcement bracket is properly positioned over body mount and finger tighten the U-bolt nuts. See Figure 2.

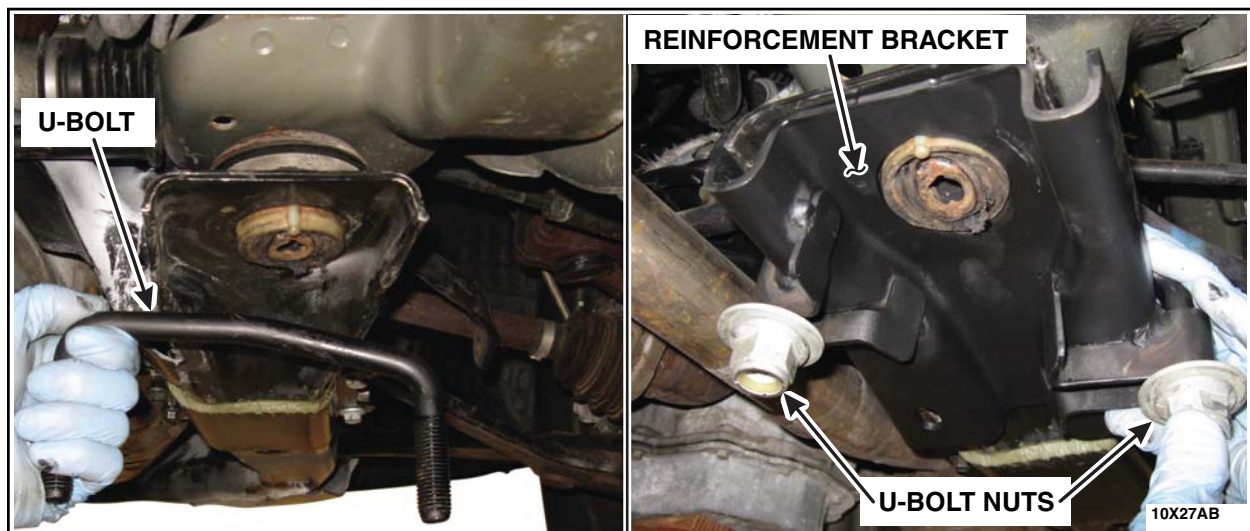


FIGURE 2



4. Install the subframe rear body mount, supplied washer and *new* rear body mount bolt. Tighten to 133 Nm (98 lb-ft). See Figure 3.

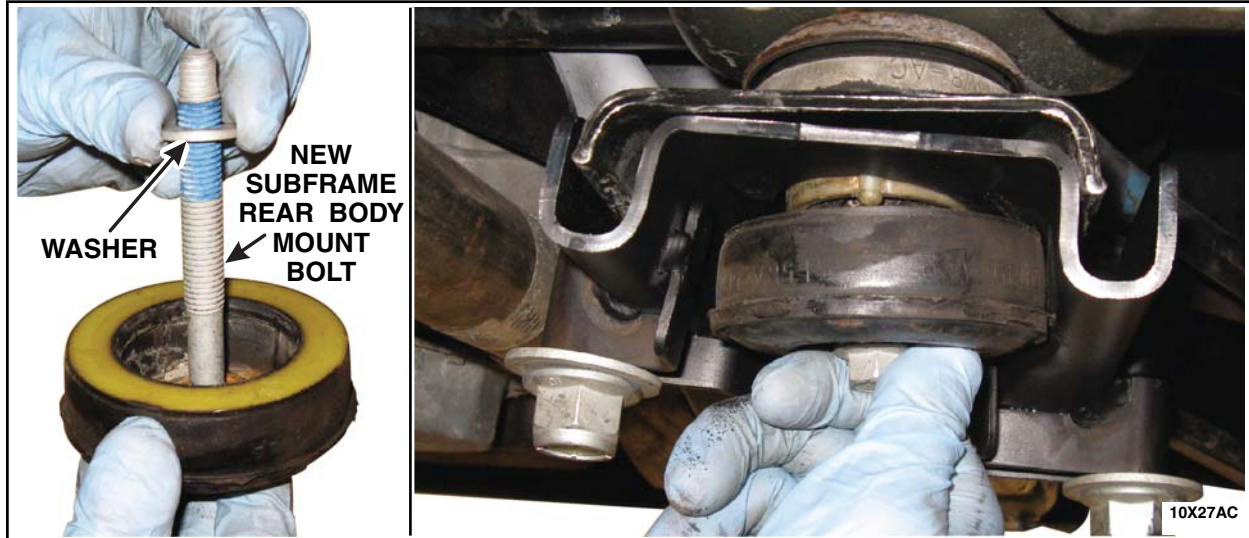


FIGURE 3

5. Starting with the nut that is to the outboard side of the vehicle, evenly tighten the U-bolt nuts. Tighten until one full thread is showing. See Figure 4.

