

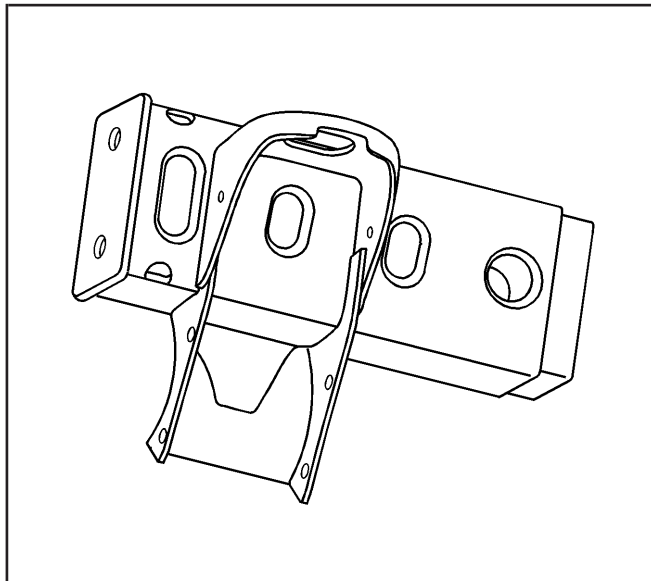
# Frame Procedures

## Repair Instructions

### Frame Sectioning - Front Full Frame (Chevrolet SSR)

#### Removal Procedure

The service assemblies for the left and the right front frame rails are pre-sleeved, mild steel, hydro-formed parts, which correlate directly with the die marks located on the front frame rails. The assemblies include pre-welded support mounting brackets for the body and the radiator.



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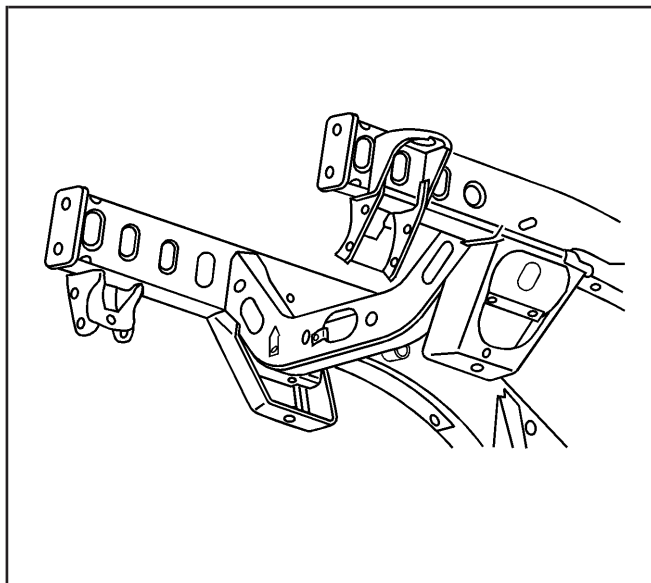
**Caution:** Refer to *Approved Equipment for Collision Repair Caution* on page 1-1.

**Caution:** Refer to *Collision Sectioning Caution* on page 1-1.

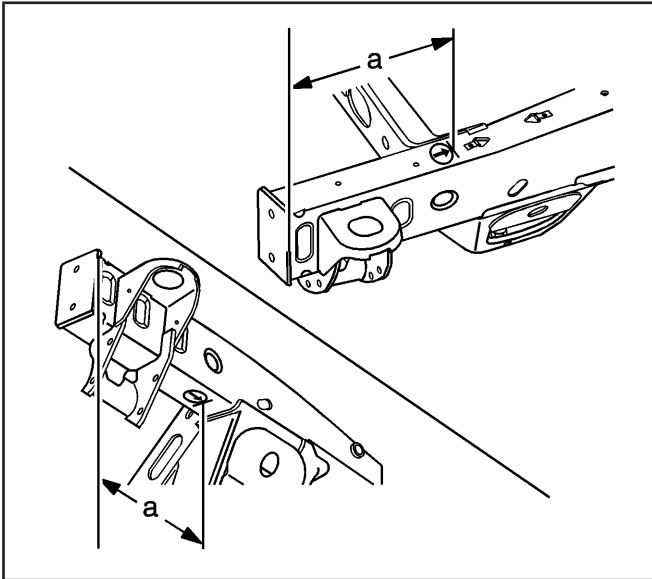
1. Disable the SIR system. Refer to *SIR Disabling and Enabling Zones* on page 1-118.

**Caution:** Refer to *Battery Disconnect Caution* on page 1-1.

2. Disconnect the negative battery cable.
3. Remove all of the related panels and components.

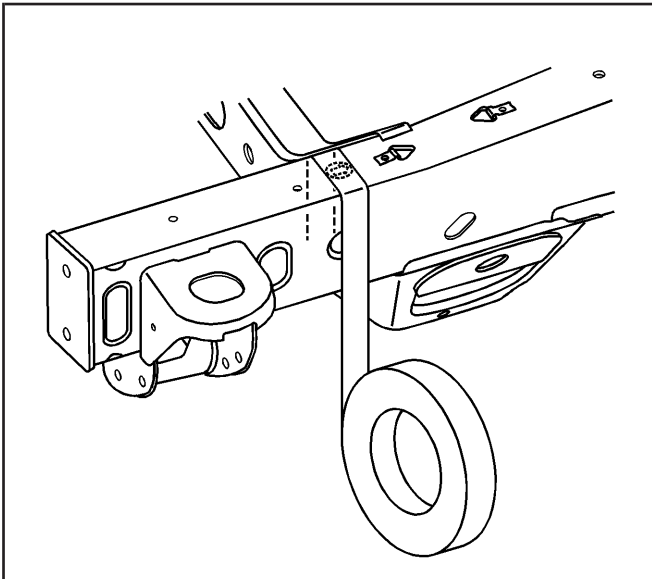


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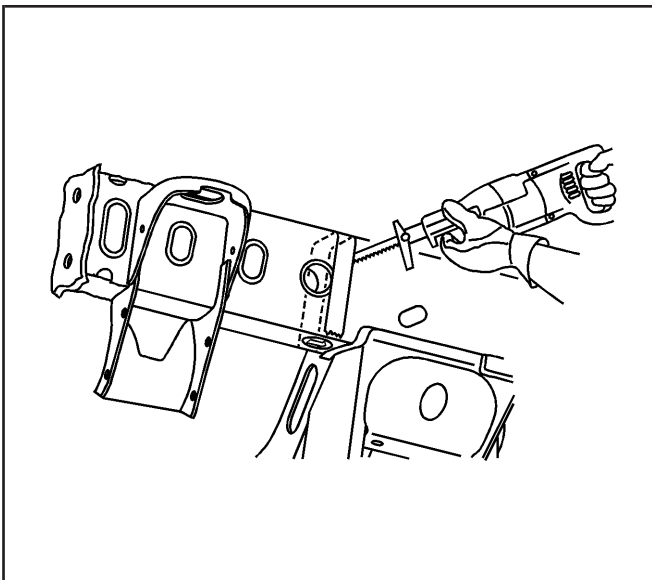
4. Locate the two die-marks on the damaged frame rail. The die marks are located 302 mm (11 7/8 in) rearward from the front frame rail bumper bracket, on the top and bottom side of each rail.



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**Important:** Line up the masking tape with the point of each die mark arrow as shown.

5. Apply masking tape over the die-marks and down each frame rail side as shown, for the cut location.

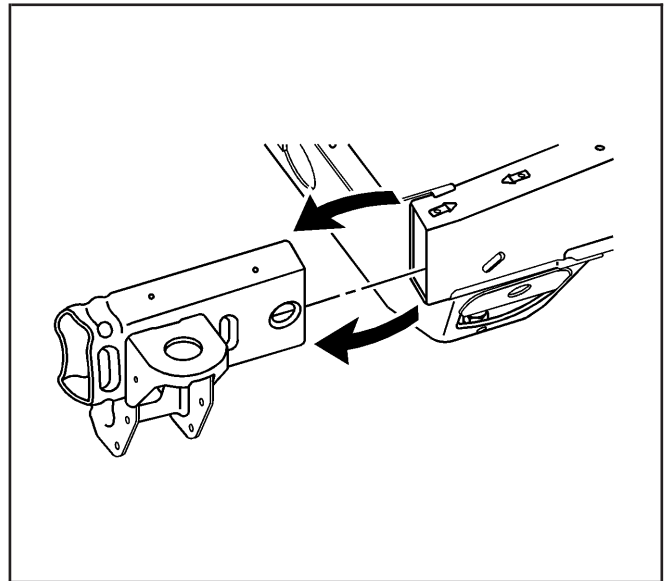


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**Important:** The tape edge facing the rear of the vehicle is the proper cut location. The cut location is not to exceed 302 mm (11 7/8 in) of the front frame section.

6. Cut the damaged frame rail at the rear edge of the tape line using a reciprocating saw or equivalent, as shown.

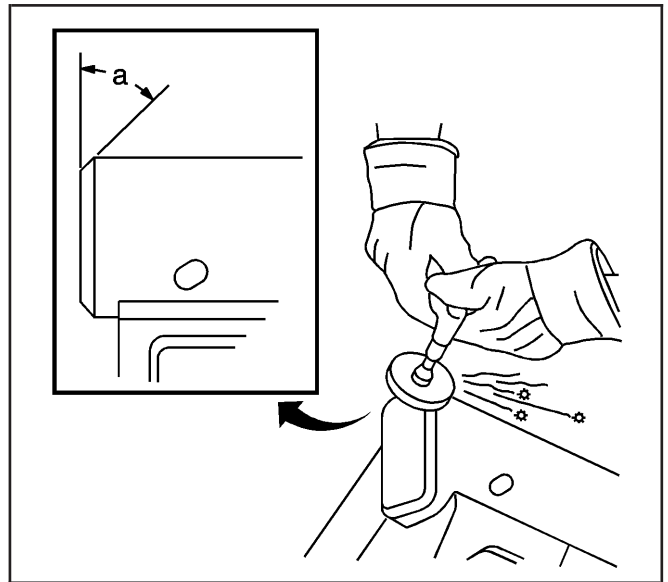
7. Remove the damaged frame section.



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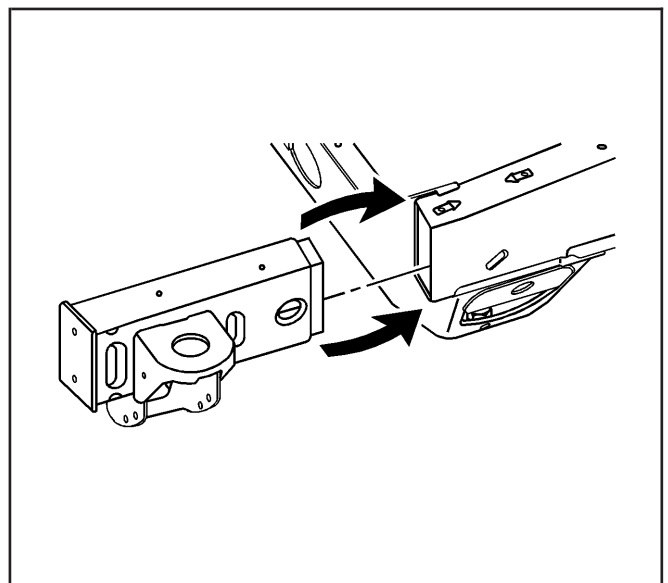
### Installation Procedure

1. Grind the existing frame rail sectioning location to a 45 degree angle.
2. Prepare all of the attaching surfaces as necessary.

