

2007 Saturn Outlook XE

2007 ACCESSORIES & EQUIPMENT Frame and Underbody - Outlook

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Frame and Underbody - Outlook

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Engine Mount to Frame Nut	75 N.m	55 lb ft
Frame Brace Bolt	60 N.m	44 lb ft
Front Crossmember Brace Bolt	50 N.m	37 lb ft
Front Frame to Body Bolt	110 N.m	81 lb ft
	+ 90 degrees	
Front Wheelhouse Liner Screw	2.5 N.m	22 lb in
Radiator Support Bolt	50 N.m	37 lb ft
Rear Brake Caliper Bracket Bolt	50 N.m	37 lb ft
Rear Frame Reinforcement Bolt	60 N.m	44 lb ft
Rear Frame Reinforcement Stud	60 N.m	44 lb ft
Rear Shock Absorber Bolt	50 N.m	37 lb ft
Rear Suspension Crossmember to Body Bolt	160 N.m	118 lb ft
Rear Wheelhouse Liner Screw	2.5 N.m	22 lb in
Right Park Brake Cable Retaining Bolt	10 N.m	89 lb in
Trailer Hitch Bolt	100 N.m	74 lb ft
Transmission Mount to Frame Nut	75 N.m	55 lb ft
Underbody Side Rail Bolt	47 N.m	35 lb ft
Underbody Side Rail Nut	11 N.m	97 lb in
Upper Bumper Support to Radiator Support Bolt	9 N.m	80 lb in
Wheel Drive Shaft Nut	260 N.m	192 lb ft

REPAIR INSTRUCTIONS

UNDERBODY REAR SIDE RAIL REPLACEMENT

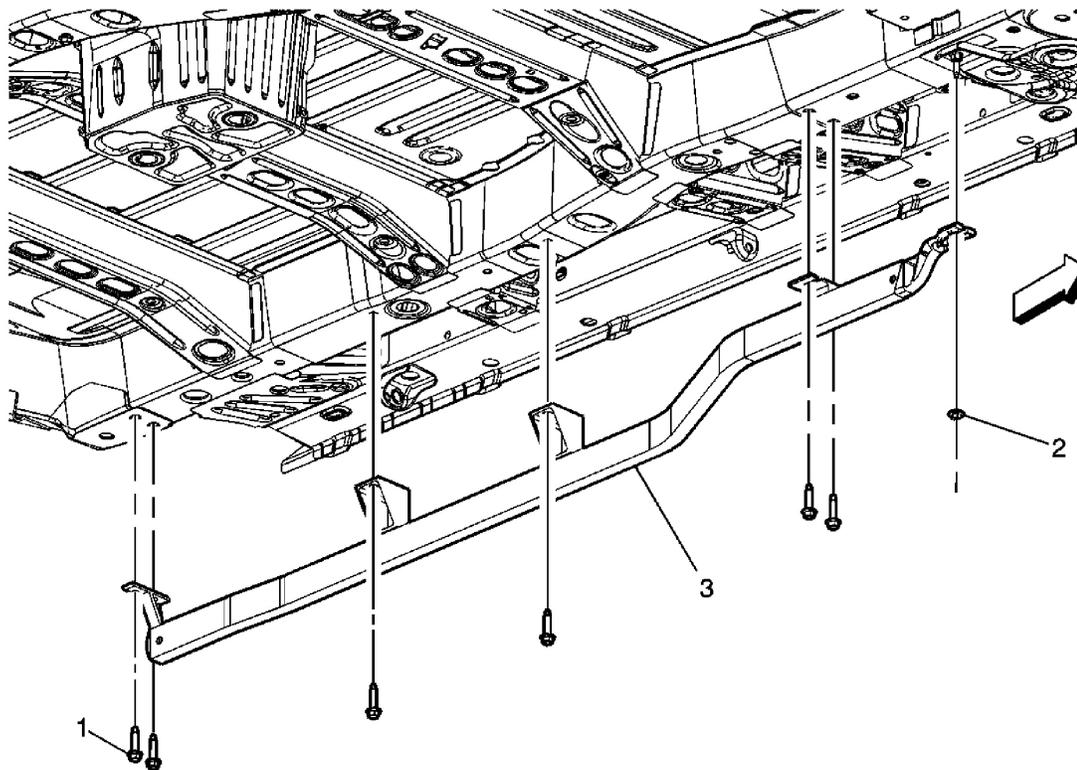


Fig. 1: View Of Underbody Rear Side Rail
 Courtesy of GENERAL MOTORS CORP.

Underbody Rear Side Rail Replacement

Callout	Component Name
Preliminary Procedure: Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
1	Underbody Rear Side Rail Nut NOTE: Refer to <u>Fastener Notice</u> . Tighten: 11 N.m (97 lb in)
2	Underbody Rear Side Rail Bolt (Qty: 10) Tighten: 47 N.m (35 lb ft)
3	Underbody Rear Side Rail Bolt Tighten: 47 N.m (35 lb ft)

FRONT CROSSMEMBER BRACE REPLACEMENT

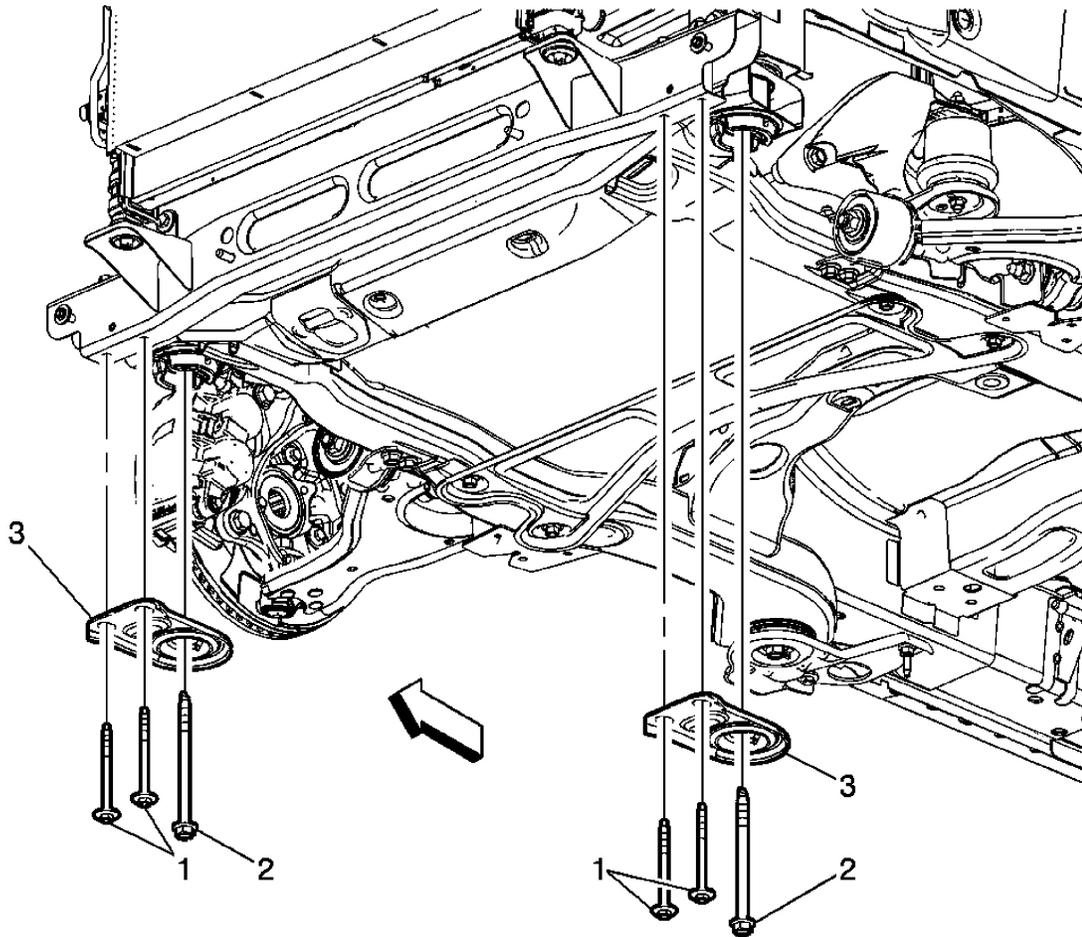


Fig. 2: Identifying Front Crossmember Brace
 Courtesy of GENERAL MOTORS CORP.

Front Crossmember Brace Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Support the frame with a jack stand.	
1	Front Crossmember Brace Bolt (Qty: 4) NOTE: Refer to <u>Fastener Notice</u> .

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	Tighten: 50 N.m (37 lb ft)
2	Frame Bolt (Qty: 2) Tighten: 110 N.m (81 lb ft) plus 90 degrees
3	Front Crossmember Brace (Qty: 2)

RADIATOR CROSSMEMBER REPLACEMENT

Removal Procedure

1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement** .
2. Tie the condenser radiator fan module to the upper bumper support.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

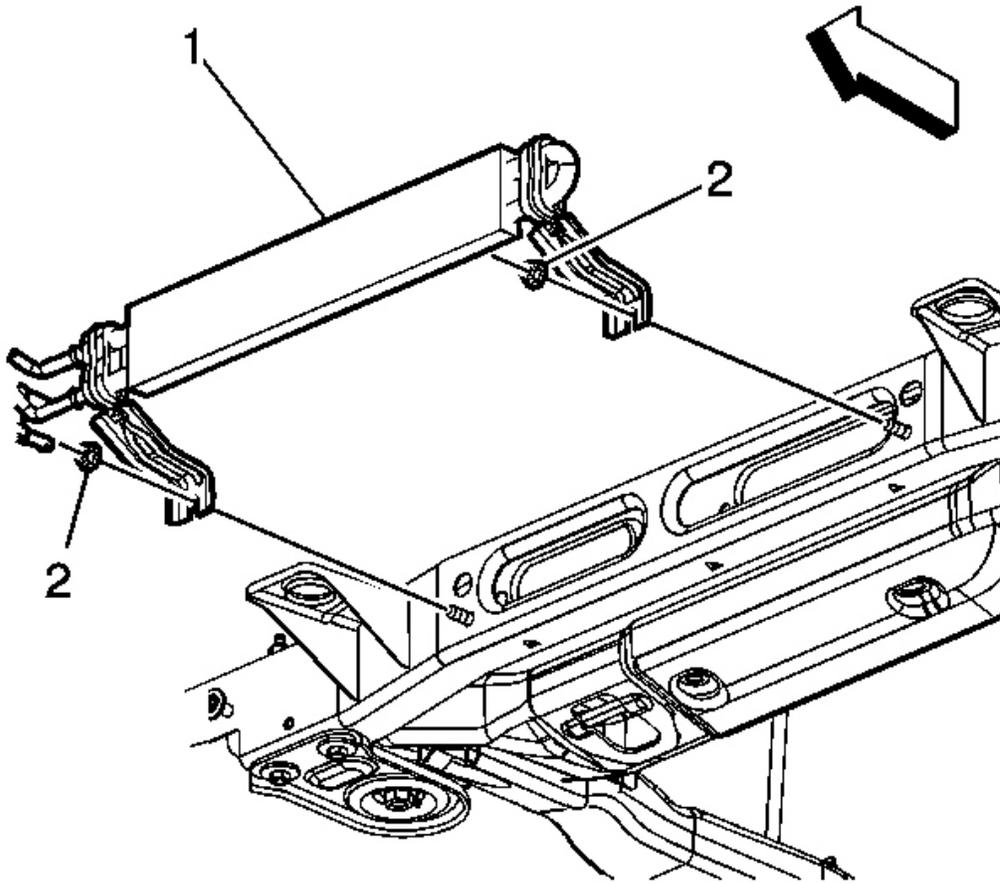


Fig. 3: View Of Power Steering Cooler & Nuts
Courtesy of GENERAL MOTORS CORP.