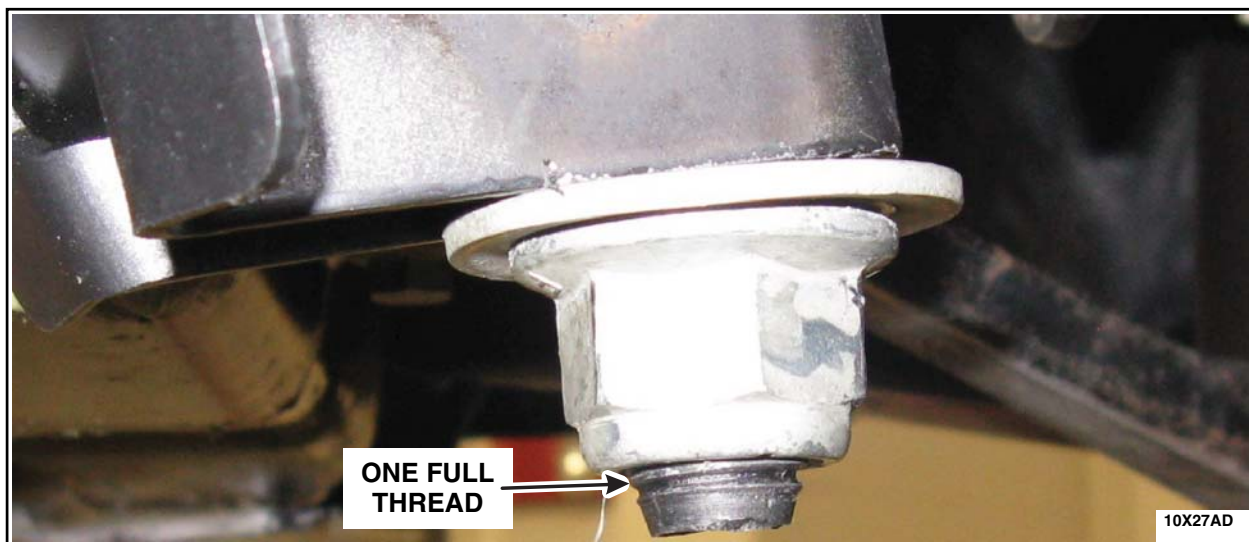


FIGURE 4

6. Repeat steps 2 through 5 on the driver side.
7. Install both front wheels. For additional information, refer to the WSM, Section 204-04.



8. Lower the vehicle and allow the adhesive to cure. The vehicle may be removed from the hoist while the adhesive is curing unless Safety Recall 10S13 (Rear Axle Repair) is also being performed. The vehicle can be returned to the customer only after the adhesive has cured. See Adhesive Cure Time below.

Adhesive Cure Time

NOTE: Obtaining the proper adhesive cure is a critical part of the subframe LCA reinforcement bracket repair.

In order for the reinforcement brackets to properly bond to the vehicle subframe, the vehicle must remain in the shop until the adhesive used to install the subframe LCA reinforcement brackets has cured. To ensure the adhesive cures properly, the following guidelines **must** be followed:

- 2 hour cure time at 21° C (70° F) or higher shop temperature
- 3 hour and 15 minute cure time at 16° C (60° F) shop temperature
- If the shop temperature is lower than 16° C (60° F), the adhesive will need to cure overnight
- **DO NOT USE HEAT LAMPS TO REDUCE CURE TIME AS EXCESSIVE TEMPERATURES WILL AFFECT BOND STRENGTH OF THE ADHESIVE**



V. Subframe LCA Flange Cutting

NOTE: Cutting off a damaged LCA flange will allow the shims to lay flat when installed between the LCA bushing and the reinforcement bracket.

Passenger Side Shown

1. Remove the LCA and mark the locations of the areas to be cut with a paint pen or marker. The cuts must be between 5 mm (0.20 in) to 8 mm (0.31 in) from the flange weld. See Figure 1.