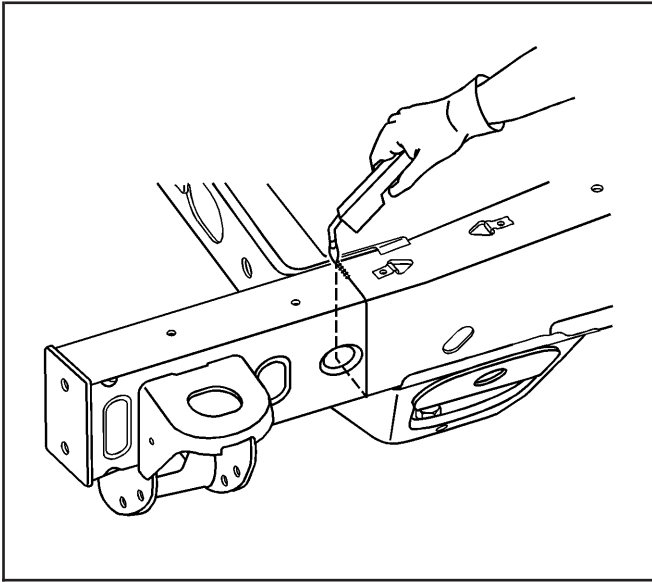


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3. Position the service frame section to the existing frame and clamp in place.



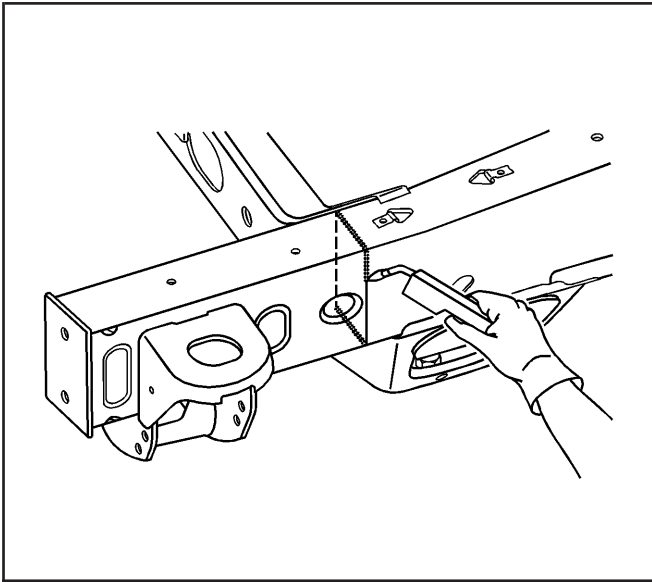
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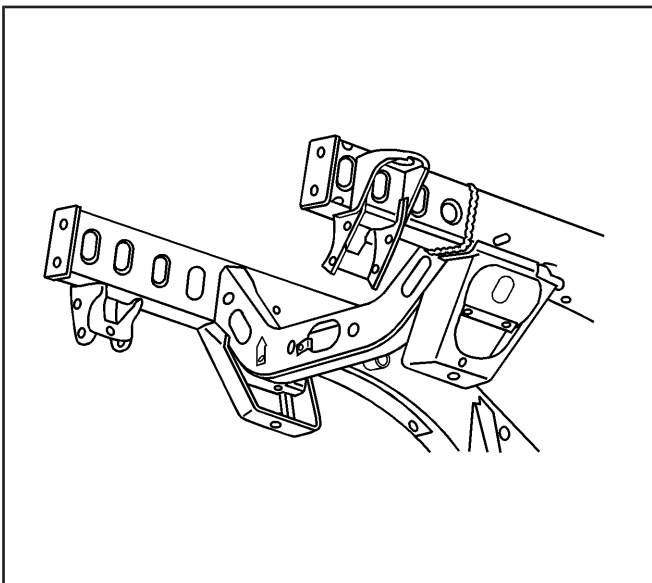
**Important:** Inspect the frame measurements three-dimensionally to ensure proper position of the service frame prior to welding. Refer to *Dimensions - Frame*.

4. Continuous-weld the upper and lower horizontal joints from corner to corner.



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5. Continuous-weld the inner and outer vertical joints from corner to corner.



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6. Clean and prepare all of the welded surfaces.
7. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to *Anti-Corrosion Treatment and Repair*.
8. Install all of the related panels and components.

**Caution:** Refer to *Battery Disconnect Caution on page 1-1*.

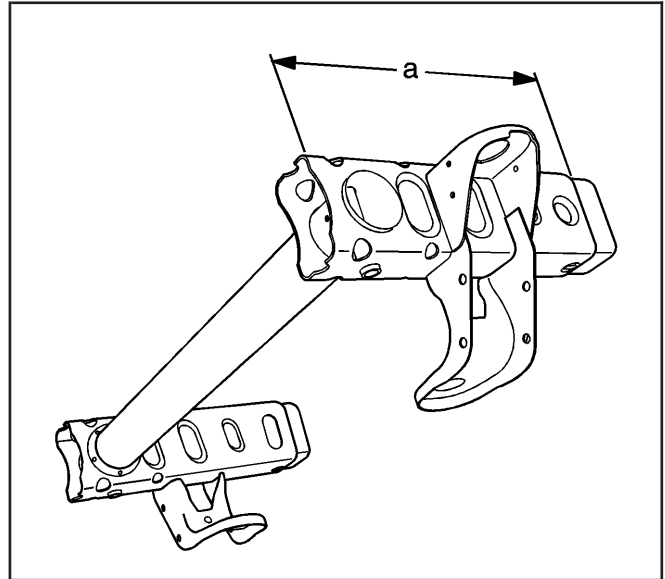
9. Connect the negative battery cable.
10. Enable the SIR system. Refer to *SIR Disabling and Enabling Zones on page 1-118*.

## Frame Sectioning - Front Full Frame (Mid size utility 2002 - current, except S/T models)

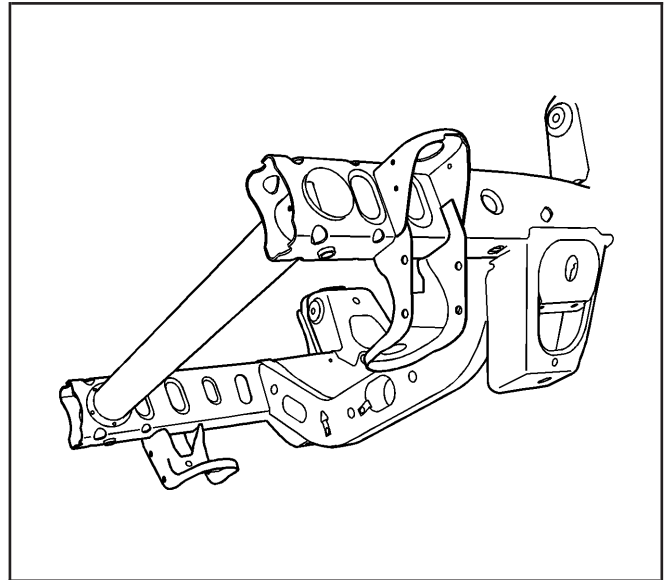
### Removal Procedure

The re-designed frame assembly for the new S/T Utility is a mild, steel hydroformed frame assembly. A front frame service section consisting of the left and right frame ends, body, and radiator support mounting brackets and front connecting cross tube is available. If damage permits, locate and cut off the front 420 mm (16½ in) portion of the frame using the die-mark indicators as a guide. The front and rear body mounts, radiator support mounts, steering gear and transmission cross-member can be ordered and replaced separately.

1. Remove all of the related panels and components including the front bumper assembly.

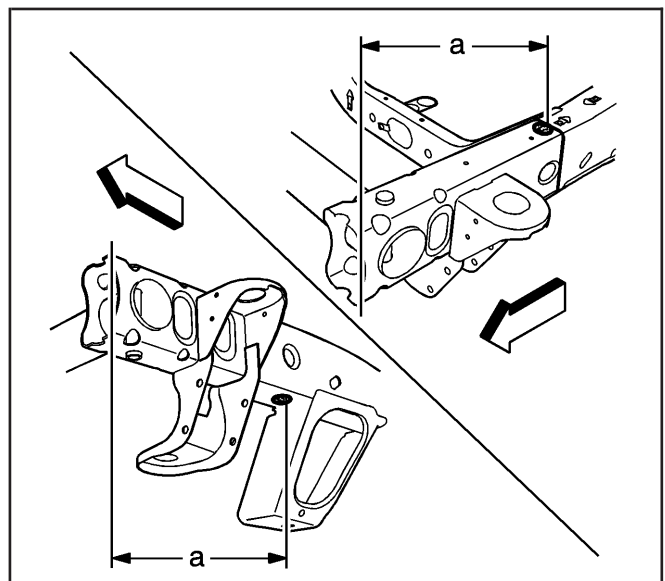


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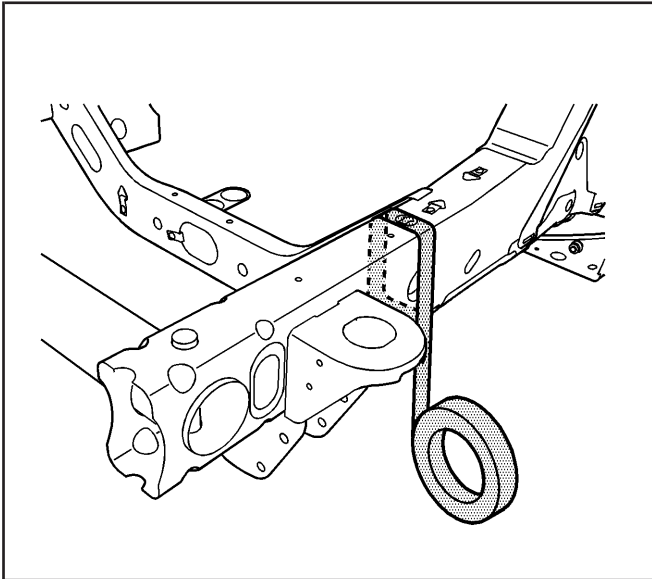


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2. Locate the 2 die-marks on each frame. The die marks are located 420 mm (16½ in) rearward from each front frame rail end on the top and bottom side of each rail.