4. Remove the power steering cooler nuts (2).
5. Position the power steering cooler (1) securely out of the way.

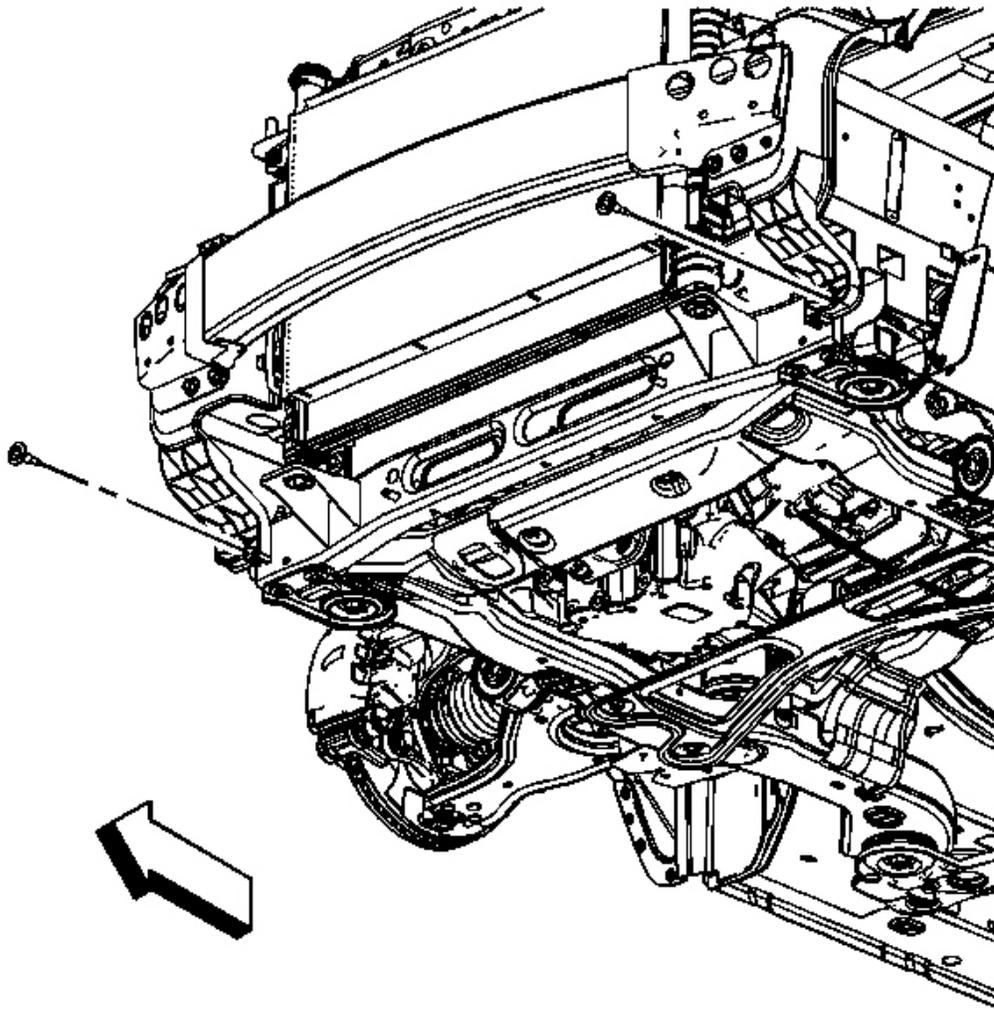


Fig. 4: Locating Upper Bumper Support Bolts
Courtesy of GENERAL MOTORS CORP.

6. Remove the lower 2 bolts from the upper bumper support.

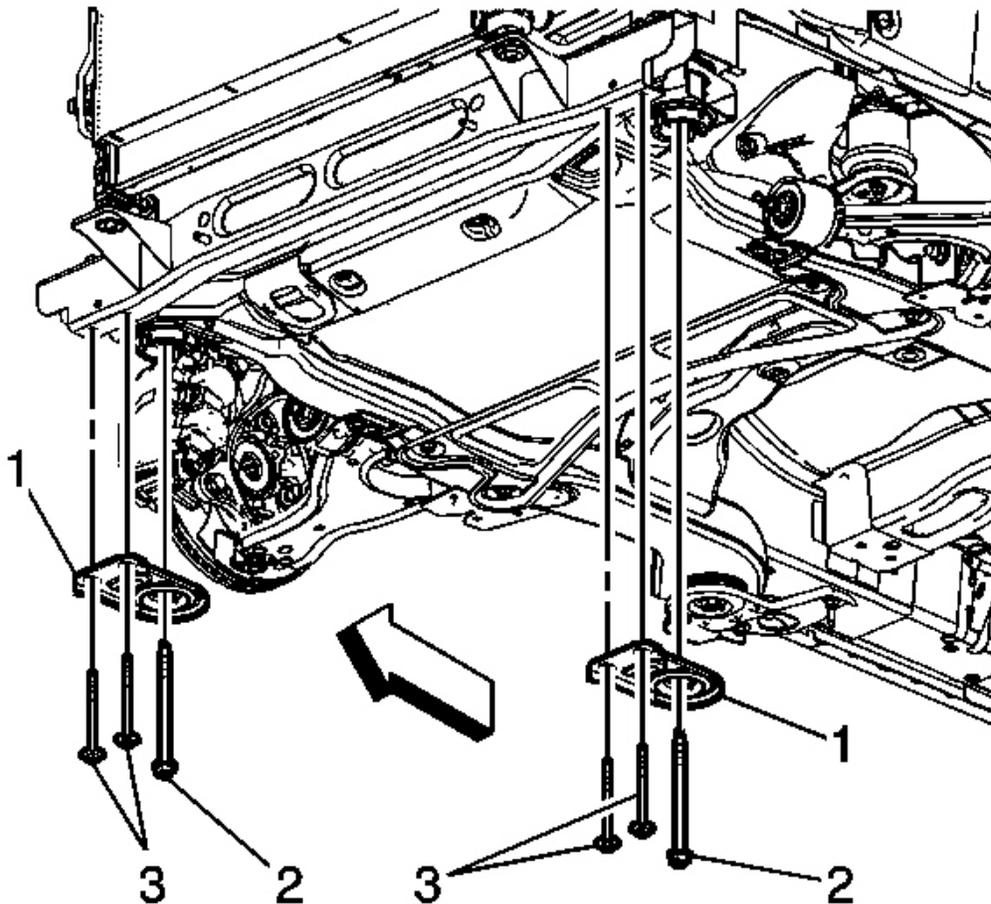


Fig. 5: Identifying Front Crossmember Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the front crossmember brace bolts (3).

IMPORTANT: When the frame insulator bolts are removed, always discard the bolts and replace with new bolts.

8. Remove the front frame to body bolts (2).
9. Remove the front crossmember brace (1).

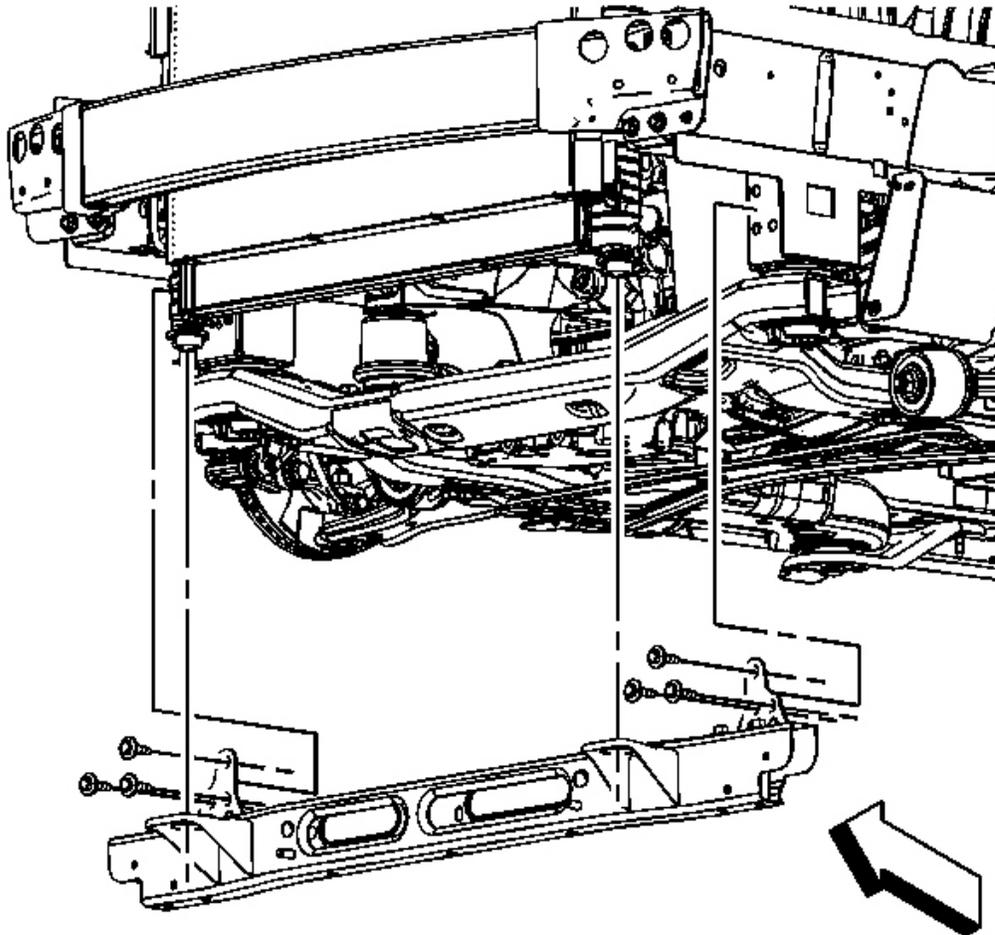


Fig. 6: View Of Radiator Support & Bolts
Courtesy of GENERAL MOTORS CORP.

10. Remove the radiator support bolts.
11. Remove the radiator support.

Installation Procedure

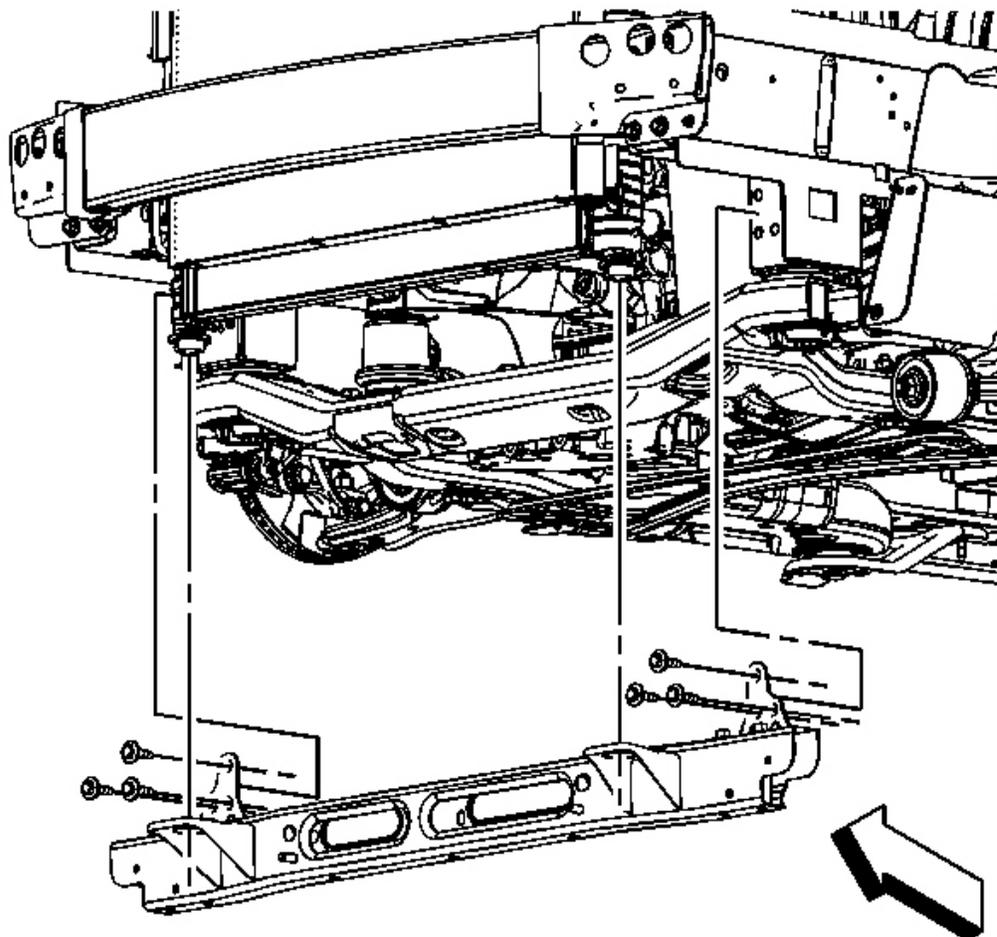


Fig. 7: View Of Radiator Support & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Install the radiator support.

NOTE: Refer to Fastener Notice .

2. Install the radiator support bolts.

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

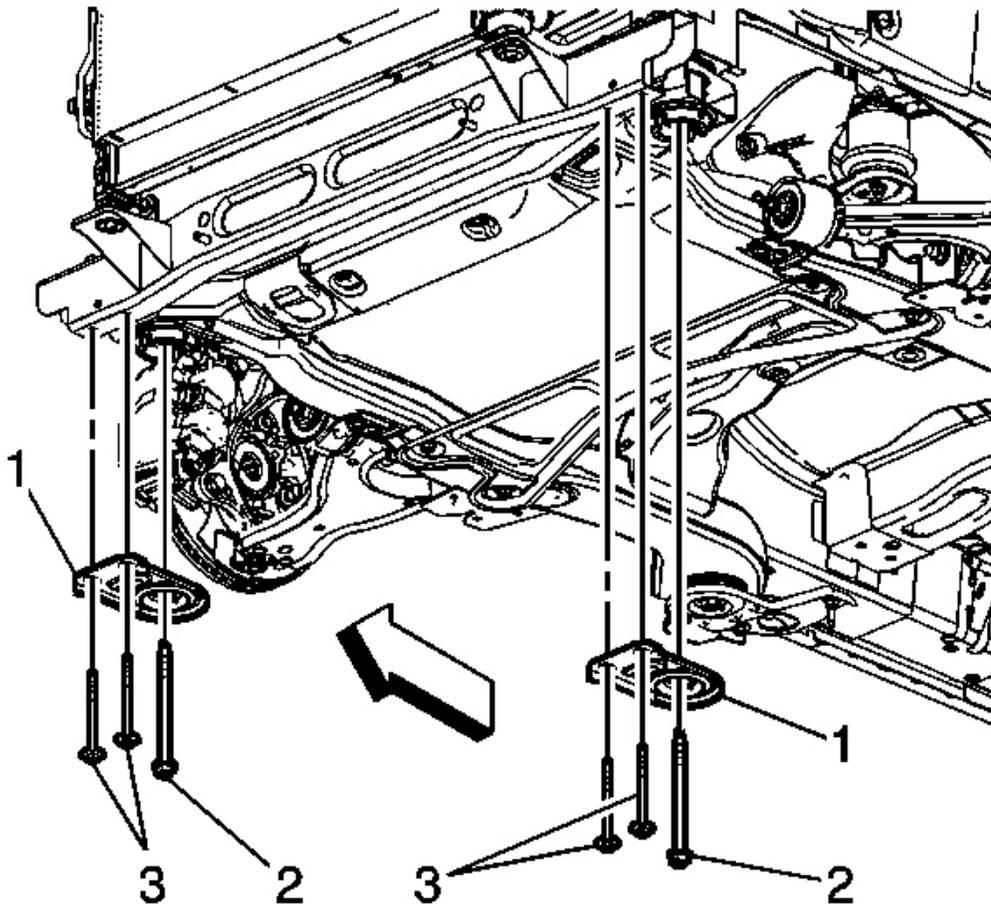


Fig. 8: Identifying Front Crossmember Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

3. Install the front crossmember brace (1).

IMPORTANT: If the frame insulator bolt does not screw in smoothly, run a tap through the frame nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody.
Do not over tighten the insulator. Over tightening may collapse a spacer or strip a bolt.