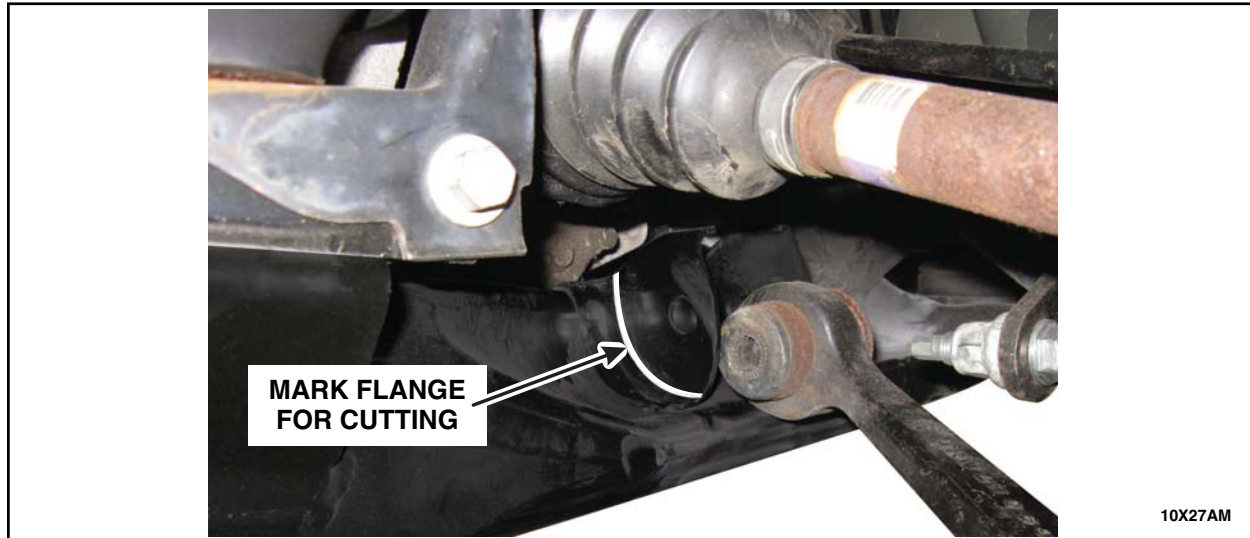


FIGURE 1

2. Using a 3M™ General Purpose Cut-Off Wheel or equivalent, cut the flanges in the marked areas. See Figure 2.

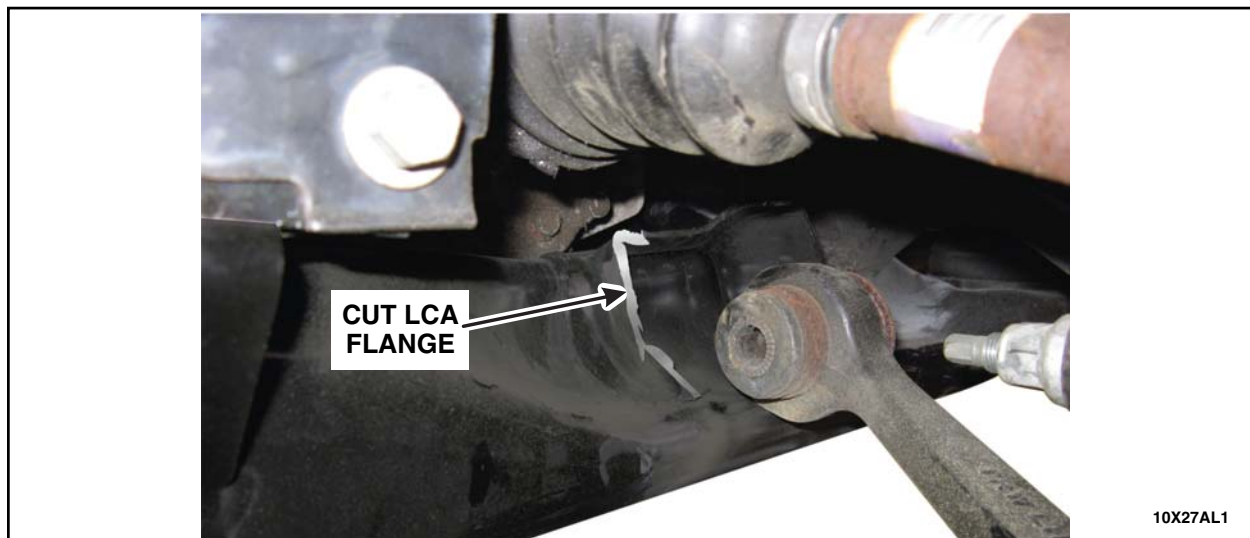


FIGURE 2

3. To continue with procedure for passenger side, return to page 13 step 6. To continue with the procedure for the driver side, return to page 14 step 8.



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VI. DIGITAL IMAGING INSTRUCTIONS

Required Pictures for Vehicles That Did Not Pass Inspection

Send the following pictures:

- One picture of the odometer.
- One picture of the Vehicle Certification (VC) Label showing the Vehicle Identification Number (VIN). See Figure 1.
- One picture of the vehicle from the rear passenger side. Picture must clearly show the trim level of the vehicle. See Figure 2.

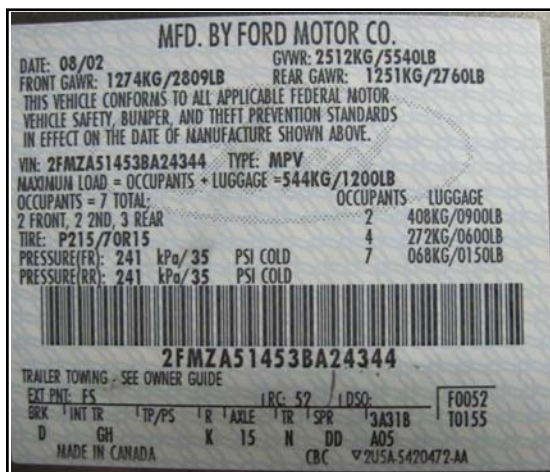


FIGURE 1



FIGURE 2

- Three clear close up pictures showing why the subframe cannot be repaired as well as three pictures of the rear body mount section in the worst condition. Pictures of the rear body mount section must include a ruler to show how far away the crack or perforation is from the tooling hole. The ruler must be flat against the subframe as shown in Figure 4.

NOTE: The angle at which the picture should be taken depends on the reason that the vehicle did not pass inspection. Refer to the following examples for guidance.



Take three close up pictures from the side of the subframe showing the crack and the tooling hole. In order to make a determination, the evaluator will need to be able to see the crack in relationship to the tooling hole. See Figure 3.



FIGURE 3 - Proper angle for a cracked subframe

Take three close up pictures from the bottom of the subframe showing the perforation and the tooling hole. In order to make a determination, the evaluator will need to be able to see the perforation in relationship to the tooling hole. See Figure 4.



FIGURE 4 - Proper angle for a perforated subframe



Take three close up pictures that clearly show the location and extent of the non-factory welds and/or reinforcements. See Figure 5.



FIGURE 5

If the LCA rear attachment point is missing both flanges, take three close up pictures of the area where the missing flanges were welded to the subframe.



Downloading Digital Imaging Software

Non DI dealers can download the Digital Imaging software from the PTS website by following these steps:

- Login to PTS website.
- Click on the “Tech Hotline” tab.
- Click on the “Digital Imaging Home Page” link.
- Click on the “Online Training” tab and watch all of the training sections prior to implementing the software download steps.
Important: The training sections will cover the Digital Imaging installation process.
- Select the download tab and click on the “Digital Image Full Install” link to download the software (using the computer you have chosen for Digital Imaging).

NOTE: When submitting an 11S16 claim, please click on the “Launch 11S16” button on the DI Homepage. See Figure 1.