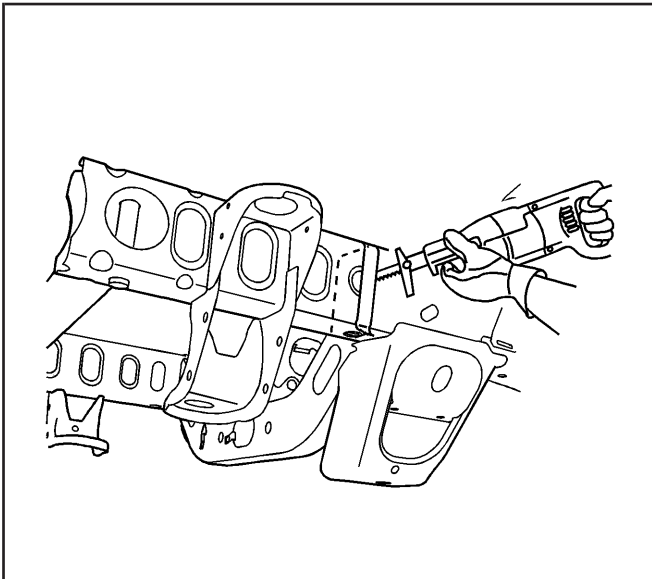
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**Important:** Line up the masking tape with the point of each die mark arrow.

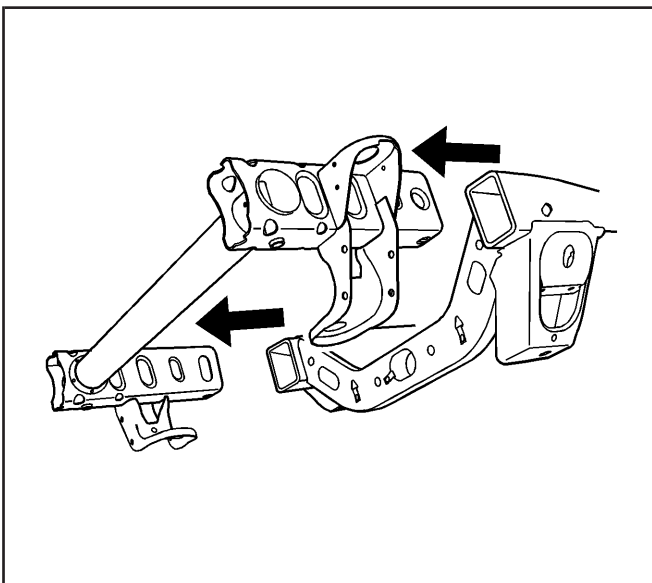
3. Apply masking tape over the die-marks and down each frame rail side as shown, for the cut location.



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**Important:** The tape edge facing the rear of the vehicle is the proper cut location. The cut location is not to exceed 420 mm (16½ in) of the front frame section.

4. Cut each frame at the rear edge of the tape line using a reciprocating saw or equivalent, as shown.

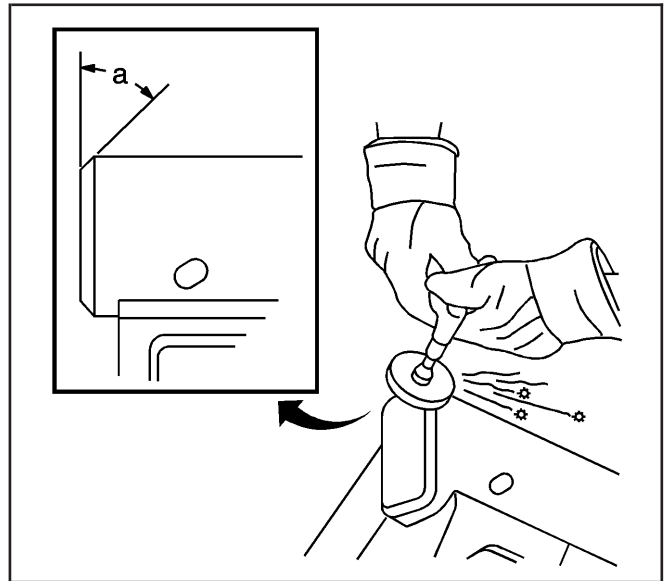


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5. Remove the damaged frame section.

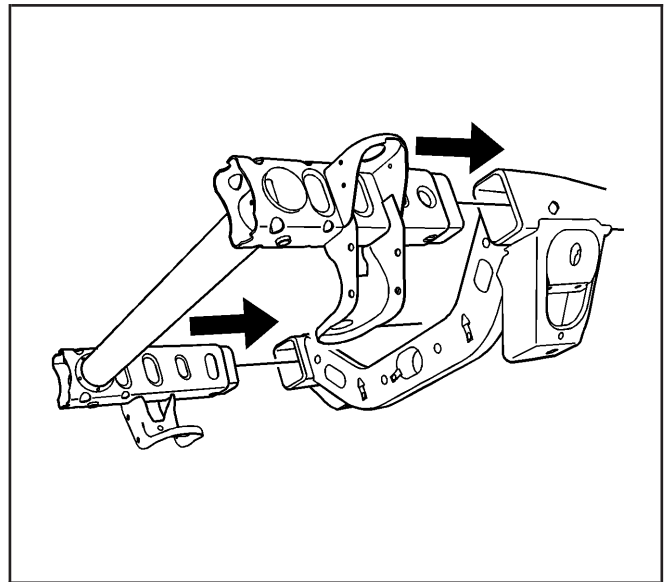
## Installation Procedure

1. Grind the existing frame rail seam to taper seam at a 45 degree angle.
2. Prepare all of the attaching surfaces as necessary.
3. Apply the weld-thru primer to all of the welded surfaces.



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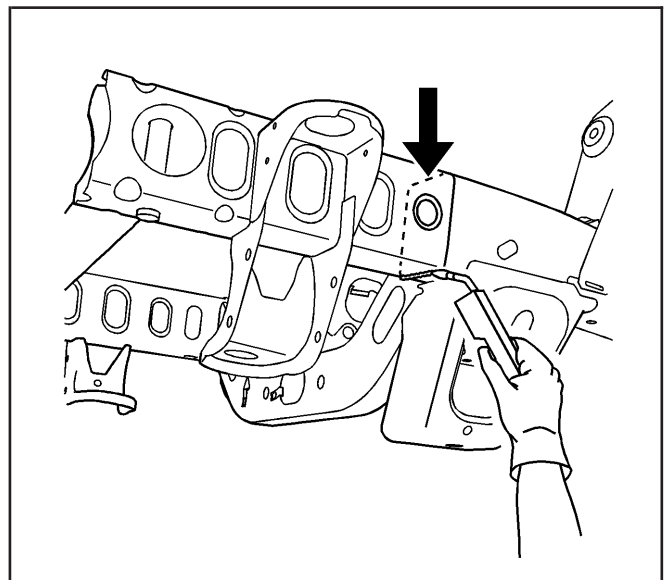
4. Position the service frame section to the existing frame and clamp in place.



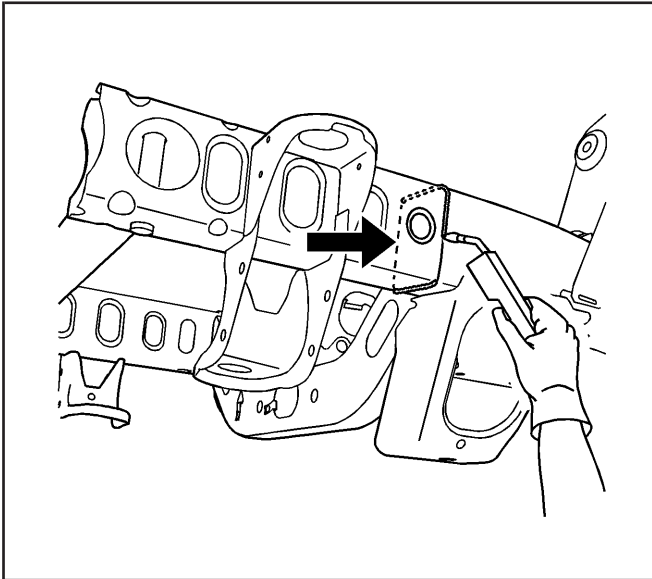
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**Important:** Verify the frame measurements 3-dimensionally to ensure proper position of the service frame.

5. Continuous-weld the upper and lower horizontal joints from corner to corner.



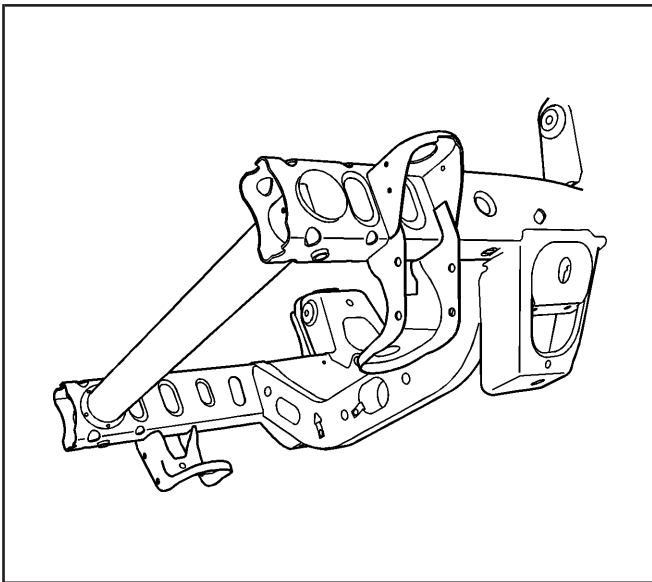
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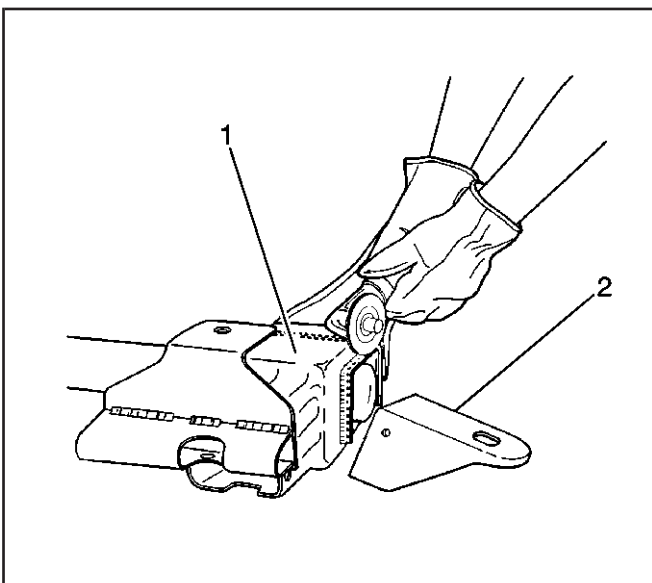
**Important:** Verify the frame measurements 3-dimensionally to ensure proper position of the service frame.