4. Install the front frame to body bolts (2).

Tighten: Tighten the bolts to 110 N.m (81 lb ft) plus 90 degrees.

5. Install the front crossmember brace bolts (3).

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

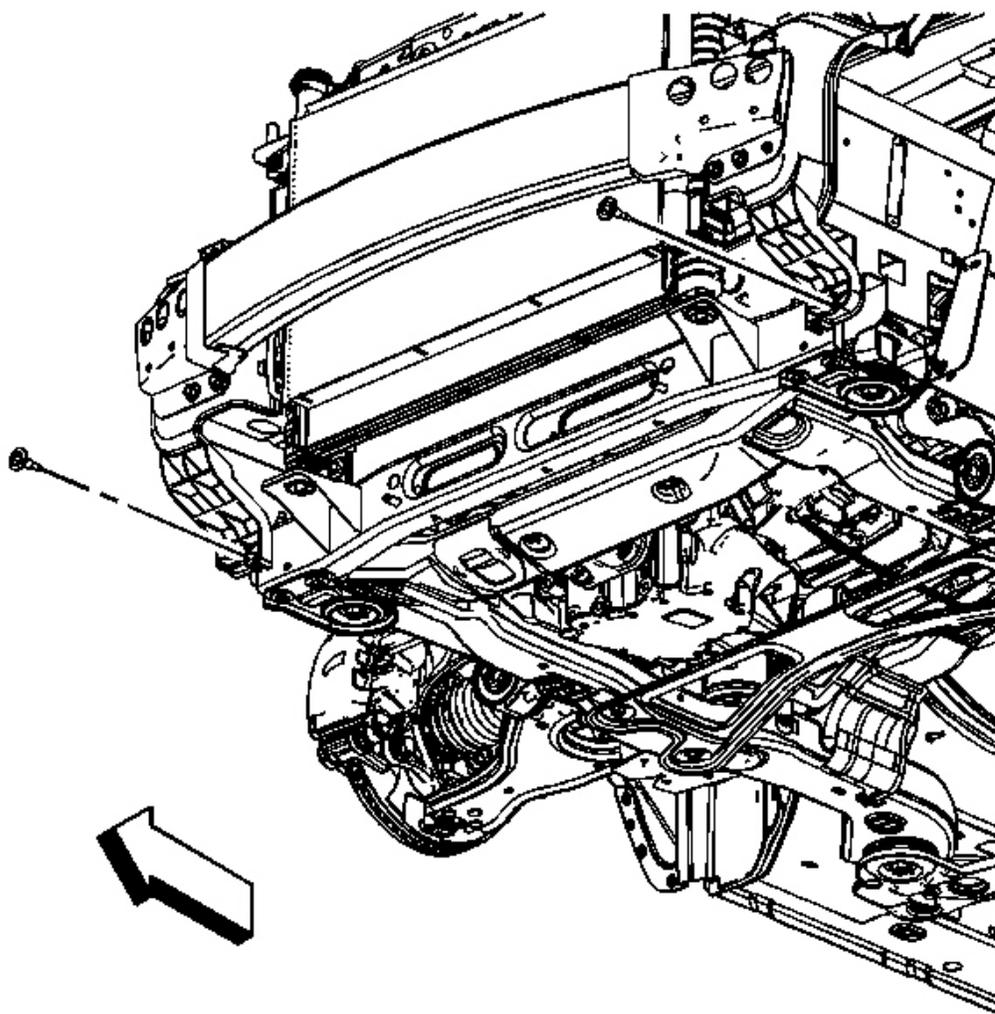


Fig. 9: Locating Upper Bumper Support Bolts
Courtesy of GENERAL MOTORS CORP.

6. Install the lower 2 bolts to the upper bumper support.

Tighten: Tighten the bolts to 9 N.m (80 lb in).

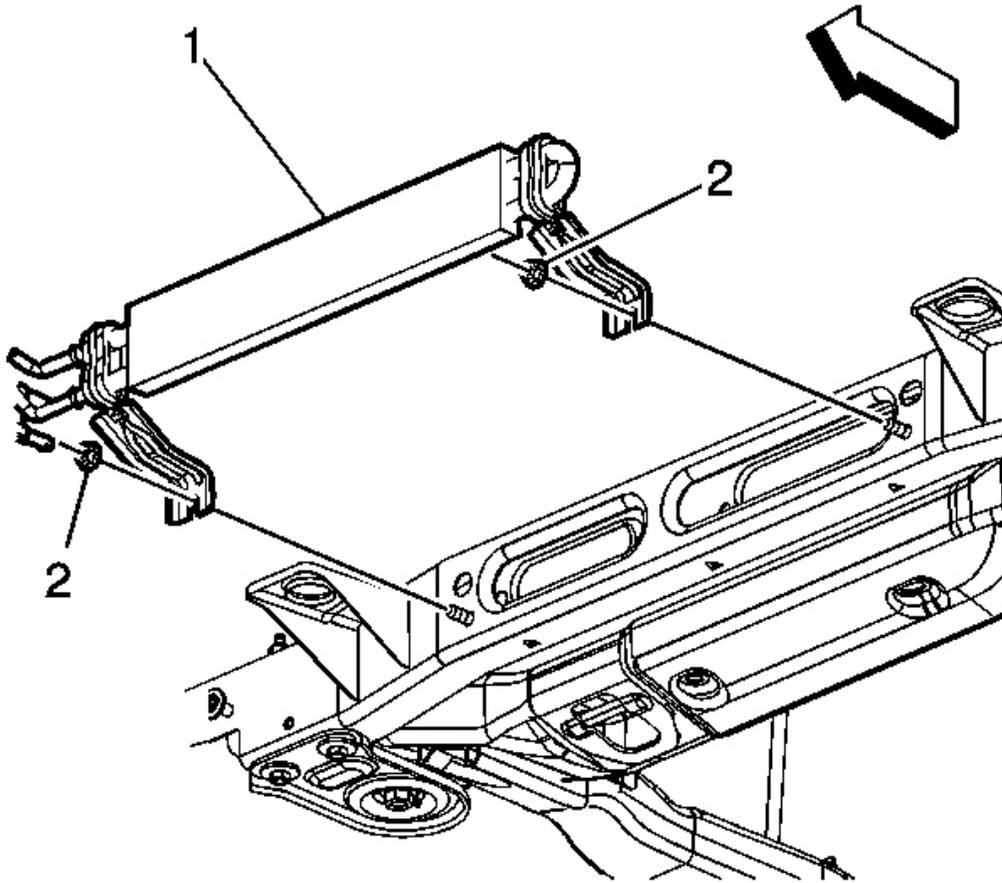


Fig. 10: View Of Power Steering Cooler & Nuts
Courtesy of GENERAL MOTORS CORP.

7. Install the power steering cooler (1).
8. Install the power steering cooler nuts (2).
9. Lower the vehicle.
10. Untie the condenser radiator fan module from the upper bumper support.
11. Install the front bumper fascia. Refer to **Front Bumper Fascia Replacement** .

REAR SUSPENSION SUPPORT CROSSMEMBER REPLACEMENT (FRONT WHEEL DRIVE)

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the rear tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .
3. Remove the muffler. Muffler Replacement (NB5) or Muffler Replacement (NEA/NEB) .

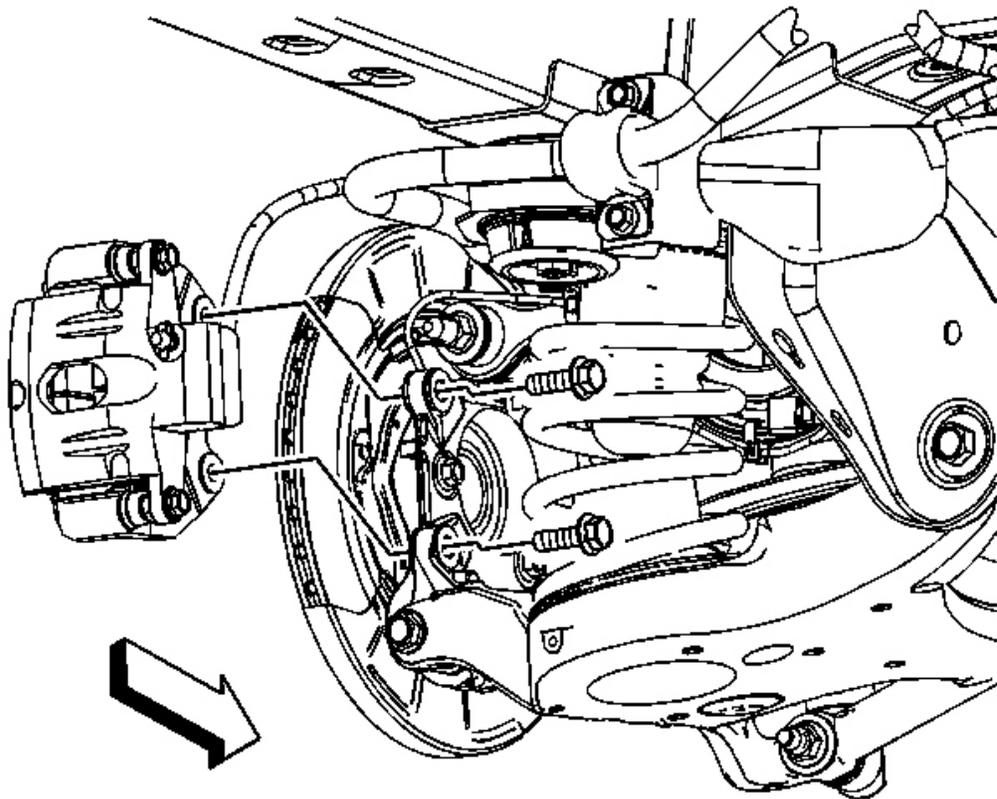


Fig. 11: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear brake caliper bracket bolts.
5. Secure the rear brake caliper and bracket assemblies to the vehicle underbody.

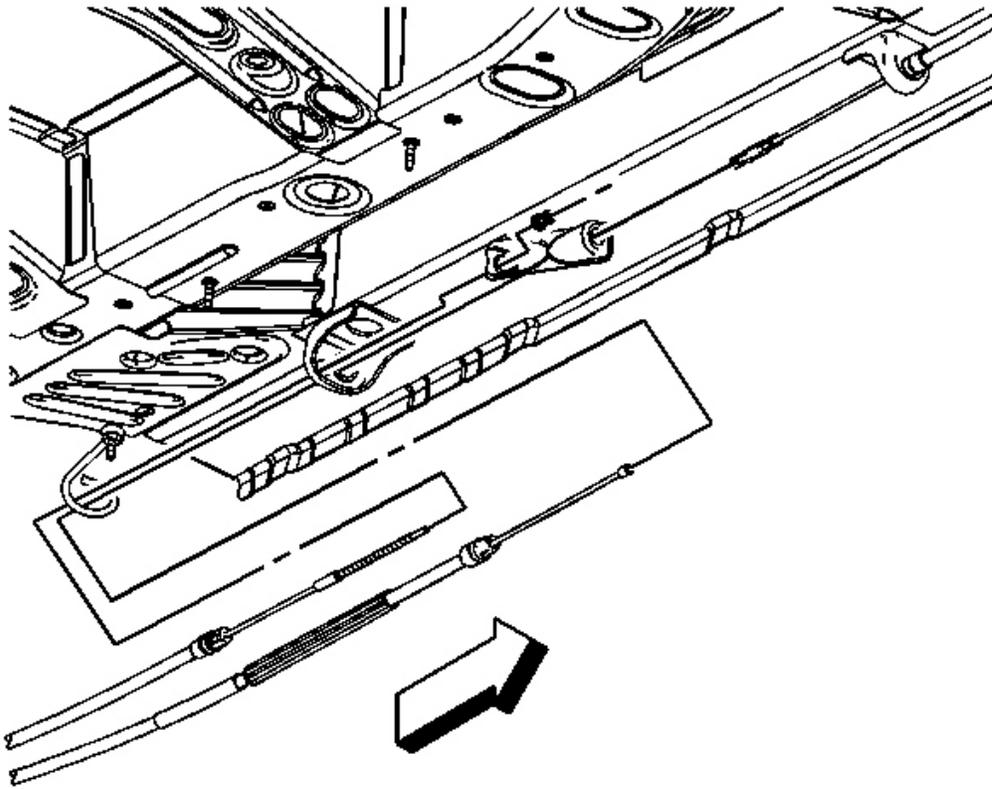


Fig. 12: View Of Park Brake Cables
Courtesy of GENERAL MOTORS CORP.