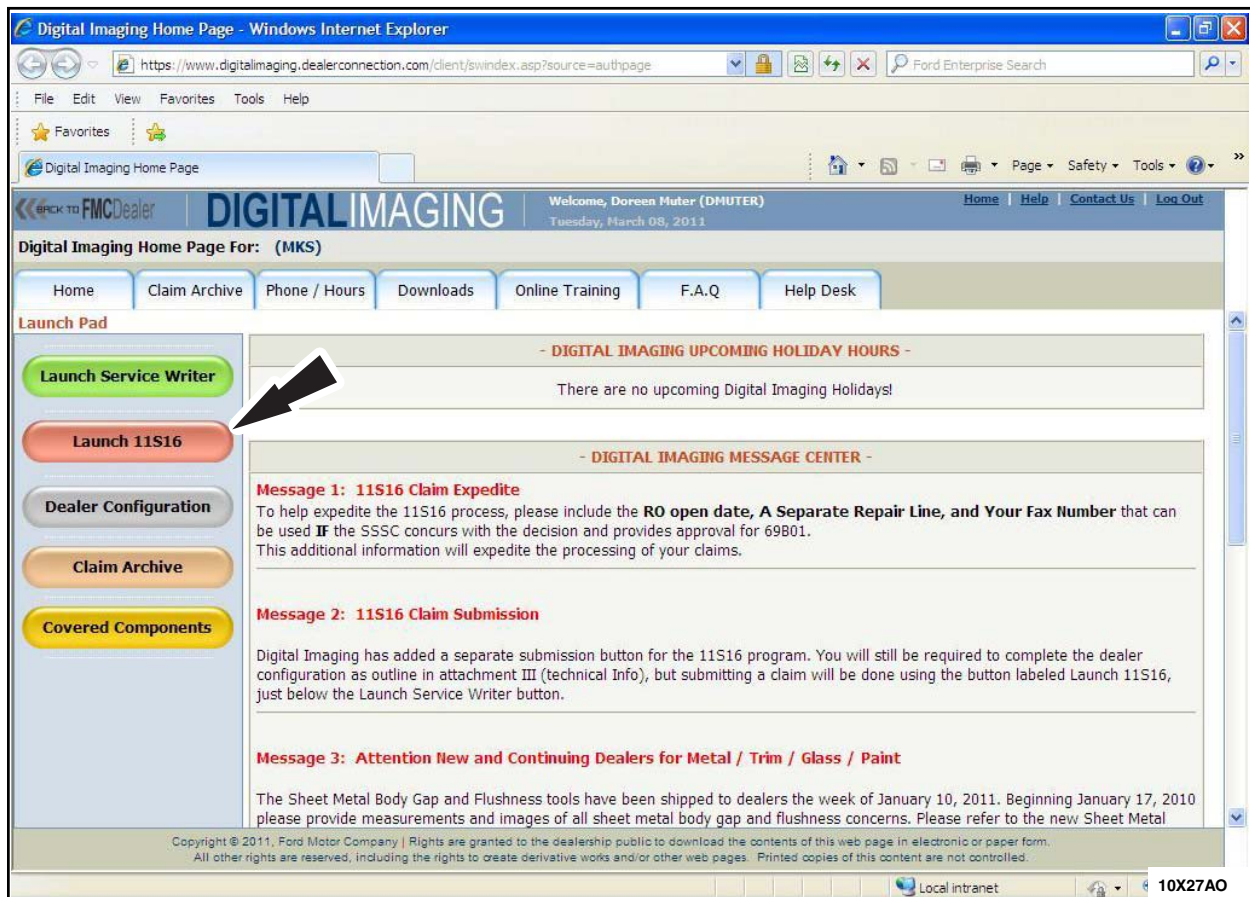


FIGURE 1

NOTE: 11S16 claims must be submitted under the 11S16 routing. 11S16 claims submitted under a different routing group will be processed and returned to the dealership without resolution. The dealership will be responsible for resubmitting the claim under the correct routing group.



Routing Group Setup for 11S16

- The 11S16 images will be submitted under a new routing group, which must be set up in the Dealer Configuration tool, located on the Digital Imaging Home Page.
- If your dealership will only be submitting claims for the 11S16, you will only need to enter your name once and select 11S16 in the routing column.
- **If your dealership is currently using the Digital Imaging application to submit claims for any other program, an additional routing group for the 11S16 will need to be set up in the Dealer Configuration tool.**
- In the Dealer Configuration tool, if one individual will be submitting claims under multiple routing groups, such as Digital Imaging and 11S16, the recommended process is to enter the individuals name one time for each different routing group.
- When entering names in the Dealer Configuration tool, it is recommended that the user add a middle initial to match the first letter of the routing group name.

Dealer Configuration Example

- Don Reed from dealership P&A Code: 11111 will be submitting images for Digital Imaging Prior Approvals and for the 11S16 program.
- Because Don Reed will be submitting images for two different programs, Don will be entering his name twice in the Dealer Configuration tool.
- Don will enter the following names
 - o “Don **D** Reed” for the “**D**igital Imaging” routing
 - o “Don **W** Reed” for the “11**S**16” (**W**indstar) routing.

Required Equipment for the Digital Imaging Application

The digital imaging application is only supported on **Windows XP Professional** or **Windows 7 Professional with XP Mode** installed.

Digital Imaging recommends the following camera brands for ease of use and quality of images:

- Kodak Easyshare
- Canon Powershot - A Series
- Sony Point & Shoot - Cybershot Models

NOTE: It is preferred to use a digital camera that supports the PTP (Picture Transfer Protocol)

NOTE: The DI software application has a 3.5 Megapixel limitation. Most cameras are shipped from the factory pre-set at the highest megapixel setting. Prior to capturing images, make sure that your camera is set at a Quality Setting less than 3.5 Megapixels.



DI Technical Information Support (TIS)

For Digital Imaging software, website, connectivity, image upload, and camera support assistance, please complete a "TIS Assistance Request Form" located on the PTS / Tech Hotline page.

- Access the PTS Website
- Select the Tech Hotline button
- Select TIS Assistance Request Form (left side)
- Select the Digital Imaging button
- Complete the TIS Assistance Request and click Continue
- Optional - Enter a cell phone number if you would like a text message when a response has been posted to PTS
- Click Submit

VII. SUBFRAME REMOVAL AND REPLACEMENT

Repair Tips

NOTE: Do not follow the Workshop Manual for subframe replacement. The following service procedure has been developed specifically for Safety Recall 11S16. Some of the special tools called out in the Workshop Manual are now obsolete.