6. Continuous-weld the inner and outer vertical joints from corner to corner.



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7. Clean and prepare all of the welded surfaces.
8. Install all of the related panels and components.



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### Rail End Crush Cap Replacement - Front (Full size pickup 1999 and utility 2000 - current)

#### Removal Procedure

**Important:** The redesigned frame of the 1500 model C/K pickup and C/K Utility, incorporates hydroformed technology. There is a replaceable, hydroformed, energy absorbing crush cap at the front of the frame.

1. Remove all of the related panels and the components.

**Important:** If the crush cap (1) is bent or damaged in any way, replace the crush cap.

2. Visually inspect the damage. Use 3-dimensional measuring in order to restore all of the damage rearward of the crush cap (1) to the factory specifications.

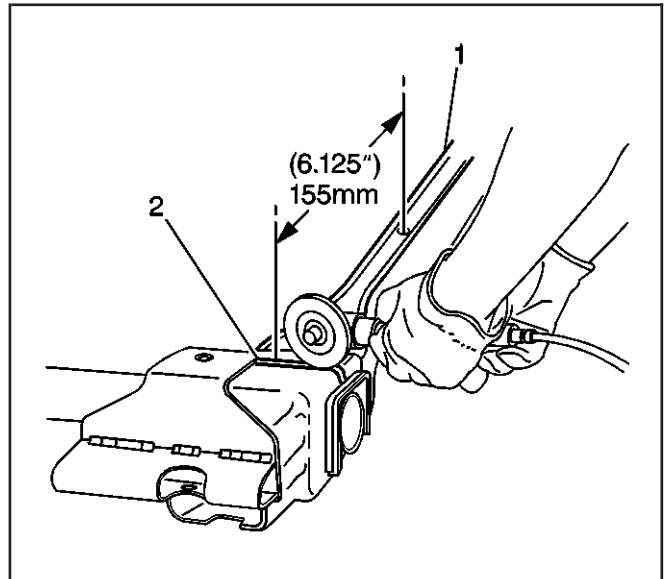


**Important:** Do not damage the rail.

3. Remove the core support mounting bracket (2).
4. Locate the brake line attachment hole (1) on the top of the rail. Measure forward 155 mm (6 1/8 in). This is the cut line (2).
5. Scribe a line 360 degrees around the frame rail.

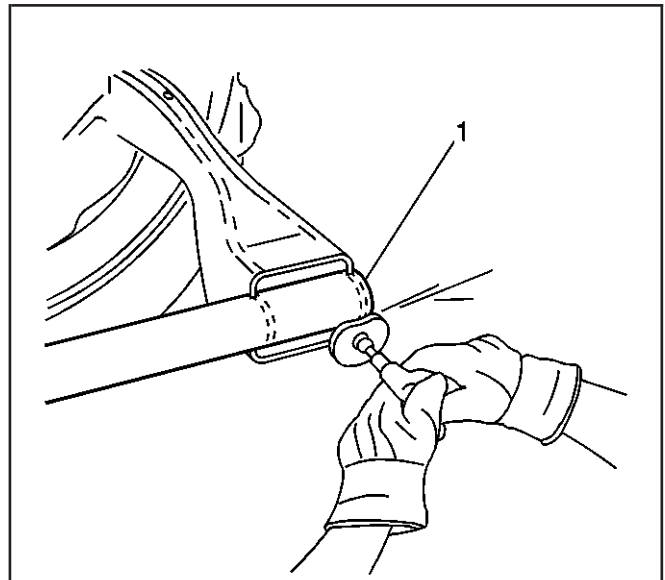
**Important:** Use caution to not damage the cross tube.

6. Remove the crush cap at the cut-line and the forward edge of the cross tube.



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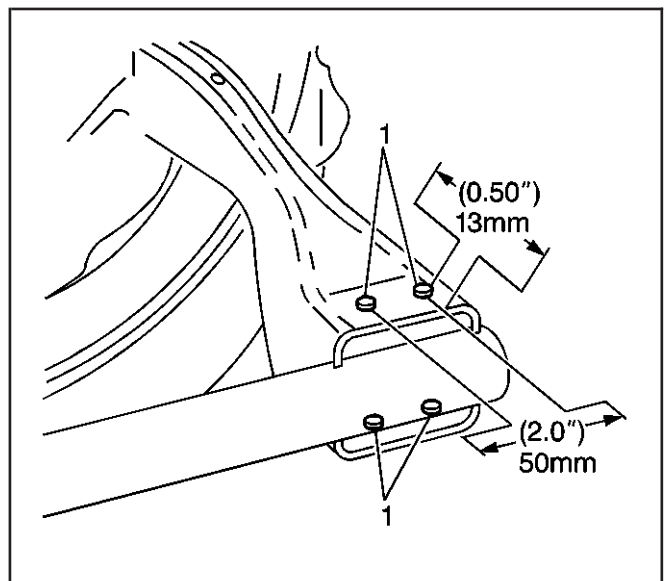
7. Grind the remaining weld off of the cross tube (1) where you removed the damaged crush cap.



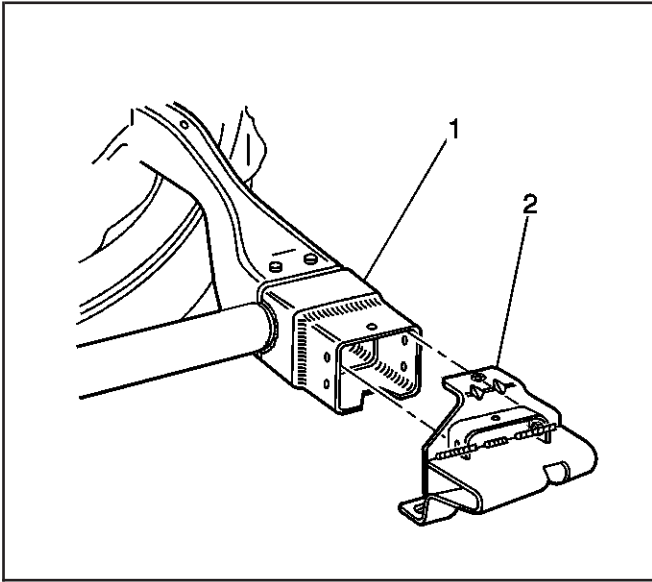
383499

### Installation Procedure

1. Drill 4 plug weld holes; 2 at the top and 2 at the bottom, 13 mm (1/2 in) from the cut line and 50 mm (2 in) apart on the existing frame rail (1).
2. Prepare all mating surfaces as necessary.
3. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.



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**Important:**

- The replacement bumper bracket (2) is a bolt-on component that must be ordered separately.
- Retain a gap of 1½ times the metal thickness at the butt joint (1) when attaching the service part to the vehicle.

4. Install and position the replacement crush cap using 3-dimensional measuring.
5. Tack weld the part into position at the initial plug weld holes.
6. Inspect the service part for proper dimensions.
7. Stitch weld along the entire sectioning joint. Make 25 mm (1 in) welds along the seam with 25 mm (1 in) gaps between.
8. Complete the stitch weld.
9. Clean and prepare the welded surfaces.

**Important:** Prior to refinishing, refer to GM 4901M Refinish Manual for recommended products. Do not combine paint systems. Refer to paint manufacturer's recommendations.

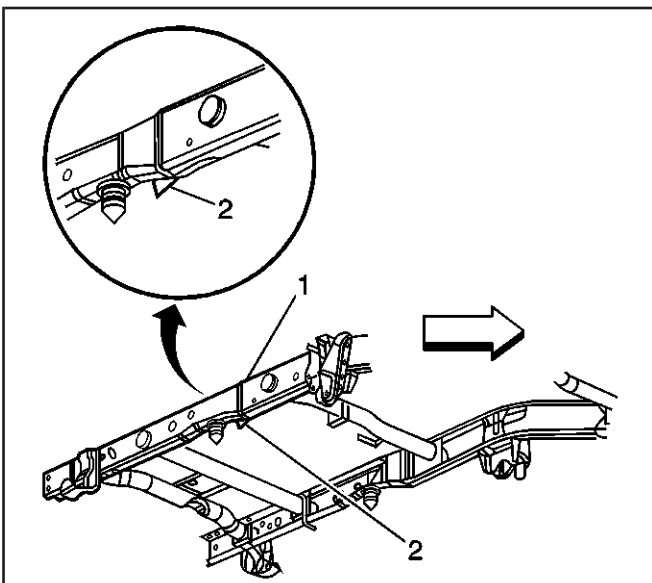
10. Apply approved anti-corrosion primer.
11. Position the new core support mounting bracket. Weld the bracket in place according to the specified dimensions.
12. Apply the sealers.
13. Refinish the welded surfaces as necessary.
14. Replace the related panels and the components.

**Frame Module Replacement - Rear  
(Full size pickup 1999 - current)**

**Removal Procedure**

**Important:** Perform all of the steps on both of the rails for complete module replacement.

1. Remove all of the related panels and the components.
2. Visually inspect all of the damage forward of the rear module. Use 3-dimensional measuring in order to restore the damage to the factory specifications.
3. Separate the center and the rear module at the factory stitch weld (1) with a die grinder or an appropriate tool.
4. Pry the lower edge of cross tube bracket down (2) in order to allow the rear module to separate from the center module.
5. Remove the damaged rear module.



383485

## Installation Procedure

**Important:** Monitor the specified dimensions by frequently performing 3-dimensional measuring throughout the procedures.

1. Prepare all mating surfaces as necessary.
2. Apply 3M Weld-Thru Coating P/N 05916 or equivalent to all mating surfaces.
3. Install and position the replacement module using 3-dimensional measuring.
4. Restore the bracket flange (2) for a flush fit to the new service part.
5. Tack weld the rear module into position. Inspect the service part for the proper dimensions.
6. Stitch weld the entire sectioning joint.

**Important:** Prior to refinishing, refer to GM 4901M Refinish Manual for recommended products. Do not combine paint systems. Refer to paint manufacturer's recommendations.

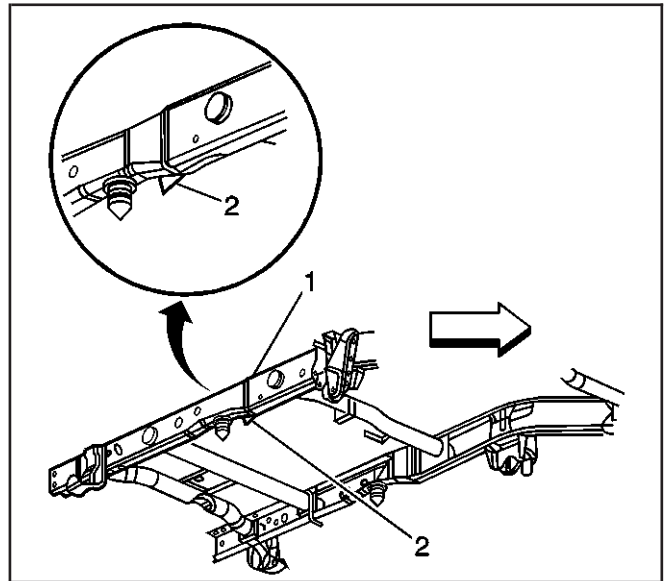
7. Clean and prepare the welded surfaces.
8. Apply approved anti-corrosion primer.
9. Apply the sealers.
10. Refinish the welded surfaces as necessary.
11. Install all of the related panels and the components.