6. Remove the park brake cables from the park brake cable equalizer and park brake cable bracket. Refer to **Park Brake Cable Equalizer Replacement** .

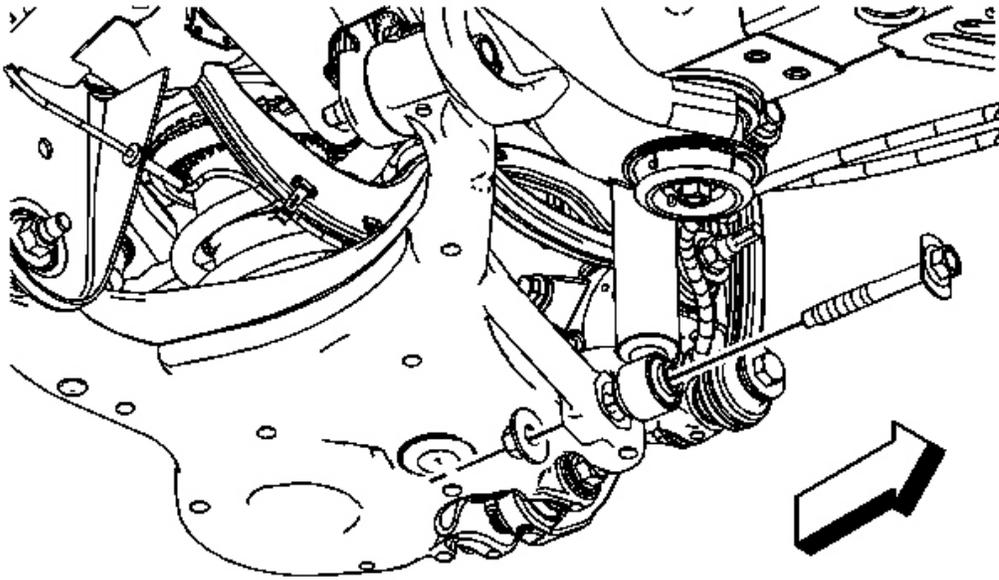


Fig. 13: Identifying Rear Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the lower bolts from the rear shock absorbers. Refer to **Shock Absorber Replacement** .

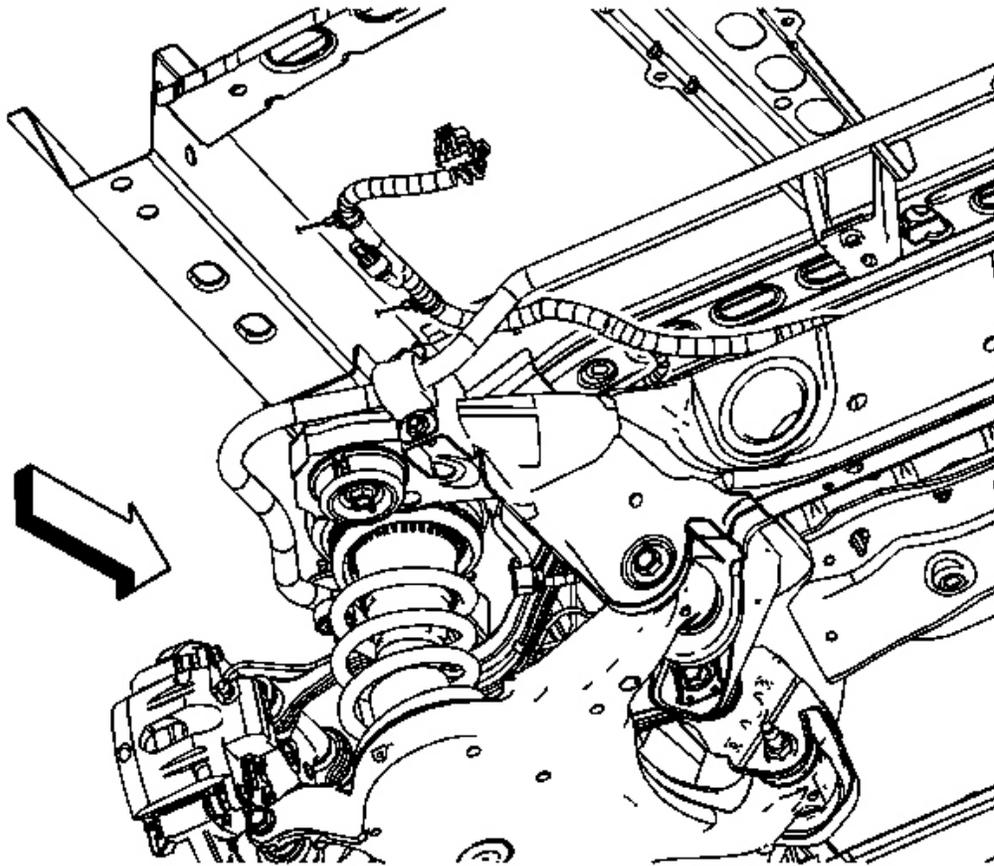


Fig. 14: Locating Rear Suspension Crossmember Wire Harness
Courtesy of GENERAL MOTORS CORP.

8. Remove the rear suspension crossmember wire harness retainers from the vehicle underbody.
9. Disconnect the rear suspension crossmember wire harness from the vehicle body wire harness.

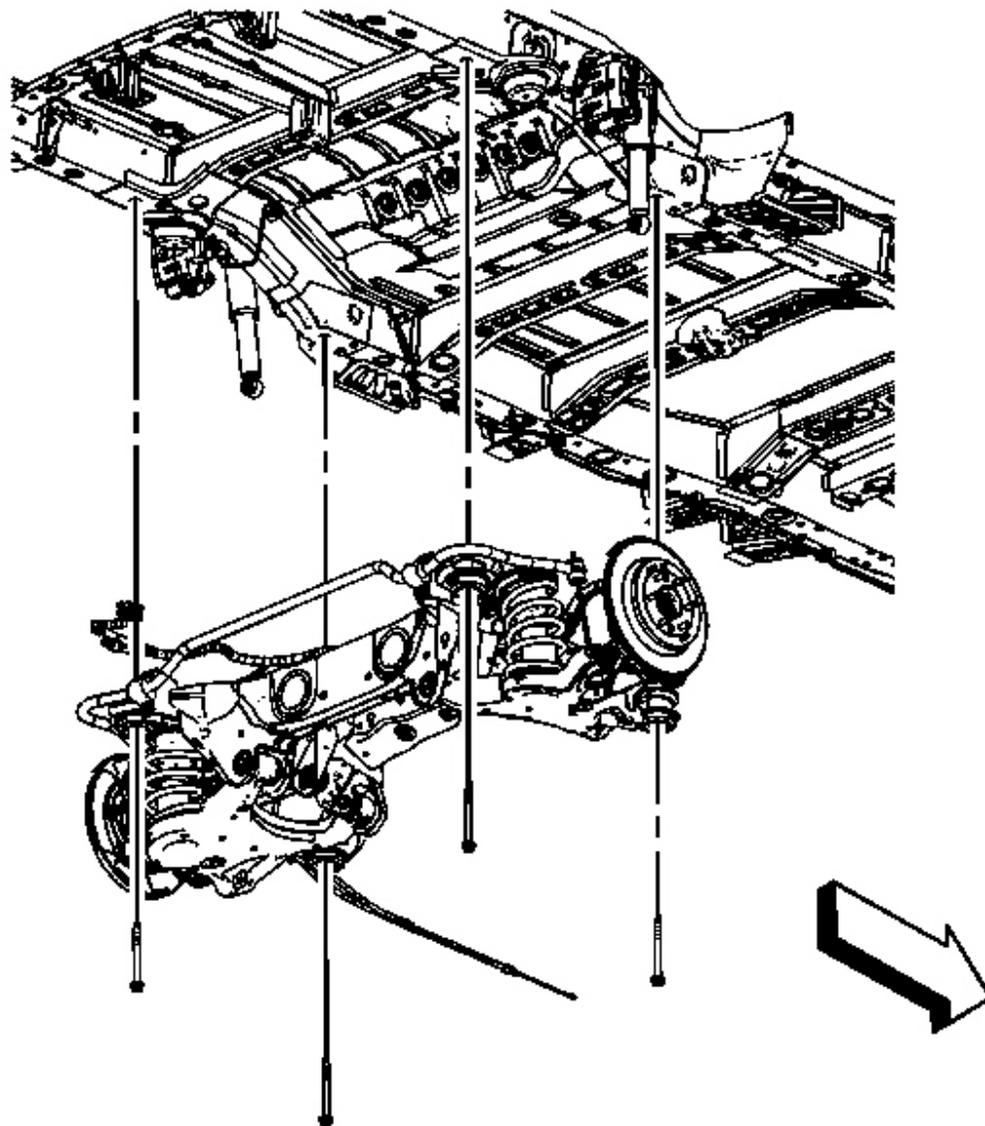


Fig. 15: Identifying Rear Suspension Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

10. Support the rear suspension crossmember with a suitable stand.
11. Remove the four bolts securing the rear suspension crossmember to vehicle.
12. With the aid of an assistant, carefully lower the rear suspension crossmember or raise the

vehicle away from the rear suspension crossmember.

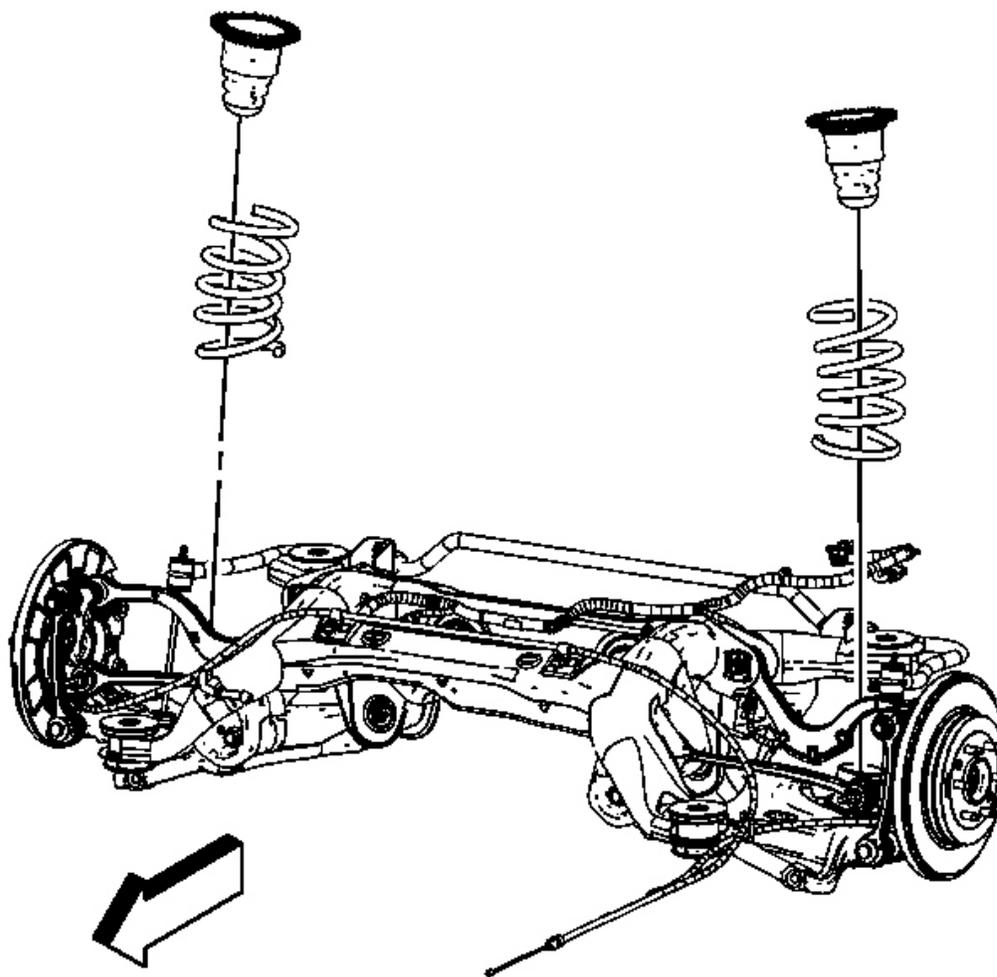


Fig. 16: Identifying Rear Jounce Bumpers & Springs
Courtesy of GENERAL MOTORS CORP.