1. **Exhaust Pipe to Flex Pipe Flange Separation:** The flange connection between the exhaust pipe and the flex pipe may be severely rusted on many of the vehicles. Heating the flange on these vehicles will make it easier to remove the bolts.
2. **Preventing Flex Pipe Damage:** Many of the vehicles will have flex pipes that are in poor condition due to vehicle age. Additional damage to the flex pipe can be avoided by using special tool 309-001. This tool is designed to keep the flex pipe straight. If special tool 309-001 is not available, a 71 cm (28 in) length of 31.75 mm (1.25 in) diameter PVC pipe may be inserted through the flex pipe and into the muffler inlet pipe to keep the flex pipe from bending.
3. **Subframe Mounting Bolt Removal:** To assist in removal, apply penetrating oil to the threads that extend above the caged nut. This will improve the chances of removing the bolt without the nut slipping out of its cage and spinning.



Service Procedure

1. Remove the upper radiator shield. See Figure 1.

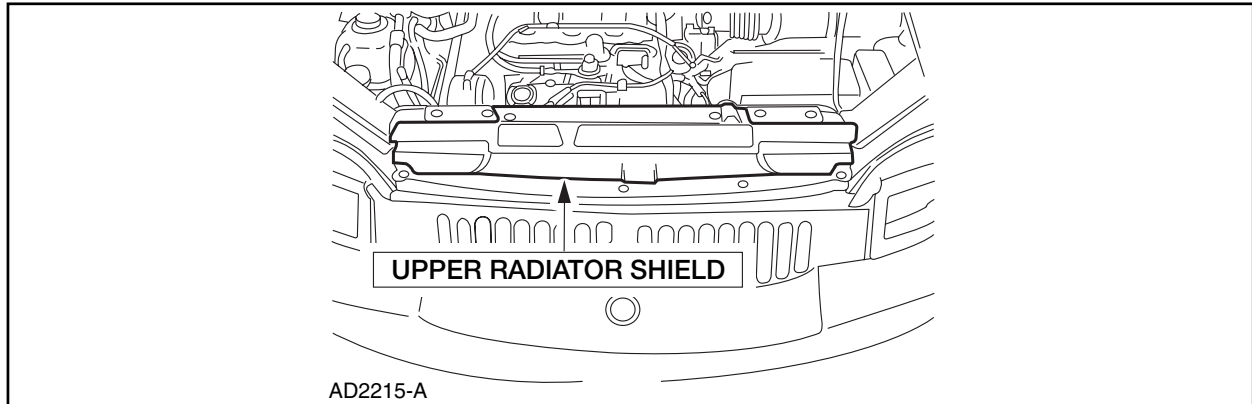


FIGURE 1

2. Remove the cowl grille. For additional information, refer to the WSM, Section 501-02.
3. Install the Engine Lifting Bracket Set special tool 303-D095. See Figure 2.