## Bracket Replacement - Front Bumper (2500 Full size pickup 1999 - current)

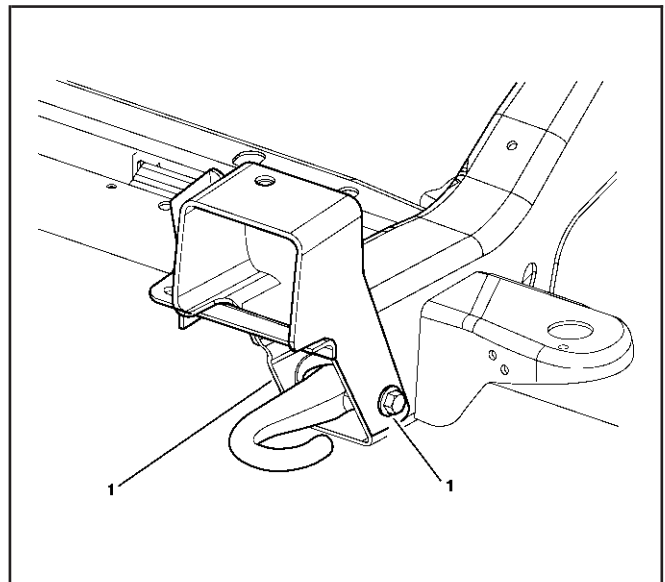
1. Remove all related panels and components.
2. Remove the damaged bumper bracket.
3. Visually inspect the frame and restore all damage to factory specifications using 3-dimensional measuring.

**Important:** If the vehicle is equipped with tow hooks, discard original fasteners.

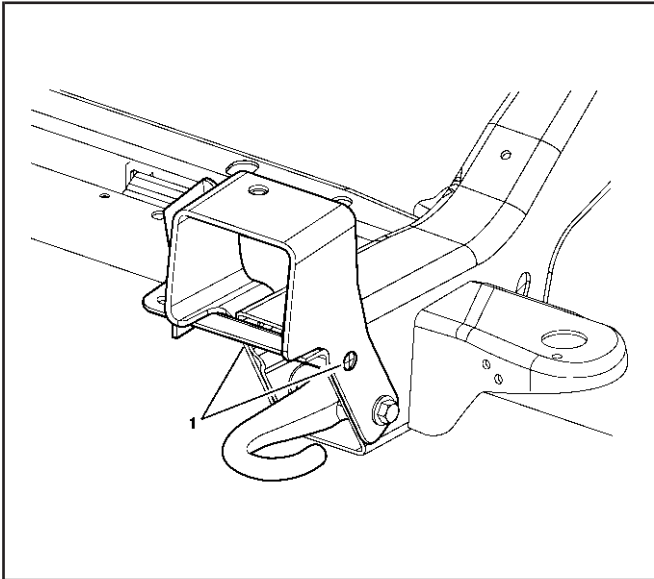
4. Align the replacement bracket lower bolt holes with tow hook mounting locations and install the bolts (1) supplied.



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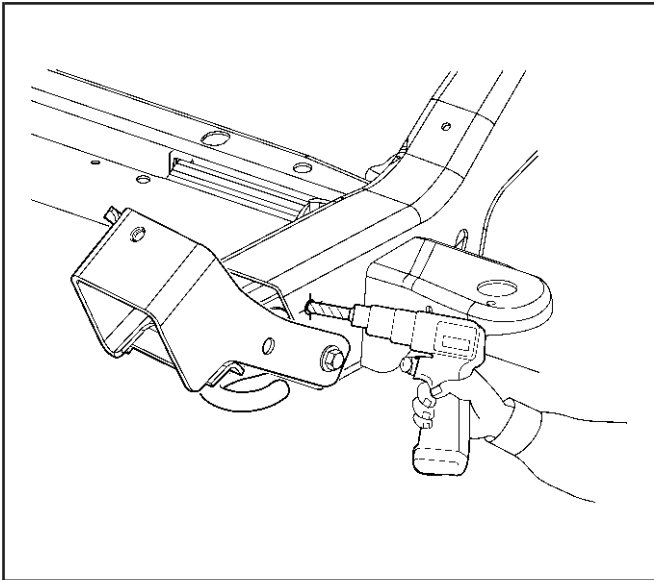


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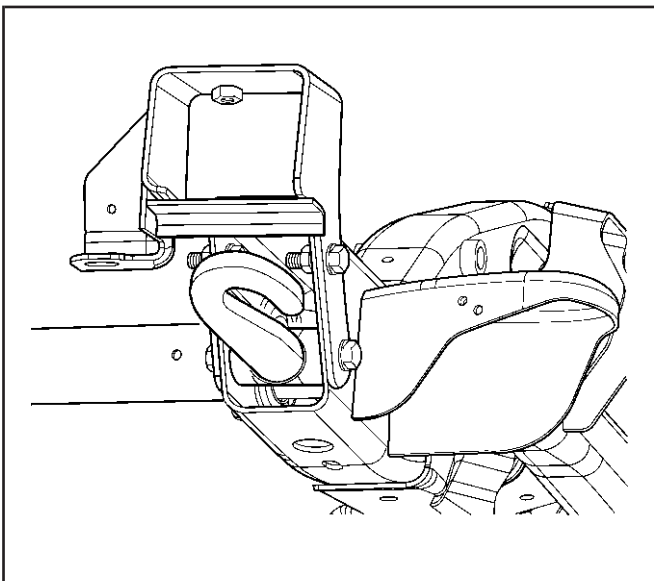
671426

5. Align the front edge of bracket with front edge of frame and mark upper bolt locations (1) on frame.



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6. Rotate the bracket forward and drill 13 mm (1/2 in) holes in frame at upper bolt locations.
7. Rotate the bracket back into position.



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**Notice:** Refer to *Fastener Notice on page 1-1*.

8. Install the fasteners supplied.

**Tighten**

Tighten the torque bracket fasteners to 70 N·m (52 lb ft).

## Bracket Replacement - Front Bumper (1500 Full size pickup 1999 and utility 2000 - current)

1. Remove all related panels and components.
2. Remove damaged bumper bracket.

**Important:** Do not remove any material from end of frame rail.

3. Position the service template on the end of the frame rail. Use 3M's Repositionable Adhesive or equivalent.
4. Drill three 13 mm (1/2 in) holes at locations indicated on template.

**Important:** Prior to refinishing, refer to the Publication GM 4901M-D-2000 "GM Approved Refinish Materials" for recommended products. Do not combine paint systems. Refer to paint manufacturer's recommendations.

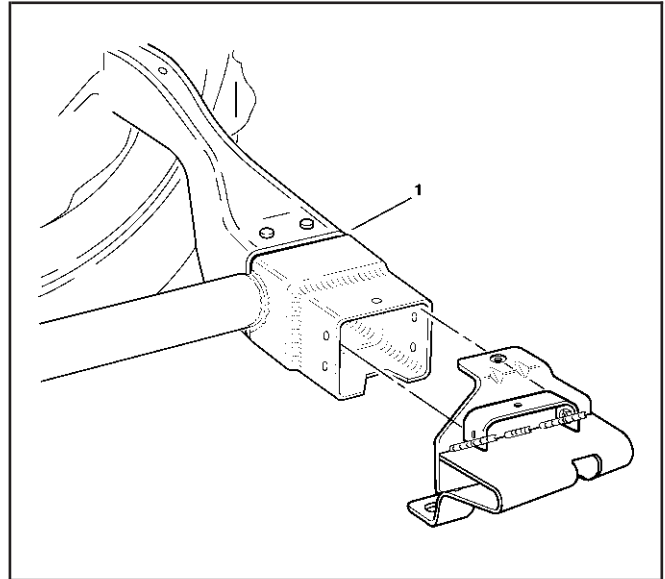
5. Apply approved anti-corrosion primer to bare metal surfaces.
6. Position replacement bumper bracket.

**Notice:** Refer to *Fastener Notice* on page 1-1.

7. Install the bolts.

### Tighten

Tighten the bolts to 50 N·m (37 lb ft).

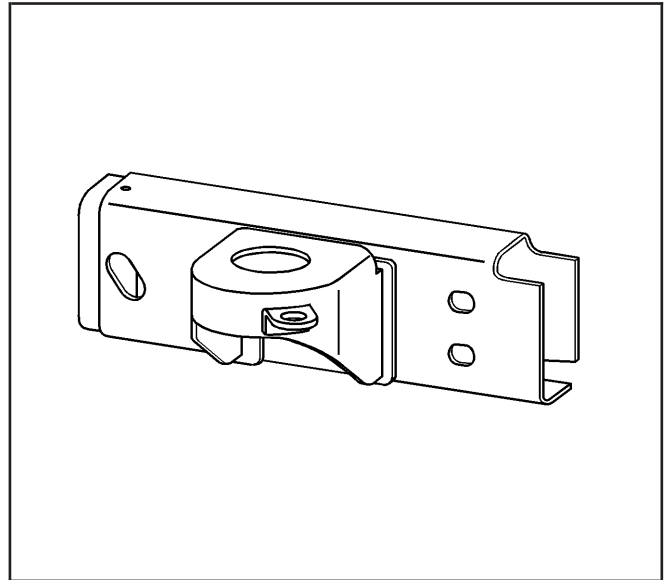


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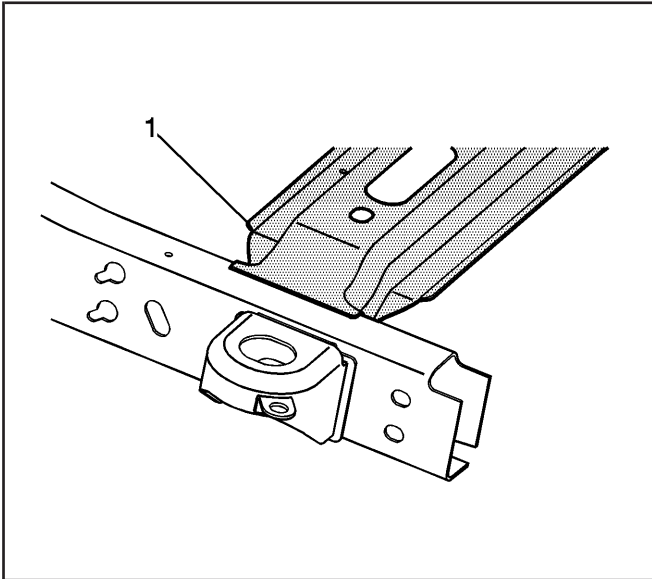
## Rail End Replacement - Rear (Full size utility 2000 - current)

### Removal Procedure

The service assembly for the left and the right rear frame rails is pre-sleeved, mild steel, hydro-formed parts. The assembly includes the body support mounting bracket, a trailer hitch and rear bumper mounting holes.