13. Remove the jounce bumpers and springs from the rear suspension crossmember.

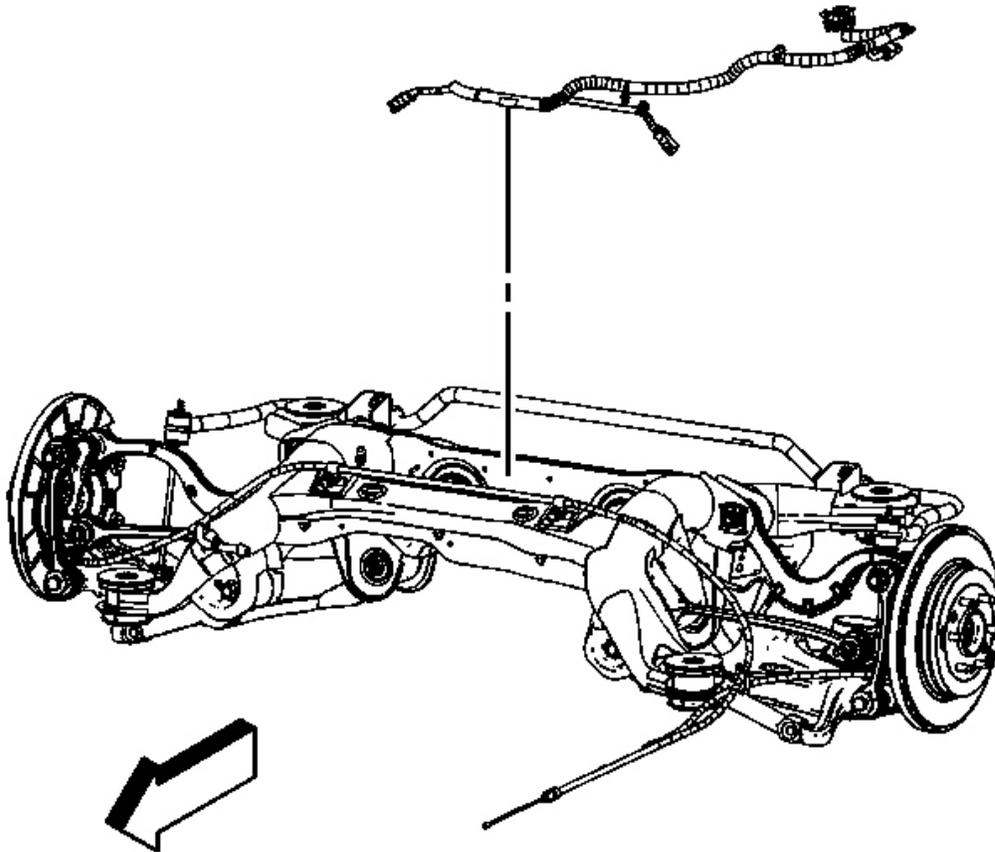


Fig. 17: View Of Wheel Speed Sensors Wire Harness
Courtesy of GENERAL MOTORS CORP.

14. Release the wire harness retainers from the rear suspension crossmember.
15. Disconnect the wire harness from the wheel speed sensors.
16. Remove the wire harness from the rear suspension crossmember.

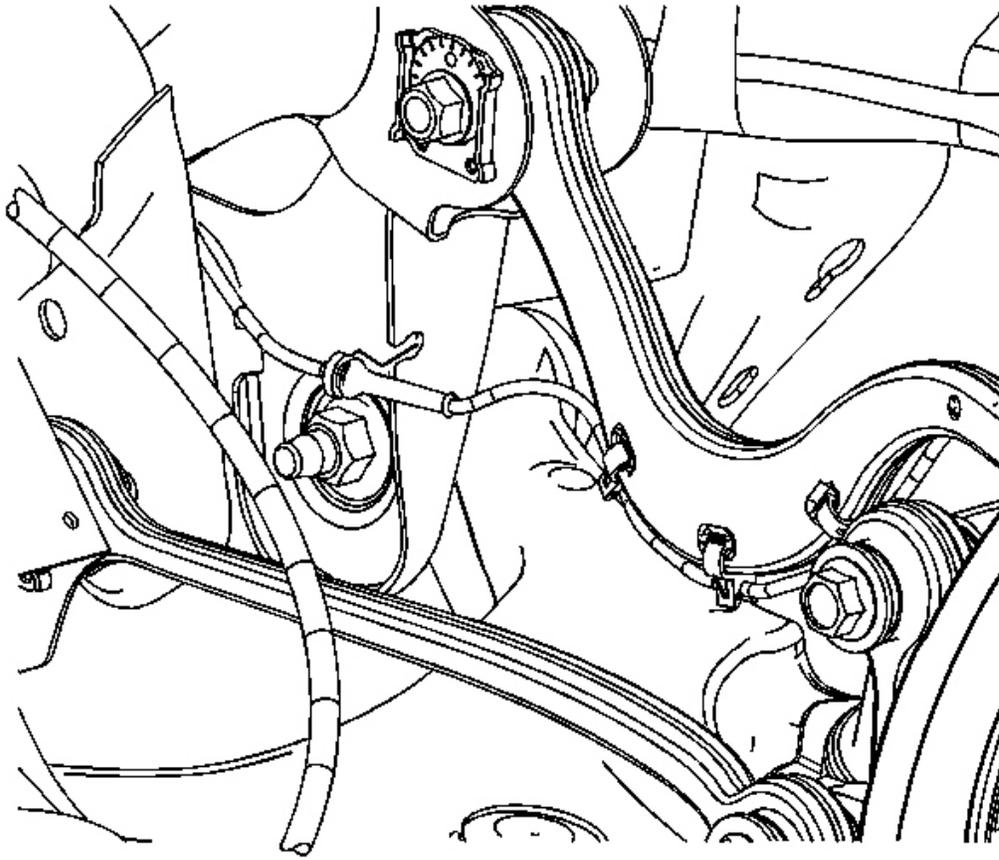


Fig. 18: View Of Wheel Speed Wire Harness Retainers
Courtesy of GENERAL MOTORS CORP.

17. Release the wheel speed wire harness retainers from the rear suspension crossmember.

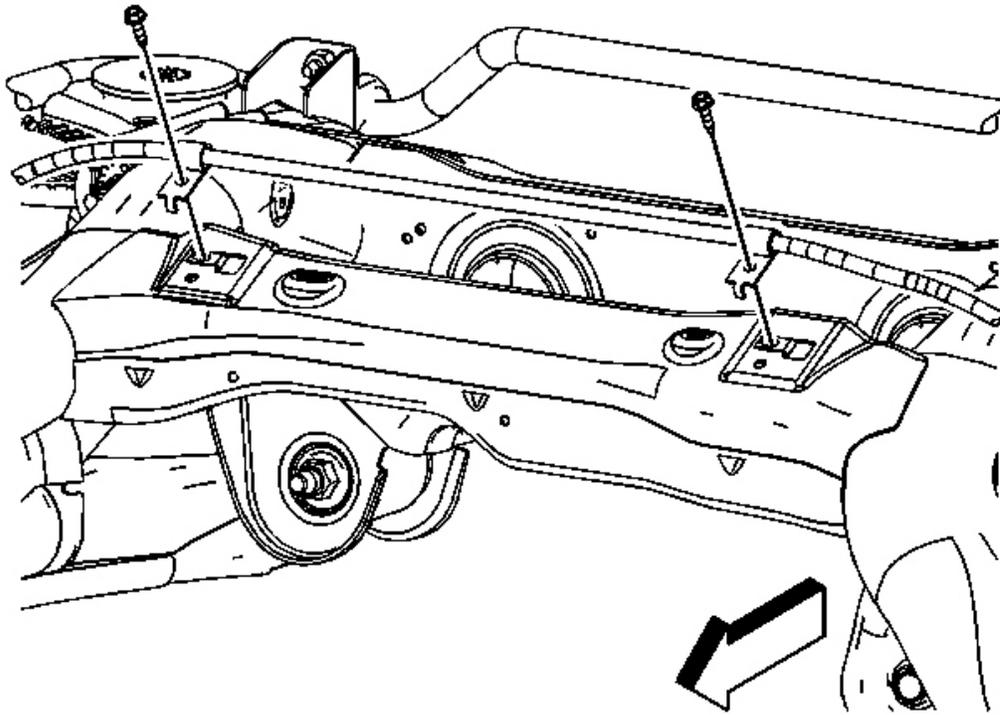


Fig. 19: Identifying Right Park Brake Cable Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

18. Remove the right park brake cable retaining bolts from the rear suspension crossmember.
19. Remove the right park brake cable from the rear suspension crossmember.

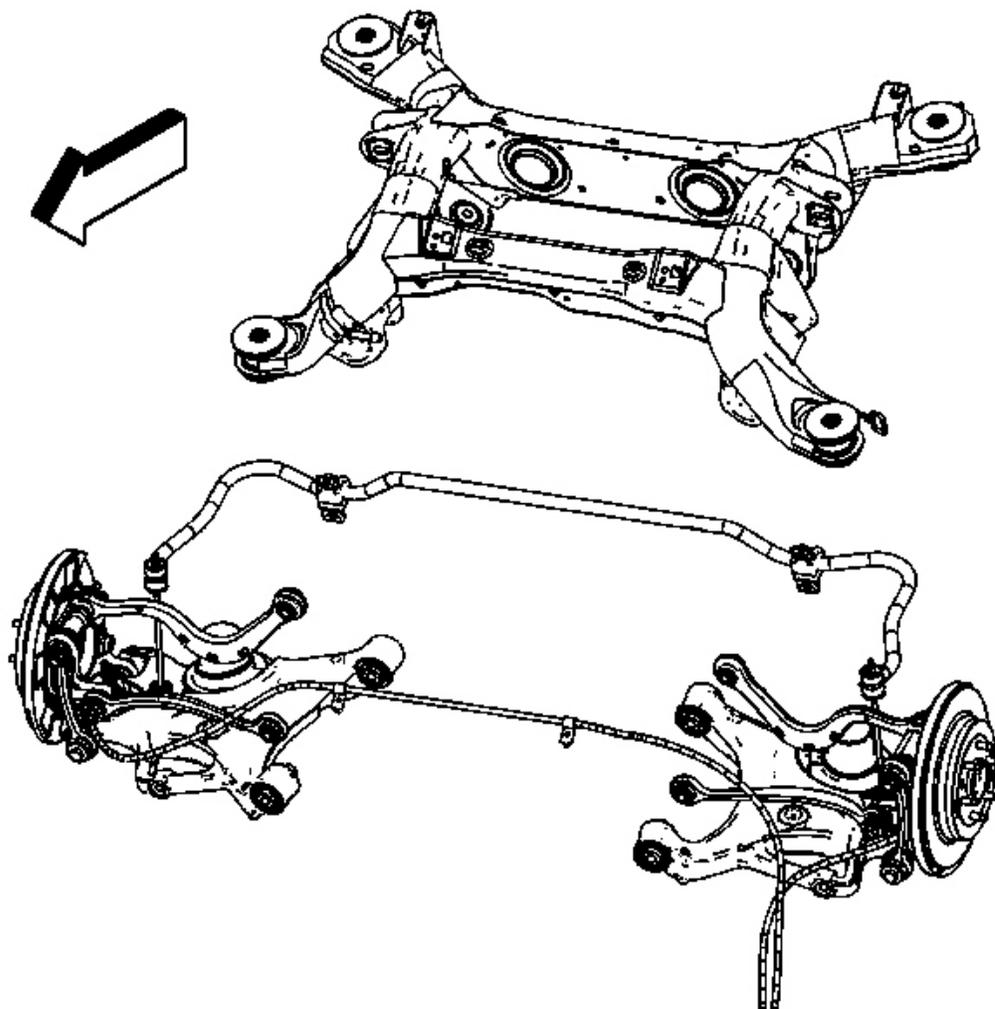


Fig. 20: View Of Rear Suspension Crossmember & Suspension Components
Courtesy of GENERAL MOTORS CORP.

20. Remove the remaining suspension components from the rear suspension crossmember:
- Stabilizer shaft insulator brackets-Refer to **Stabilizer Shaft Insulator Replacement** .
 - Upper control arm-Refer to **Upper Control Arm Replacement** .
 - Adjustment link-Refer to **Adjustment Link Replacement** .
 - Lower control arm-Refer to **Lower Control Arm Replacement** .