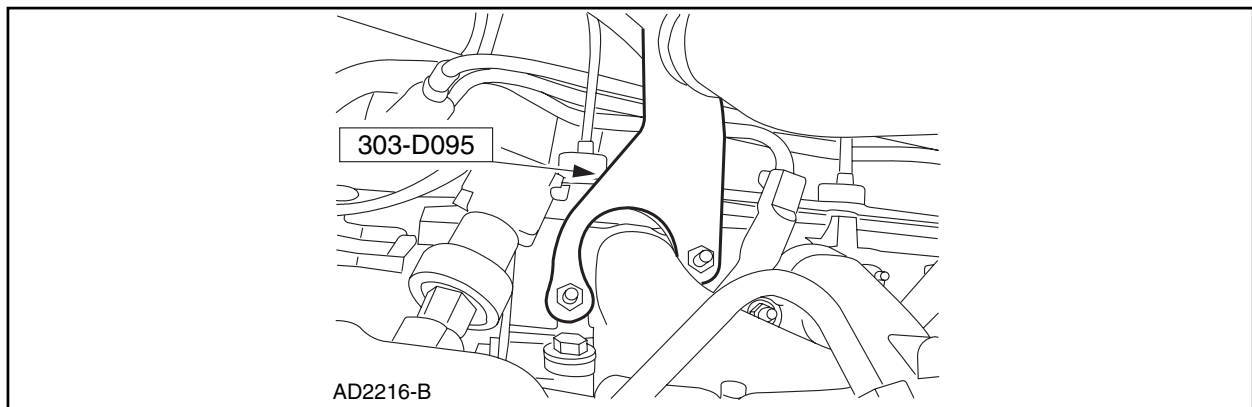


FIGURE 2

4. Install the Three Bar Engine Support Kit special tool 303-290A. See Figure 3.

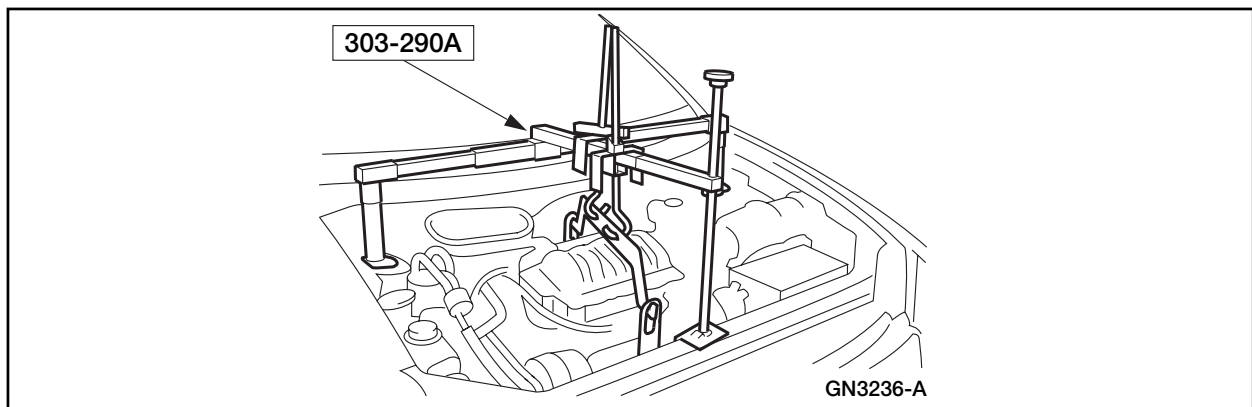


FIGURE 3



5. **NOTE:** If the lower control arm retainers and pinch bolts are not damaged, they may be used for reassembly.

Remove both front suspension lower control arms. For additional information, refer to the WSM, Section 204-01.

6. Disconnect and remove both catalyst monitor sensors.
- To install, tighten to 46 Nm (34 lb-ft).
7. Support the exhaust system with a suitable jack stand. See Figure 4.

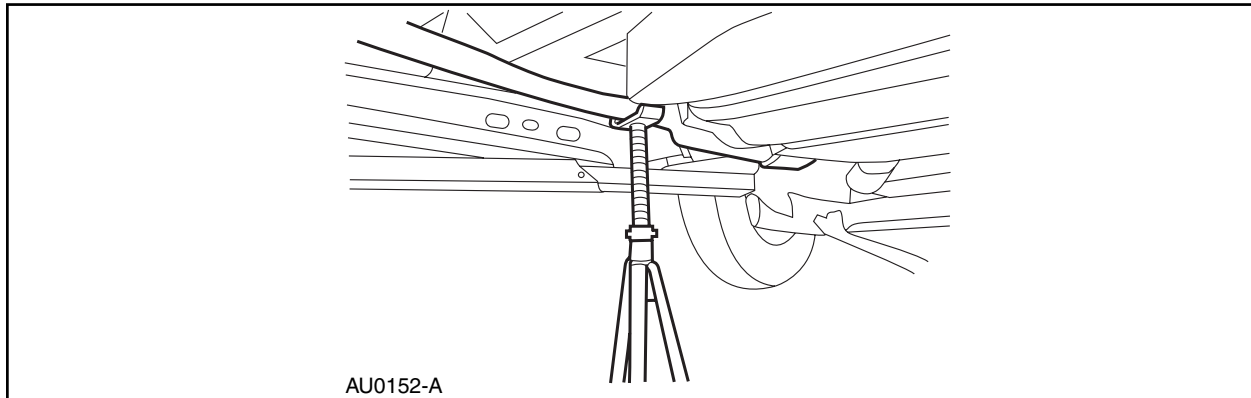


FIGURE 4

8. Remove the exhaust hangers from the rubber insulators.



9. Install the Flexible Exhaust Pipe Holding Fixture special tool 309-001 onto the flex pipe. See Figure 5.

- If special tool 309-001 is not available, insert a 71 cm (28 in) length of 31.75 mm (1.25 in) diameter PVC pipe into the flex pipe after the flex pipe has been separated from the dual converter Y-pipe. This will prevent excessive movement and/or damage. See Figure 6.