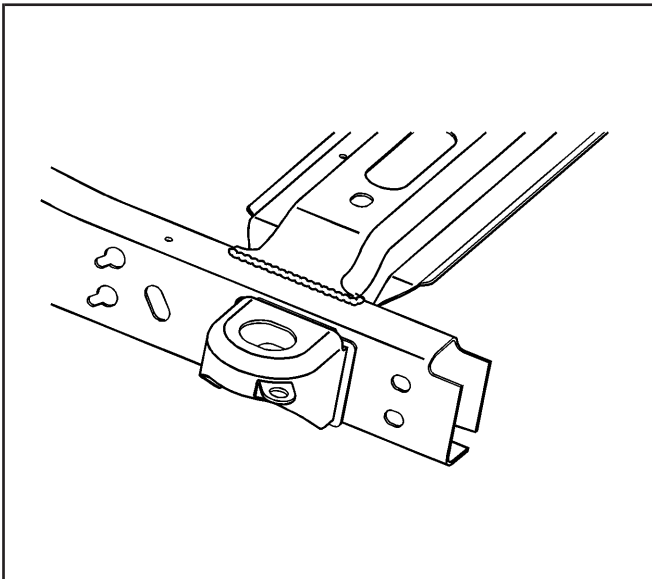


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**Important:** The position of the rear cross-member (1) varies upon the wheel-base of the vehicle. This procedure applies to all vehicles.



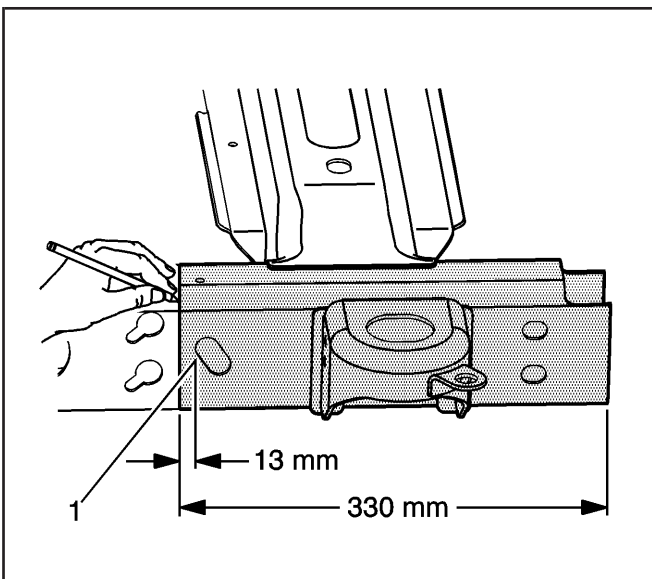
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**Caution:** Refer to *Approved Equipment for Collision Repair Caution* on page 1-1.

**Caution:** Refer to *Battery Disconnect Caution* on page 1-1.

**Caution:** Refer to *Collision Sectioning Caution* on page 1-1.

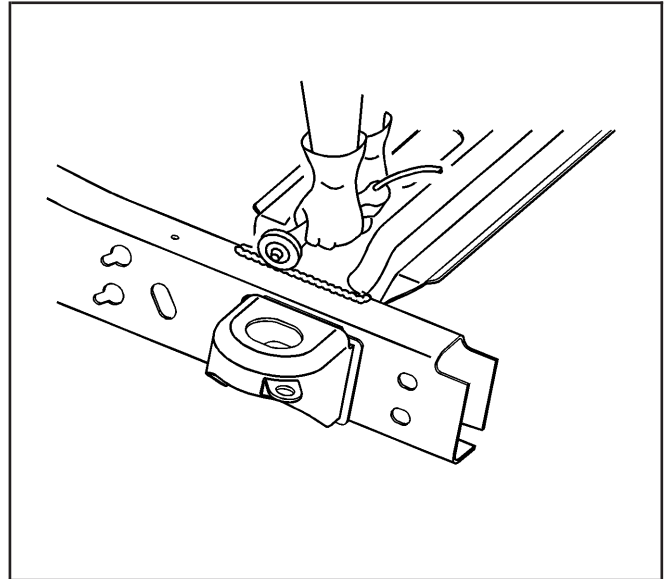
1. Disconnect the negative battery cable.
2. Remove all of the related panels and components.
3. Repair as much of the damage as possible to factory specifications.



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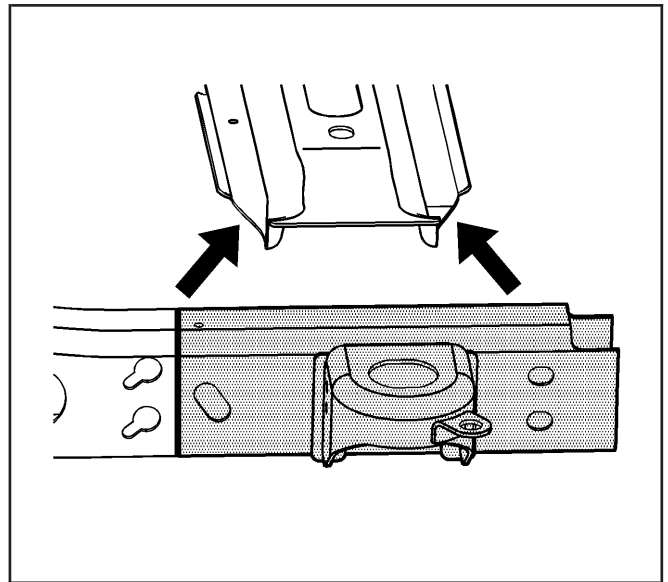
4. Locate the sectioning location by measuring 13 mm forward from the shipping slot (1) or 330 mm forward of the frame rail end. Scribe a line around the rail.

- Using a cut-off wheel or equivalent, remove the weld which attaches the rear cross-member to the damaged frame rail.



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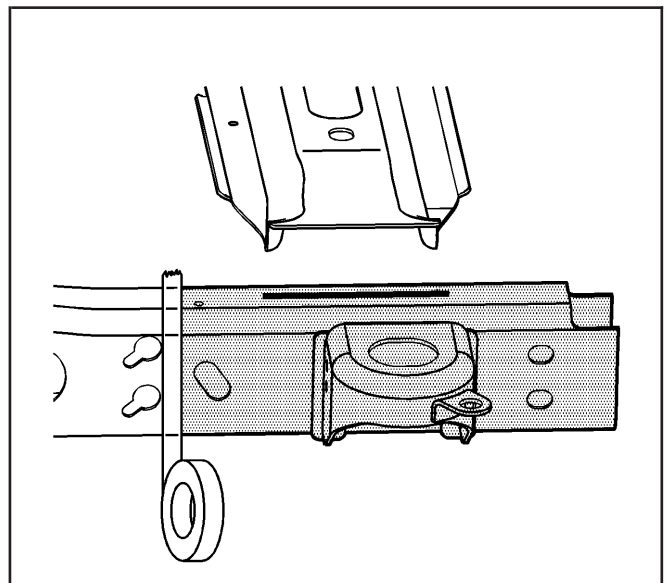
- Move the cross-member clear of the damaged frame rail.



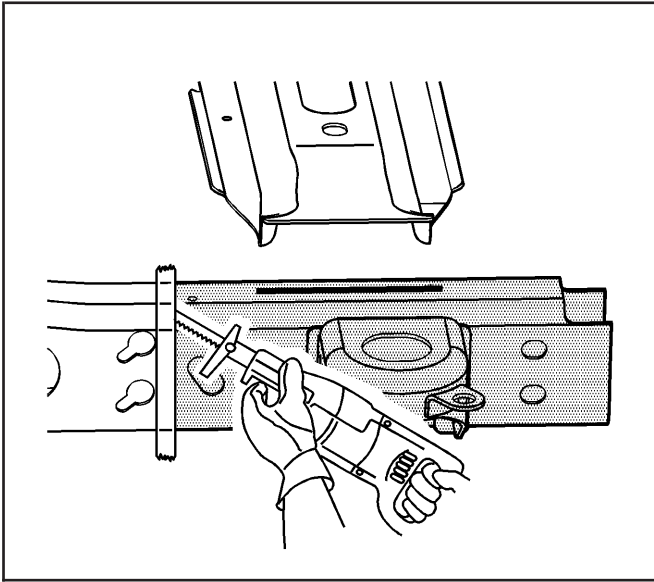
1527054

**Important:** Align the edge of the masking tape with the sectioning location.

- Apply masking tape next to the sectioning location and around the frame as shown.

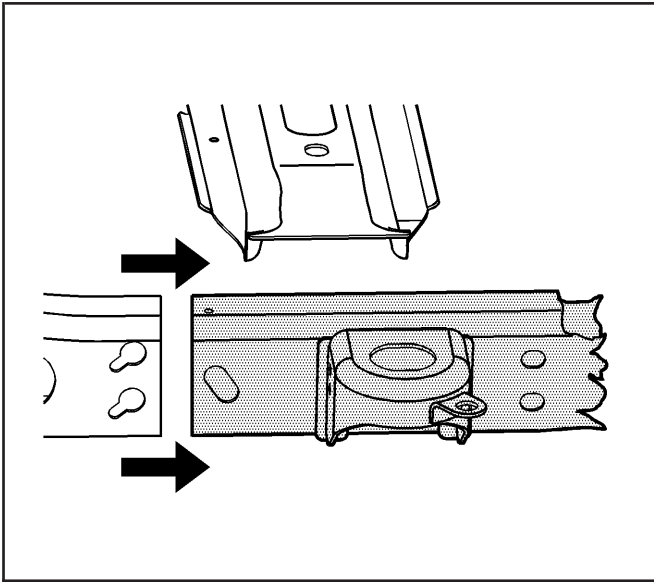


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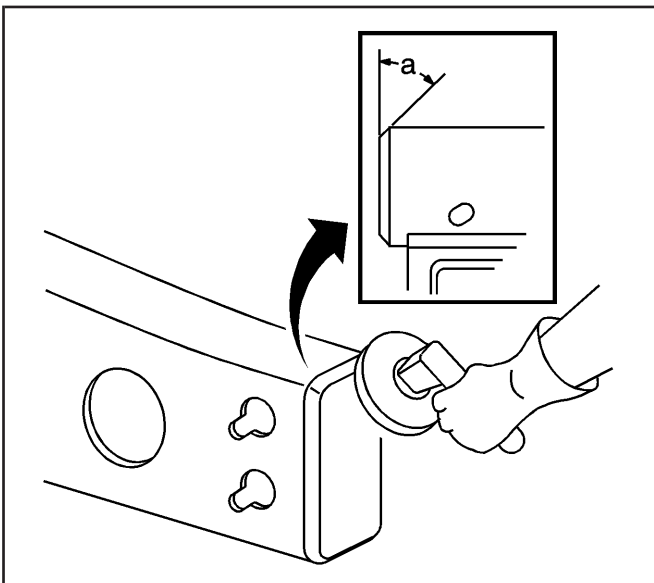
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8. Cut the damaged frame rail along the sectioning location using a reciprocating saw or equivalent, as shown.