Installation Procedure

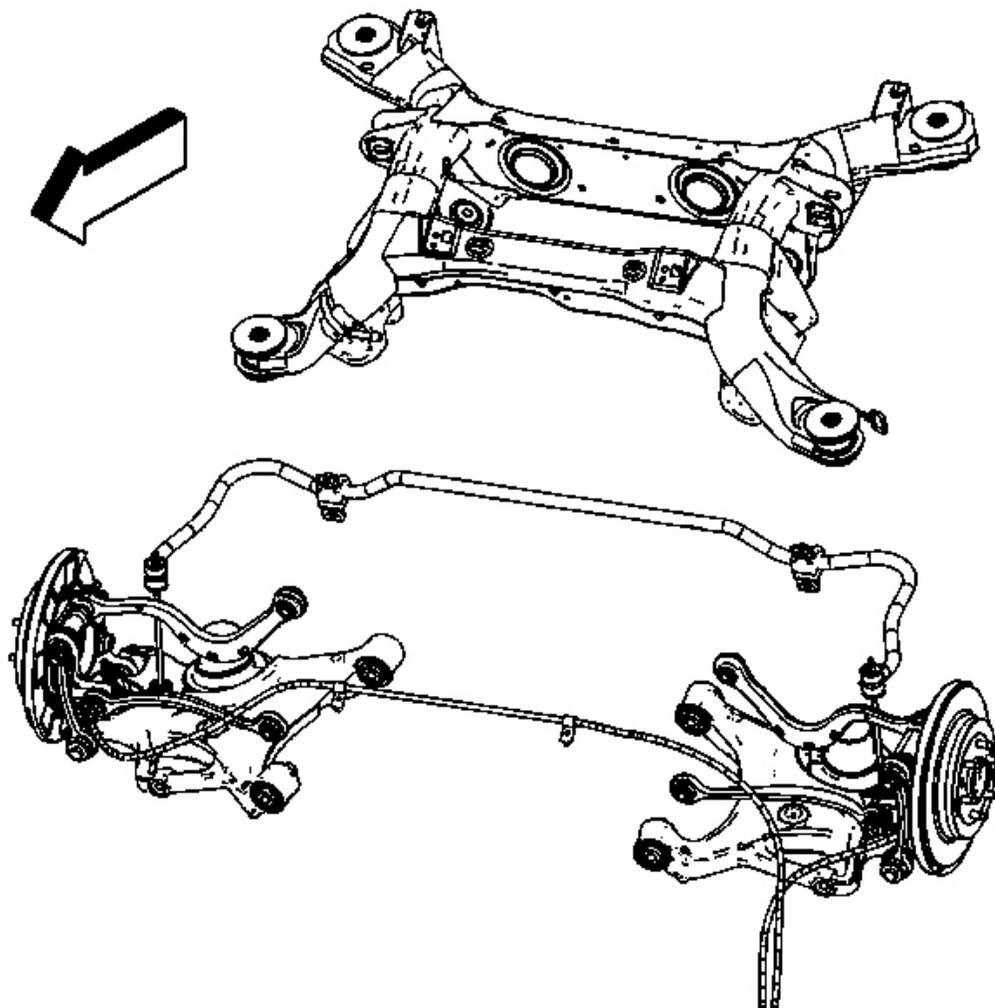


Fig. 21: View Of Rear Suspension Crossmember & Suspension Components
Courtesy of GENERAL MOTORS CORP.

1. Install the following suspension components to the rear suspension crossmember:
 - Lower control arm-Refer to **Lower Control Arm Replacement** .
 - Adjustment link-Refer to **Adjustment Link Replacement** .
 - Upper control arm-Refer to **Upper Control Arm Replacement** .

- Stabilizer shaft insulator brackets-Refer to Stabilizer Shaft Insulator Replacement .

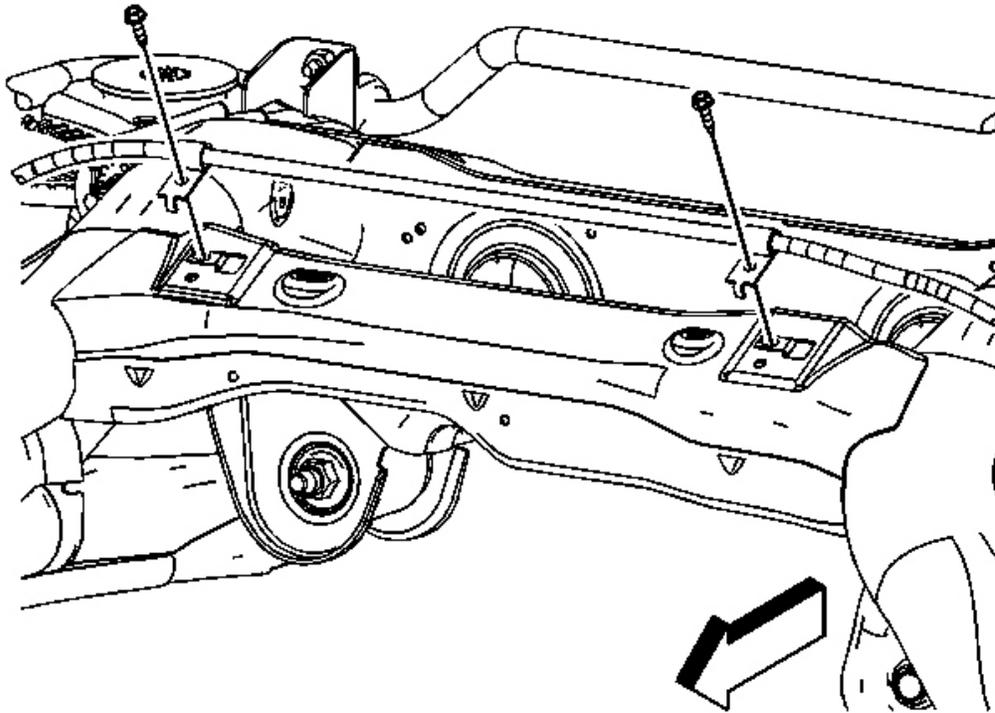


Fig. 22: Identifying Right Park Brake Cable Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

2. Install the right park brake cable to the rear suspension crossmember.

NOTE: Refer to Fastener Notice .

3. Install the right park brake cable retaining bolts to the rear suspension crossmember.

Tighten: Tighten the bolts to 10 N.m (89 lb in).

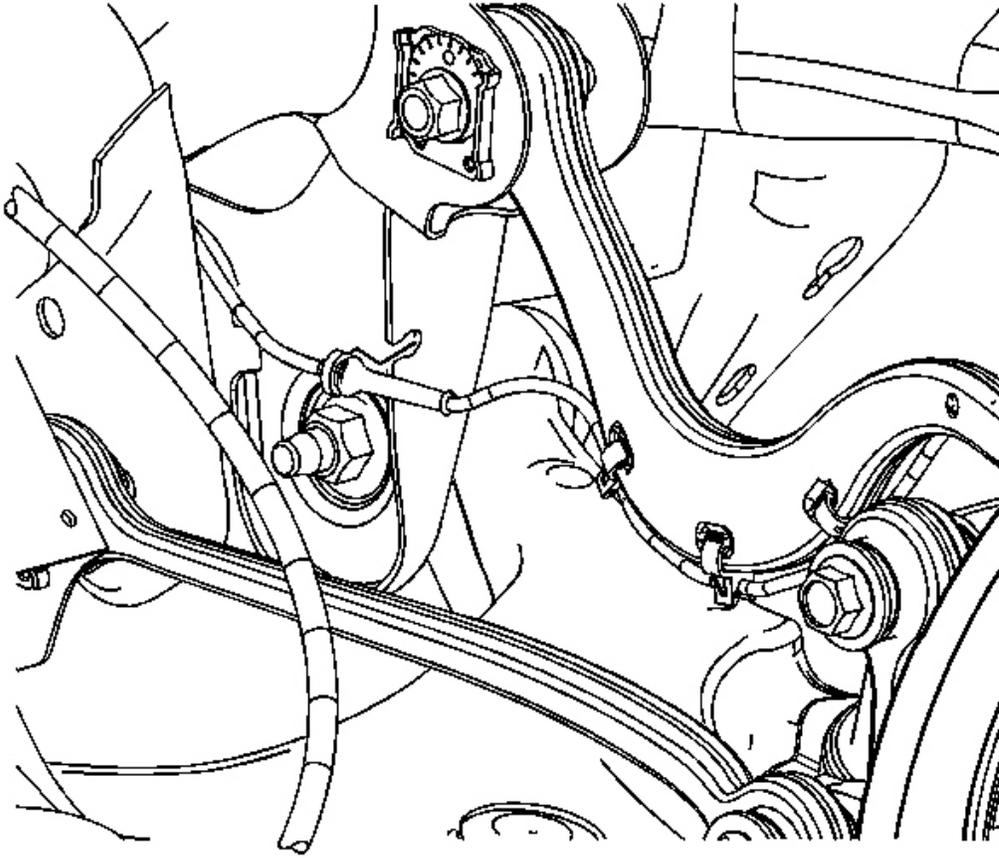


Fig. 23: View Of Wheel Speed Wire Harness Retainers
Courtesy of GENERAL MOTORS CORP.

4. Install the wheel speed wire harness retainers to the rear suspension crossmember.

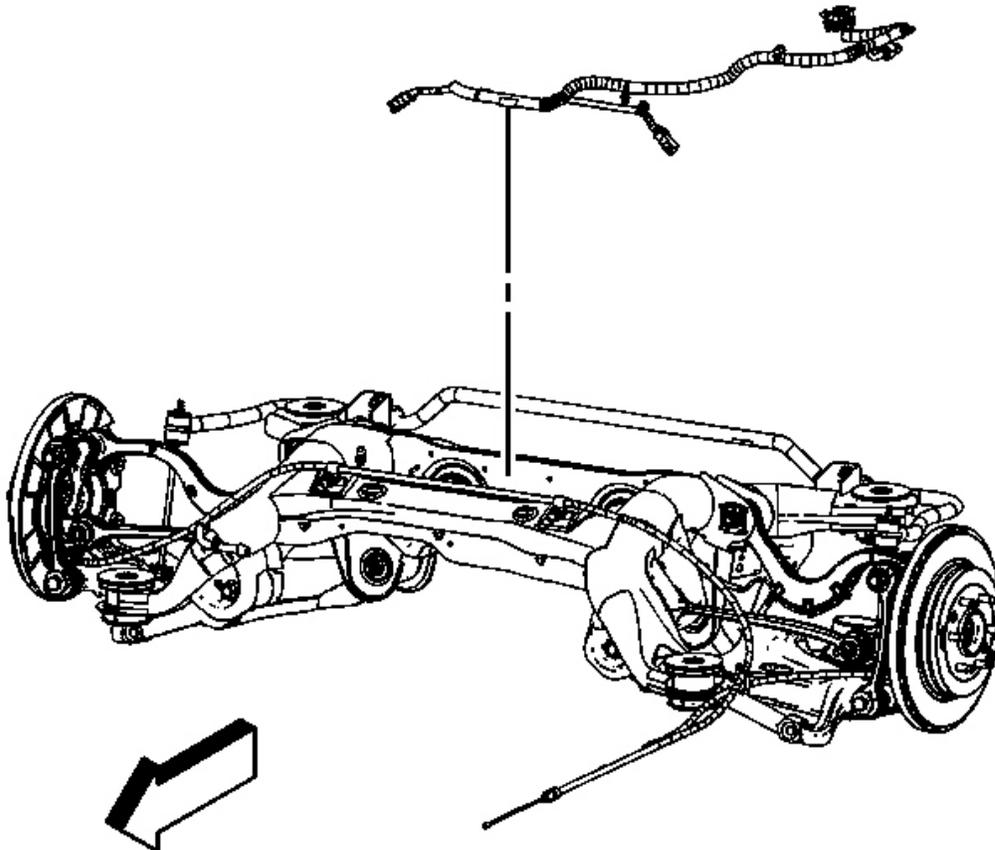


Fig. 24: View Of Wheel Speed Sensors Wire Harness
Courtesy of GENERAL MOTORS CORP.

5. Install the wire harness to the rear suspension crossmember.
6. Attach the wire harness retainers to the rear suspension crossmember.
7. Connect the wire harness to the wheel speed sensors.

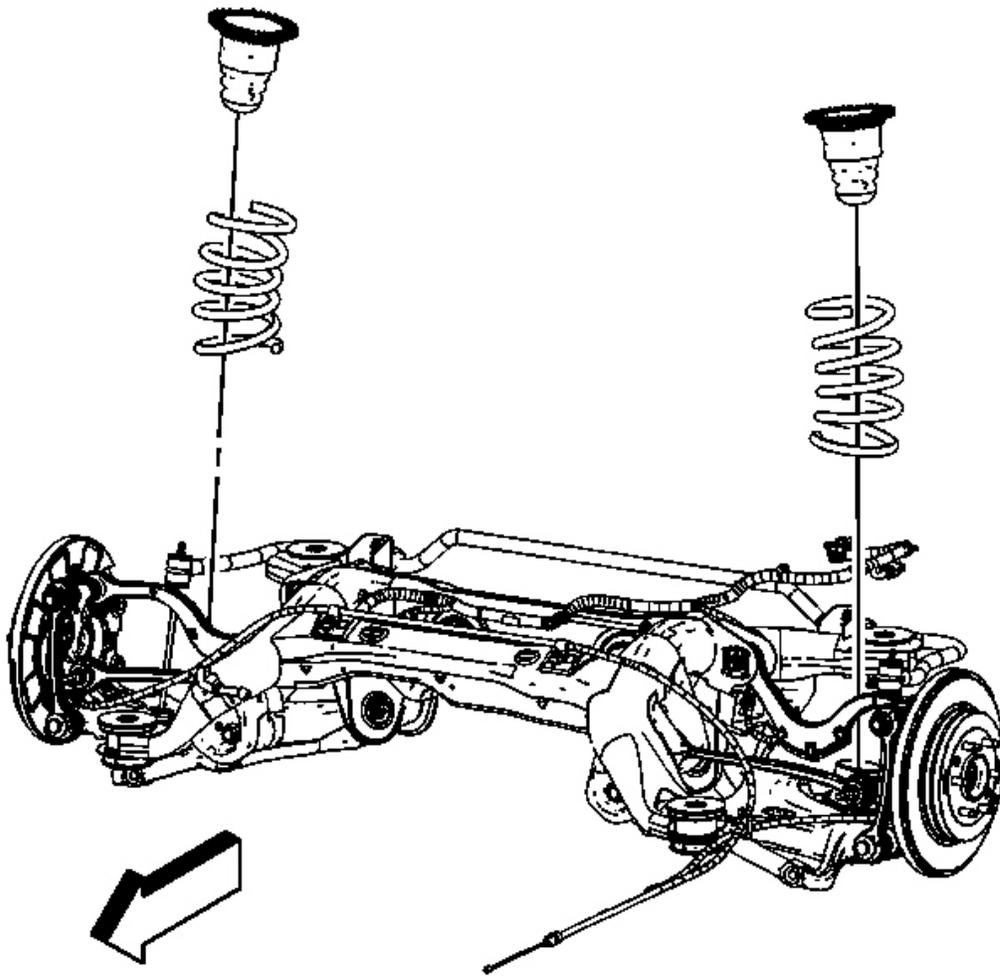


Fig. 25: Identifying Rear Jounce Bumpers & Springs
Courtesy of GENERAL MOTORS CORP.