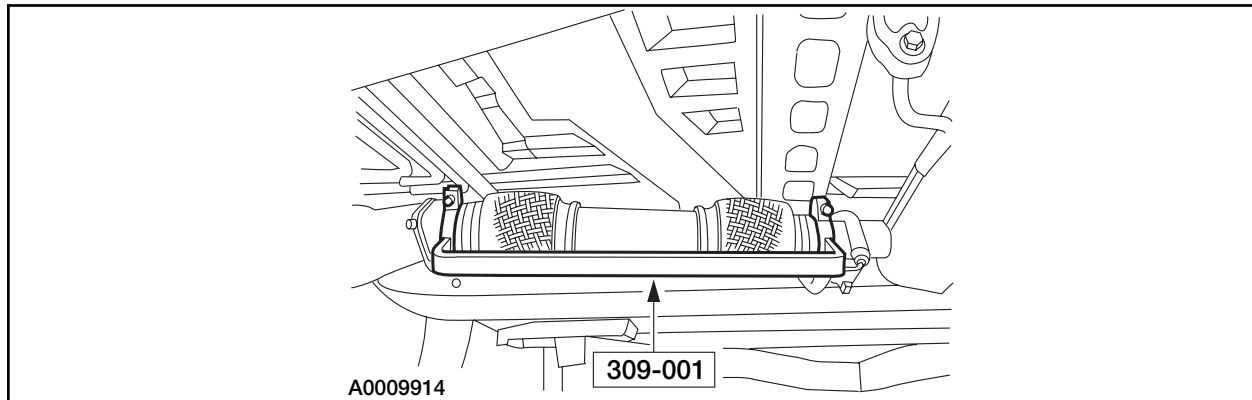


FIGURE 5

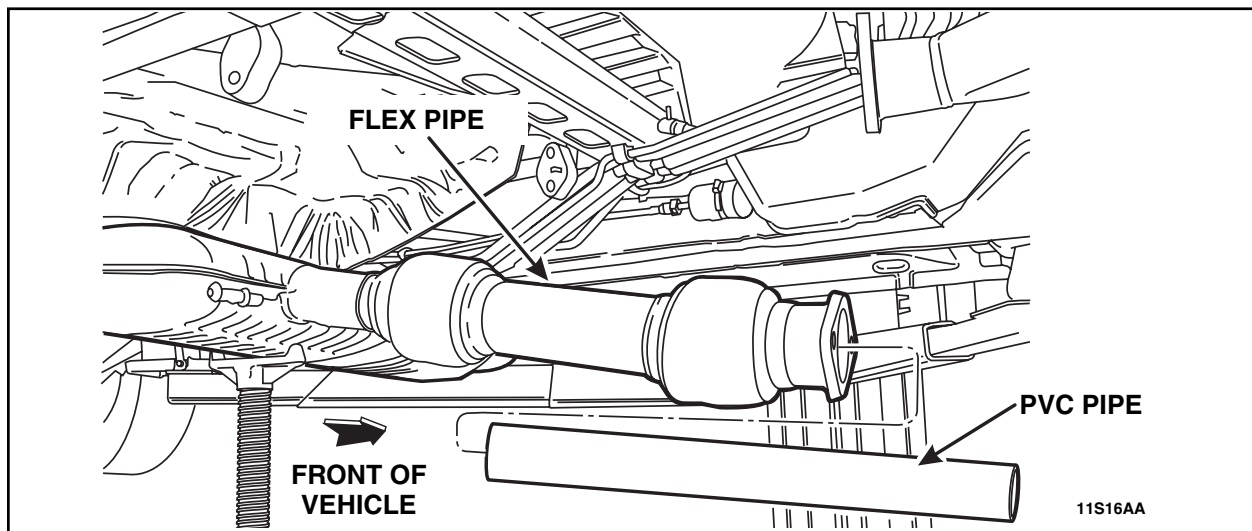


FIGURE 6

10. Remove the two dual converter Y-pipe-to-flex pipe bolts. Discard the bolts and the flange gasket.

- To install, tighten to 40 Nm (30 lb-ft).

11. Partially lower the exhaust system to aid in subframe removal.



12. Remove the two engine mount nuts. See Figure 7.

- To install, tighten to 80 Nm (59 lb-ft).

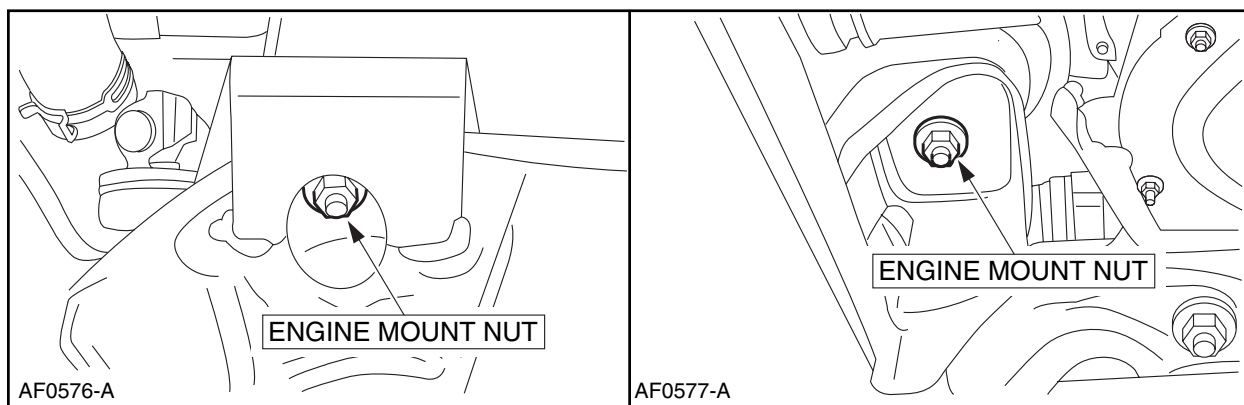


FIGURE 7

13. Remove the two bolts securing the transaxle support insulator bracket to the subframe. See Figure 8.

- To install, tighten to 80 Nm (59 lb-ft).

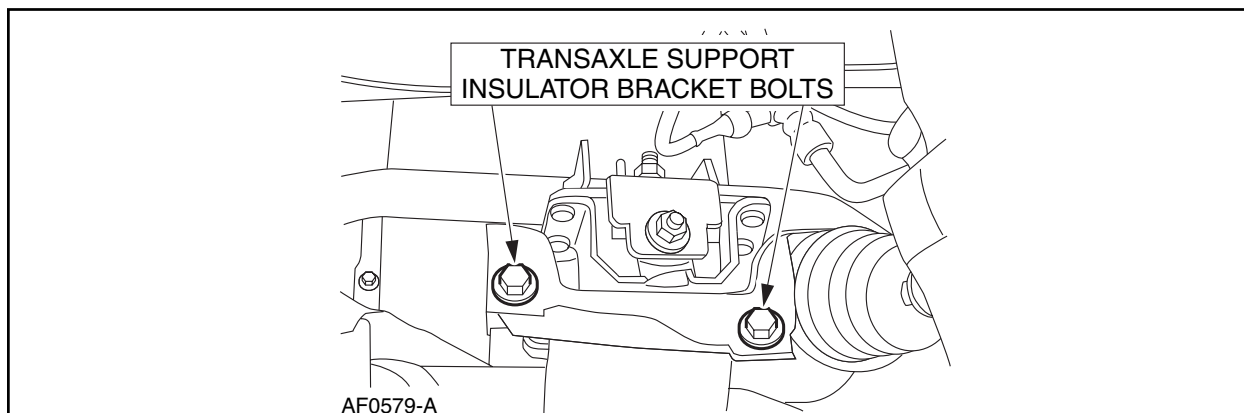


FIGURE 8

14. Remove the two bolts and push pin from the power steering return line and position aside.

- To install, tighten to 6 Nm (53 lb-in).

15. Disconnect the LH front O2 sensor connector push pin from the subframe.

16. Position a suitable lift under the vehicle and support the subframe.

17. Remove the four front subframe bolts.

- To install, tighten to 133 Nm (98 lb-ft).