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9. Remove the damaged frame section.



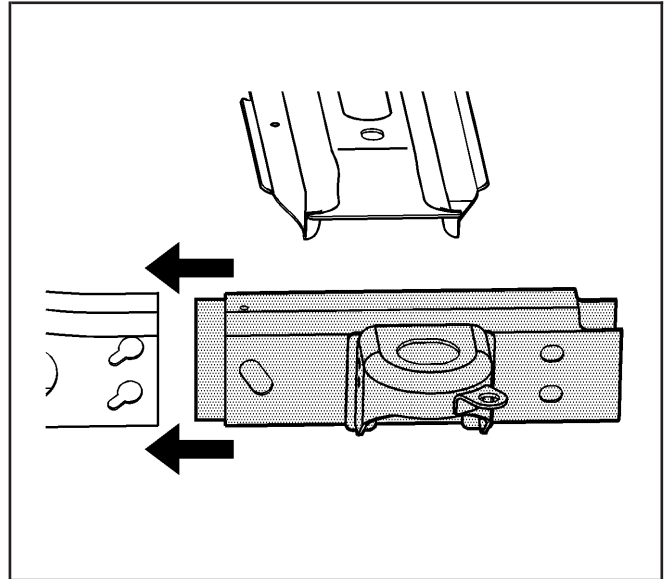
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**Installation Procedure**

1. Grind the existing frame rail sectioning location to a 45 degree angle, as shown in the figure.
2. Prepare all of the attaching surfaces as necessary.



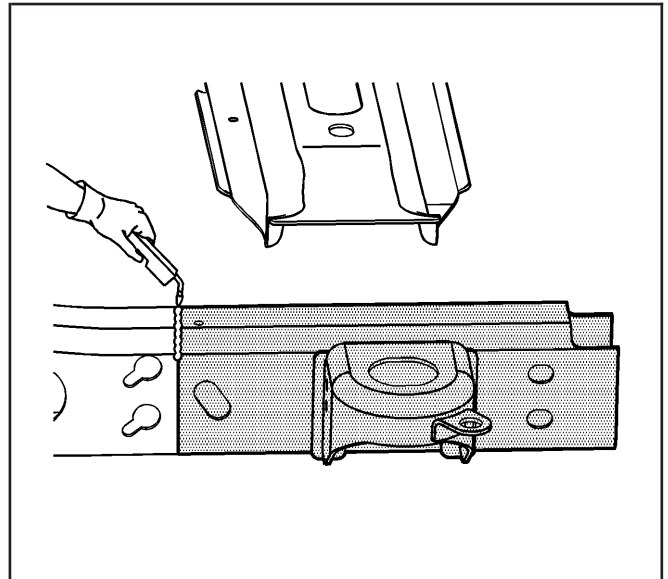
3. Position the service frame section to the existing frame and clamp in place.



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**Important:** Inspect the frame measurements three-dimensionally to ensure proper position of the service frame prior to welding.

4. Continuous-weld the sectioning location completely around the rail.

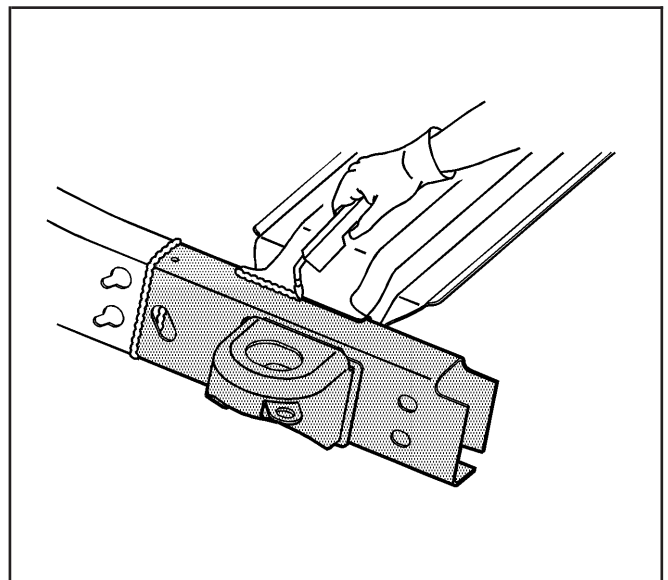


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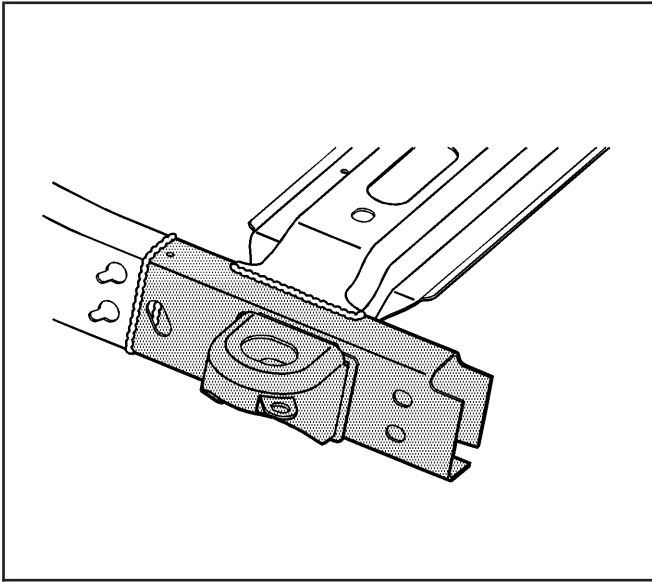
5. Lower and clamp the rear cross-member in place.

**Important:** Inspect the frame measurements three-dimensionally to ensure the proper position of the rear cross-member.

6. Continuous-weld the cross-member to the frame rail.

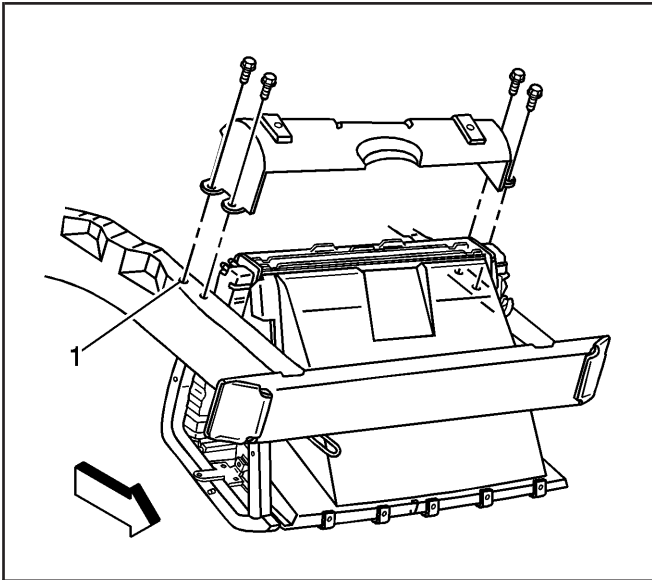


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7. Clean and prepare all of the welded surfaces.
  8. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to *Anti-Corrosion Treatment and Repair*.
  9. Install all of the related panels and components.
- Caution: Refer to Battery Disconnect Caution on page 1-1.**
10. Connect the negative battery cable.



1214888

### Rail End Replacement - Front (2005 Corvette and 2004 XLR - current)

#### Removal Procedure

**Caution: Refer to Approved Equipment for Collision Repair Caution on page 1-1.**

1. Disable the SIR system. Refer to *SIR Disabling and Enabling Zones on page 1-118*.

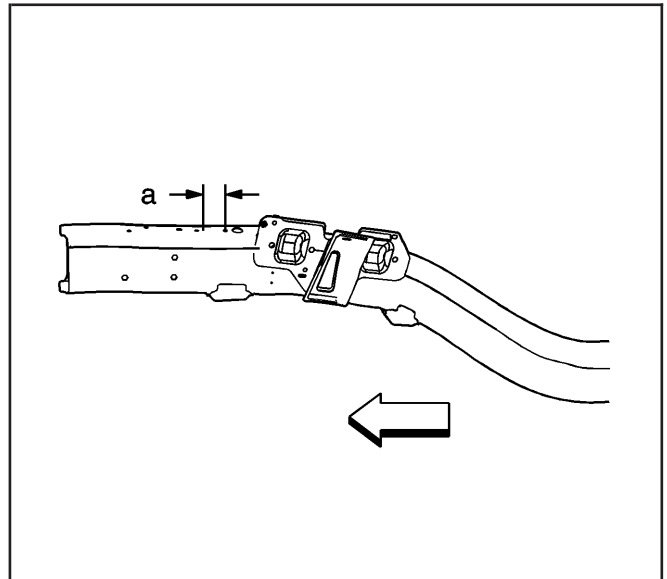
**Caution: Refer to Battery Disconnect Caution on page 1-1.**

2. Disconnect the negative battery cable.
3. Remove all related panels and components.
4. Remove the front impact bar. Refer to *Impact Bar Replacement - Front Bumper*.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area. Refer to *Anti-Corrosion Treatment and Repair*.
6. Repair as much of the damage as possible to the factory specifications.