8. Install the jounce bumpers and springs to the rear suspension crossmember. Refer to **Rear Spring, Insulator and Jounce Bumper Replacement** for proper spring installation.

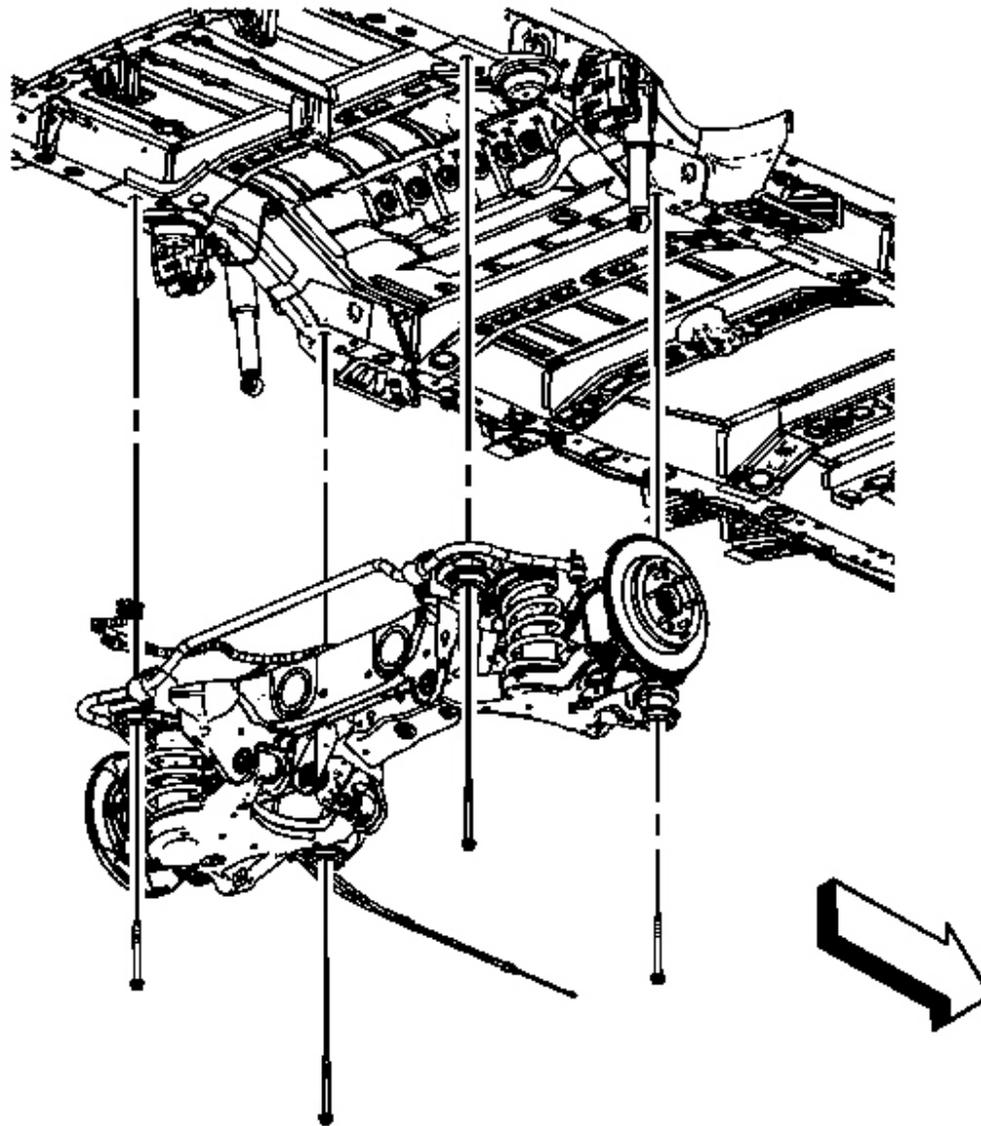


Fig. 26: Identifying Rear Suspension Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

9. With the rear suspension crossmember mounted on a suitable stand and with the aid of an assistant, carefully lower the vehicle or raise the rear suspension crossmember into location on the vehicle.

10. Install the four bolts securing the rear suspension crossmember to vehicle.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

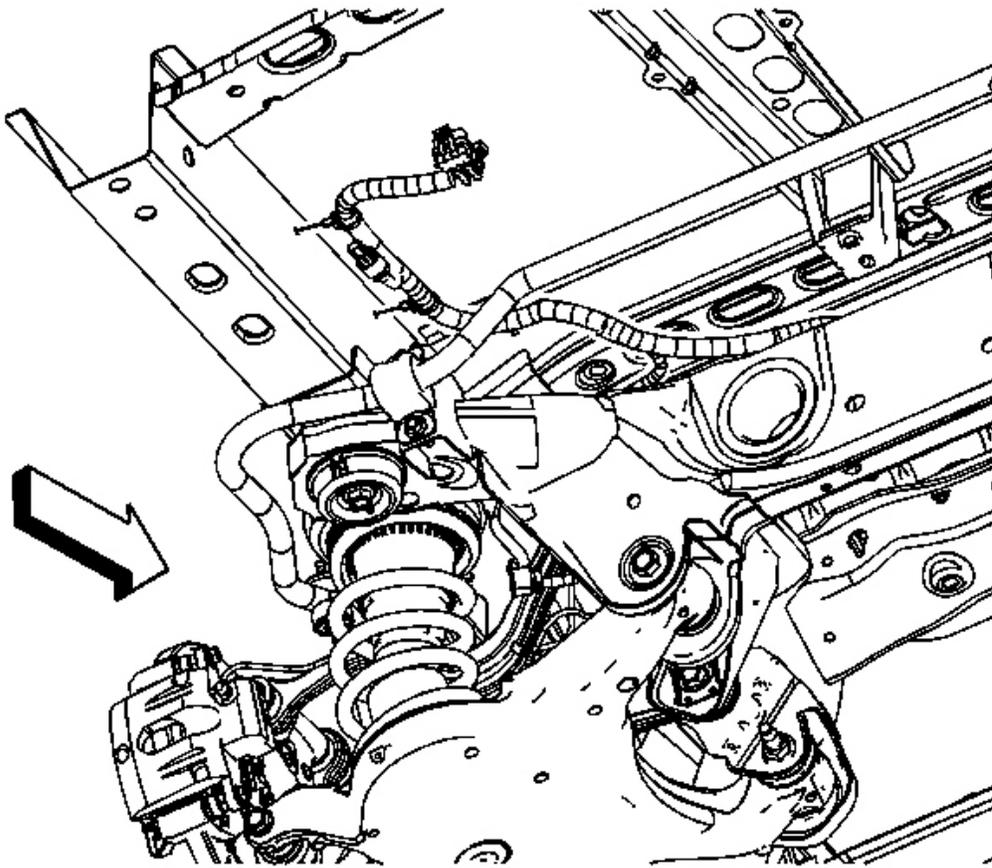


Fig. 27: Locating Rear Suspension Crossmember Wire Harness
Courtesy of GENERAL MOTORS CORP.

11. Connect the rear suspension crossmember wire harness to the vehicle body wire harness.
12. Install the rear suspension crossmember wire harness retainers to the vehicle underbody.

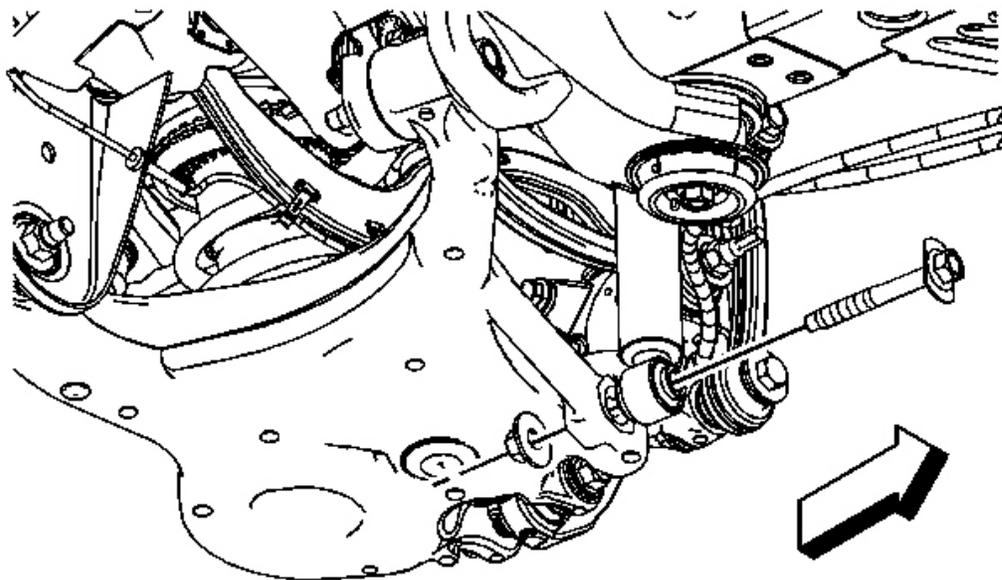


Fig. 28: Identifying Rear Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS CORP.

13. Install the lower bolts to the rear shock absorbers. Refer to **Shock Absorber Replacement** .

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

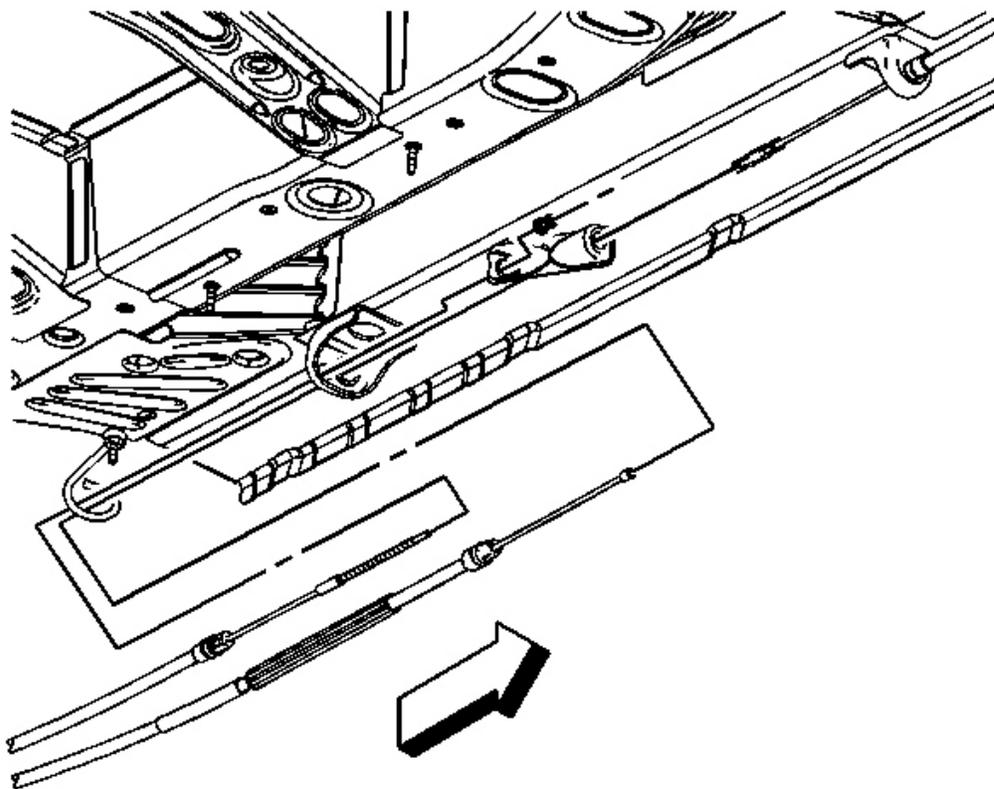


Fig. 29: View Of Park Brake Cables
Courtesy of GENERAL MOTORS CORP.

14. Install the park brake cables to the park brake cable equalizer and park brake cable bracket. Refer to **Park Brake Cable Equalizer Replacement** .