18. Lower the subframe approximately 3-4 inches to gain access to the stabilizer bar bracket insulators.
19. Remove the four stabilizer bar bracket insulator bolts. See Figure 9.
 - To install, tighten to 51 Nm (38 lb-ft).

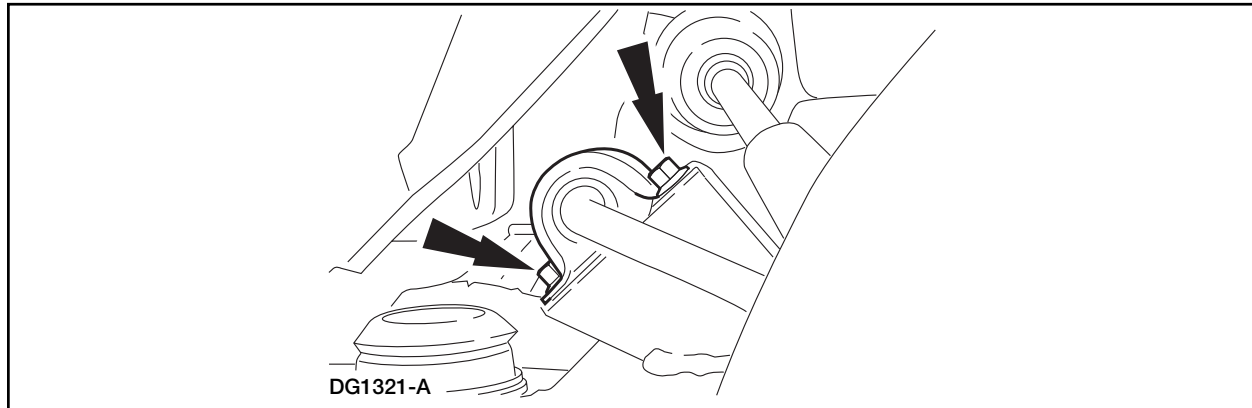


FIGURE 9

20. Remove the steering gear nuts. See Figure 10.
 - To install, tighten to 125 Nm (92 lb-ft).

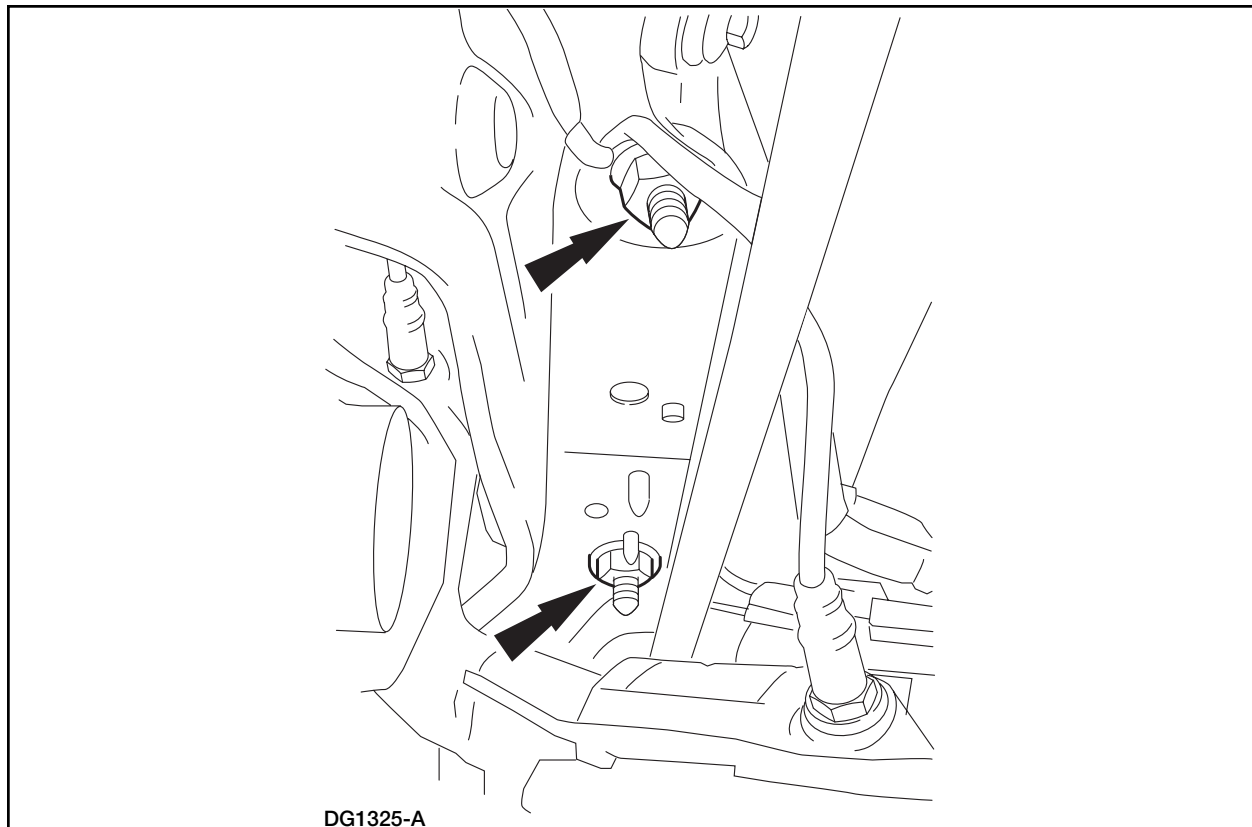


FIGURE 10



21. With the help of an assistant, remove the subframe.
22. Transfer the splash shield from the old subframe to the *new* subframe.
23. Install *new* subframe assembly by reversing the removal procedure.
24. Check toe alignment and adjust if necessary.