**Caution: Refer to Collision Sectioning Caution on page 1-1.**

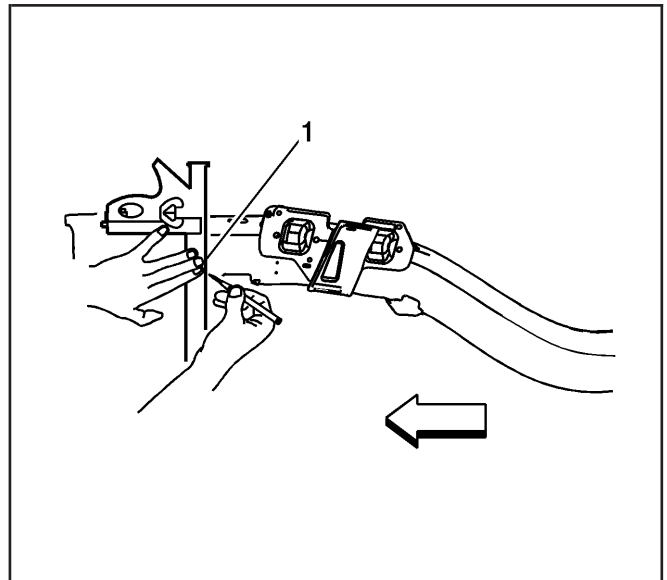
7. Determine the sectioning joint location from the center of the rear upper radiator support bolt (1)

8. Measure 67 mm (2 5/8 in) (a) forward from the center of the rear upper radiator support bolt.



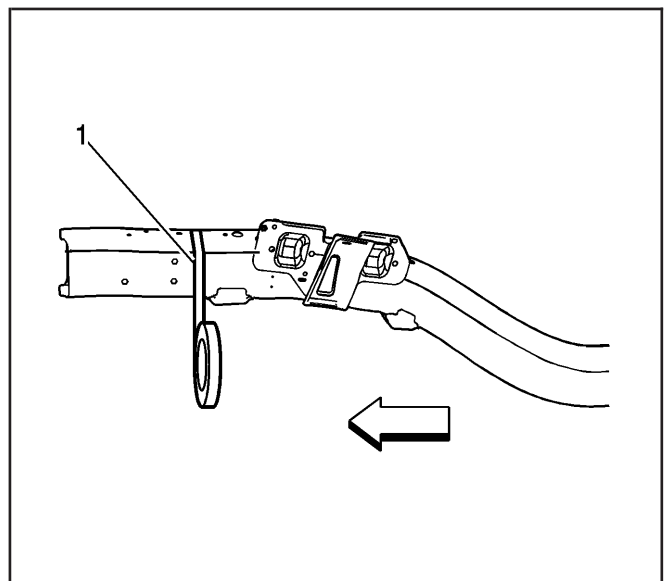
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9. Mark the top of the frame rail at the sectioning location.
10. At the mark align a sliding square or similar tool (1) square to surface to the vertical walls of the frame rail.
11. Scribe a line to both sides of the frame rail.

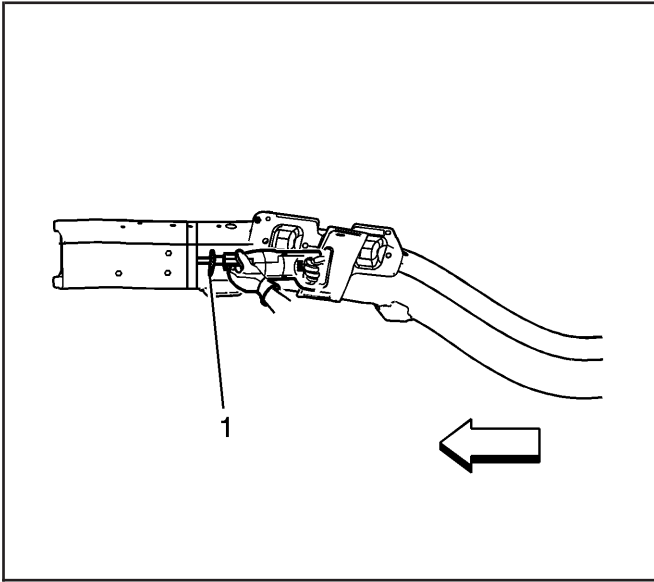


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12. Apply masking tape (1) to the scribe line completely around the frame rail.

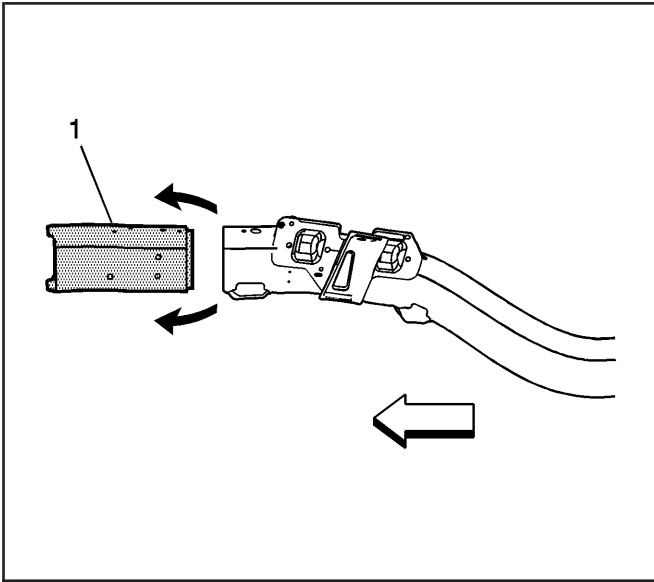


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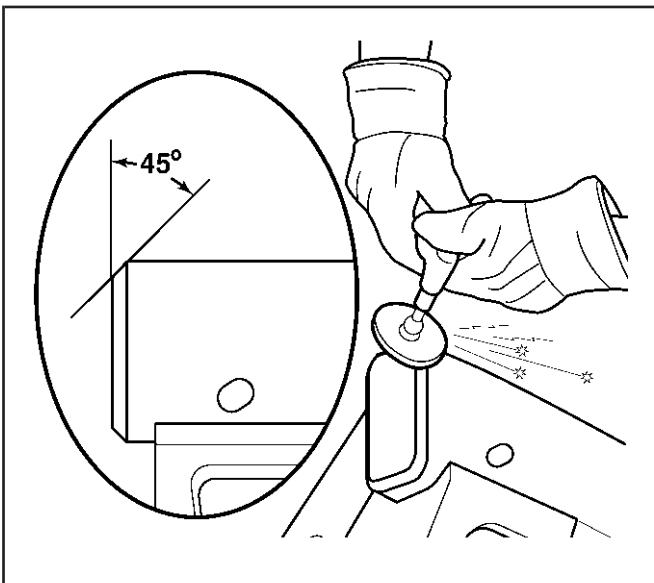
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13. Cut the frame rail at the rear edge of the tape line using a reciprocating saw or equivalent tool (1).



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14. Remove the damaged frame rail end section (1).

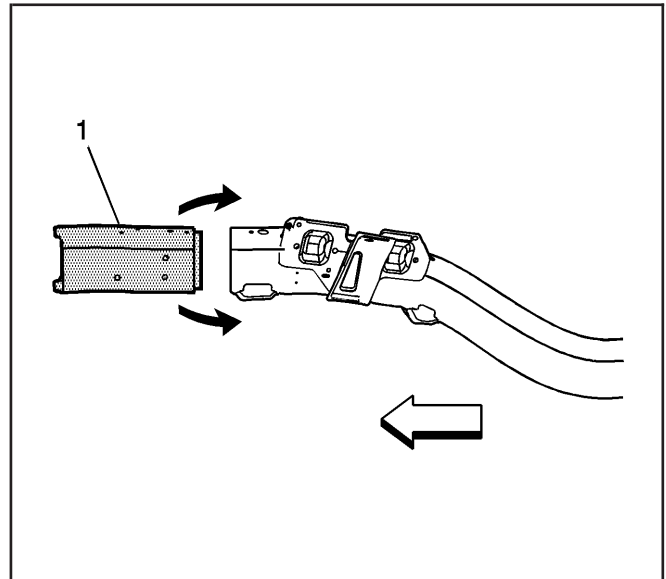


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### Installation Procedure

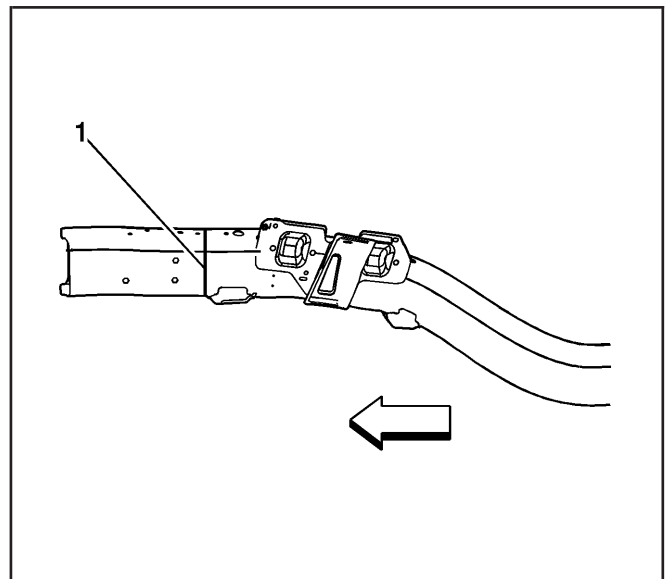
1. Grind the existing frame rail seam to taper the seam at a 45 degree angle.

2. Clean and prepare all of the welded mating surfaces.
3. Apply 3M weld-thru coating P/N 05916 or equivalent as necessary to all bare metal surfaces
4. Position the service frame section (1) to the existing frame.

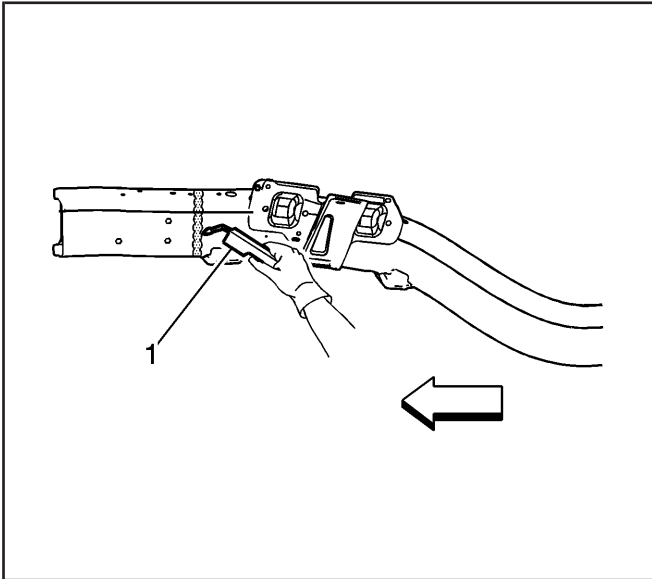


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5. Maintain a gap of one and one half frame rail metal thickness at the sectioning joint (1) and clamp in place.
6. Inspect the frame measurements three-dimensional to ensure proper position of the service frame.



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**Important:** Use a 25-mm (1-in) stitch weld to avoid minimal heat distortion.

7. Using a MIG welder, weld completely around the sleeve joint.
8. Install the front impact bar. Refer to *Impact Bar Replacement - Front Bumper*.
9. Apply the sealers and anti-corrosion materials to the repair area. Refer to *Anti-Corrosion Treatment and Repair*.

**Important:** DO NOT top coat any bonding surface. Use primer only on bonding surfaces. Refer to adhesive manufacturer's recommendations.

10. Paint the repair area. Refer to *Basecoat/Clearcoat Paint Systems*.
11. Install all related panels and components.

**Caution:** Refer to **Battery Disconnect Caution on page 1-1**.

12. Connect the negative battery cable.
13. Enable the SIR system. Refer to *SIR Disabling and Enabling Zones on page 1-118*.

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