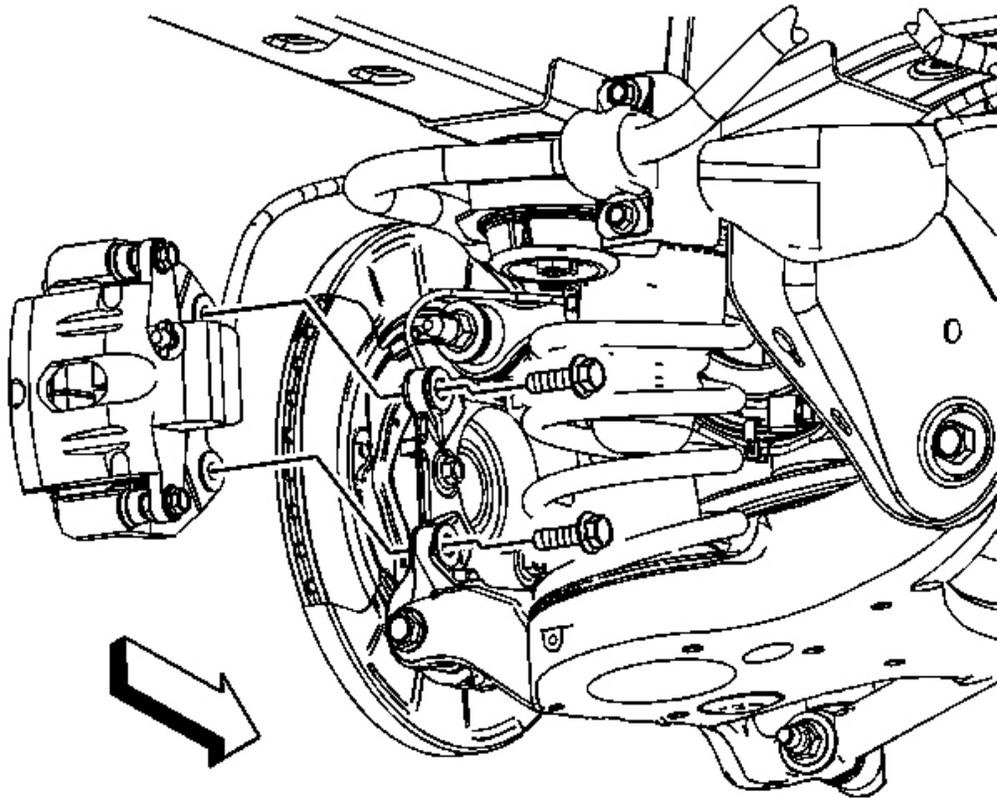


Fig. 30: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

15. Install the rear brake caliper and bracket assemblies to the rear knuckles.
16. Install the rear brake caliper bracket bolts.

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

17. Install the muffler. Muffler Replacement (NB5) or Muffler Replacement (NEA/NEB) .
18. Install the rear tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .
19. Lower the vehicle.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the muffler. Refer to **Muffler Replacement (NB5)** or **Muffler Replacement (NEA/NEB)** .

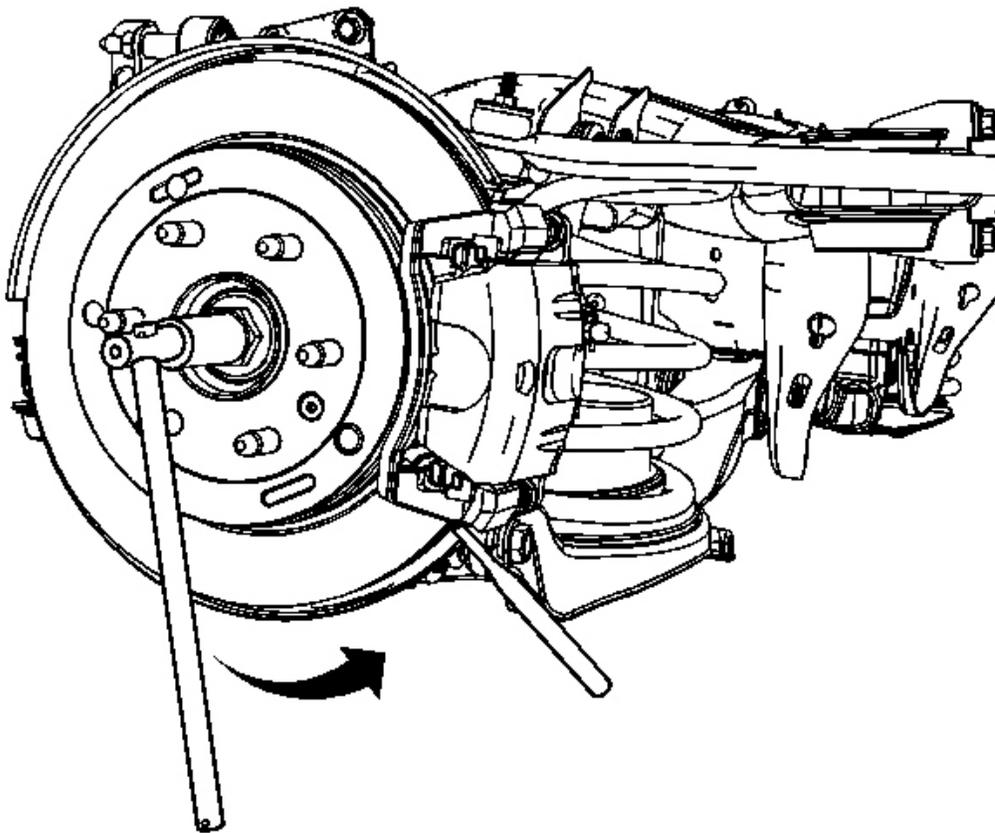


Fig. 31: View Of Tightening/Loosening Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The following step is to ensure that the wheel drive shaft assembly does not rotate while the nut is being removed.

4. Insert a brass drift or punch in the brake rotor so that the brass drift or punch rest against the brake caliper mounting bracket.
5. Using the breaker bar and socket, loosen the wheel drive shaft nut.

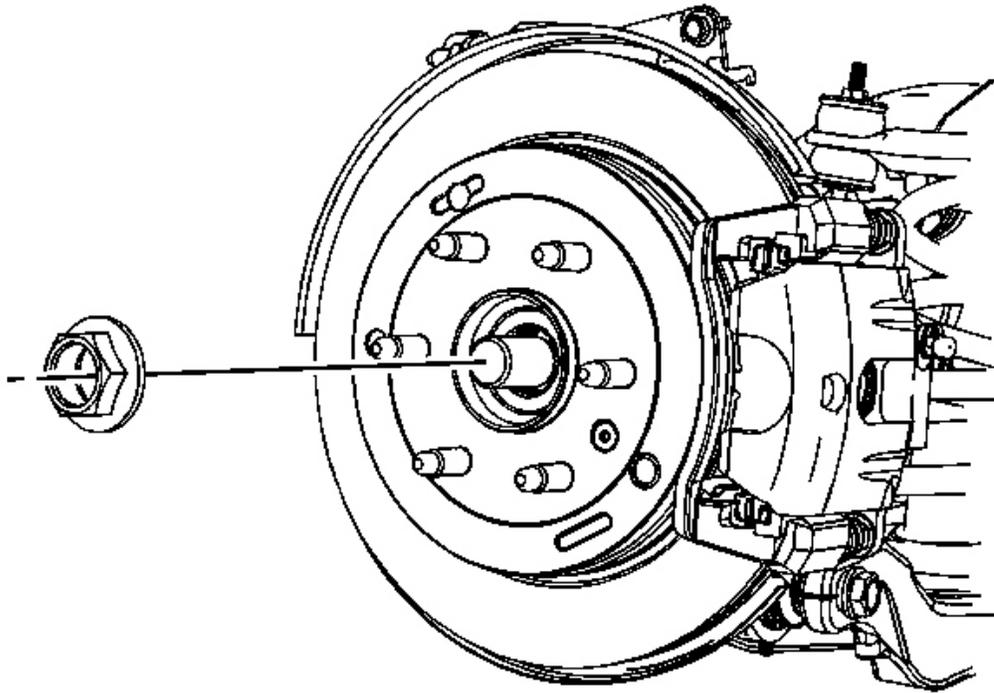


Fig. 32: Identifying Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: DO NOT re-use the wheel drive shaft nut, discard and use NEW.

6. Remove the wheel drive shaft nut.

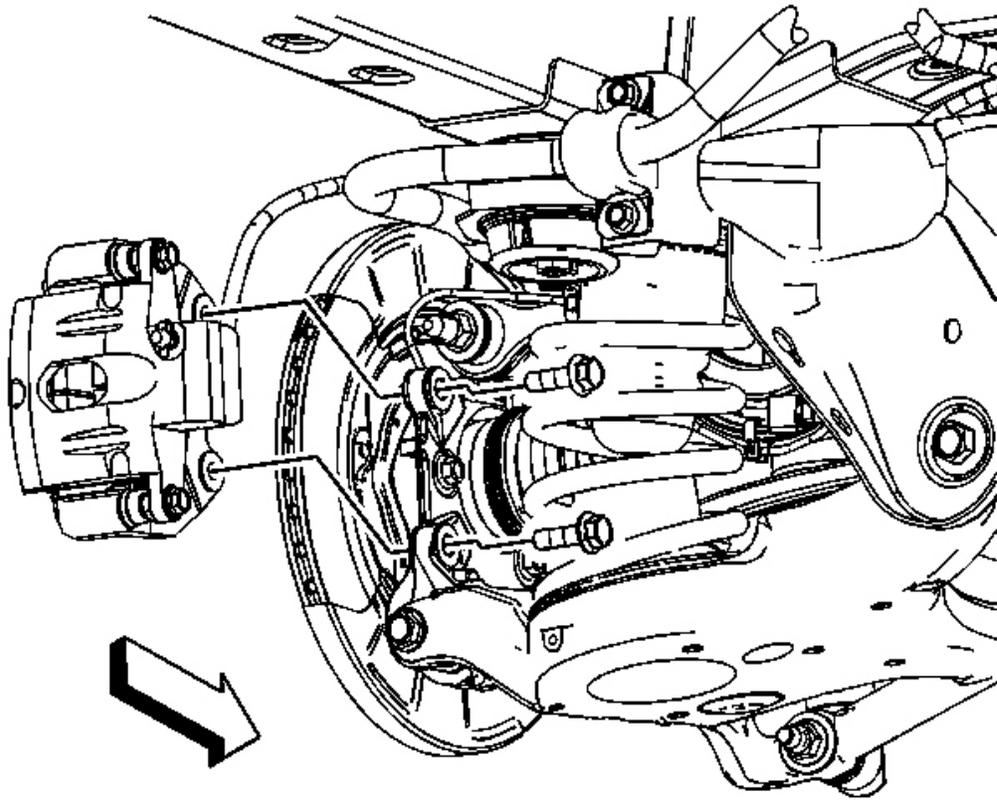


Fig. 33: View Of Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

7. Remove the rear brake caliper bracket bolts.
8. Secure the rear brake caliper and bracket assemblies to the vehicle underbody.

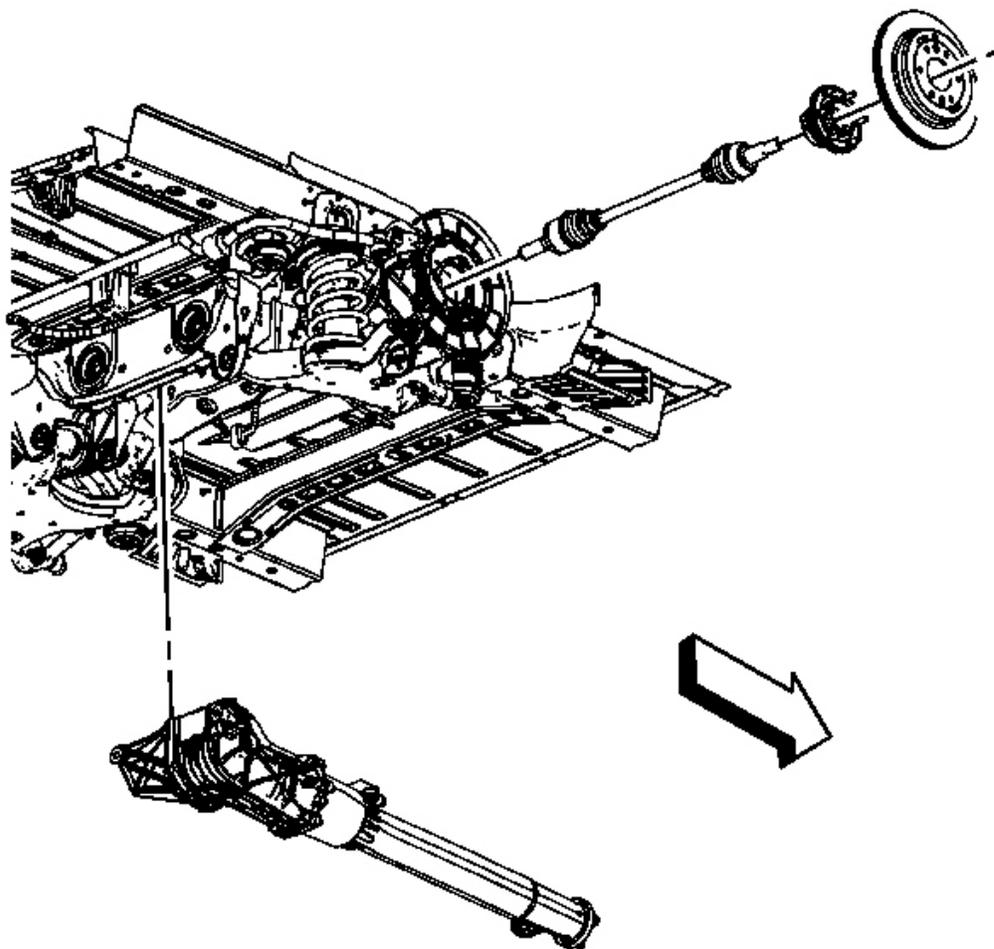


Fig. 34: Locating Rear Wheel Bearings, Axles & Differential Assembly
Courtesy of GENERAL MOTORS CORP.

9. Remove the rear wheel bearings, axles and differential assembly. Refer to **Differential Replacement** .

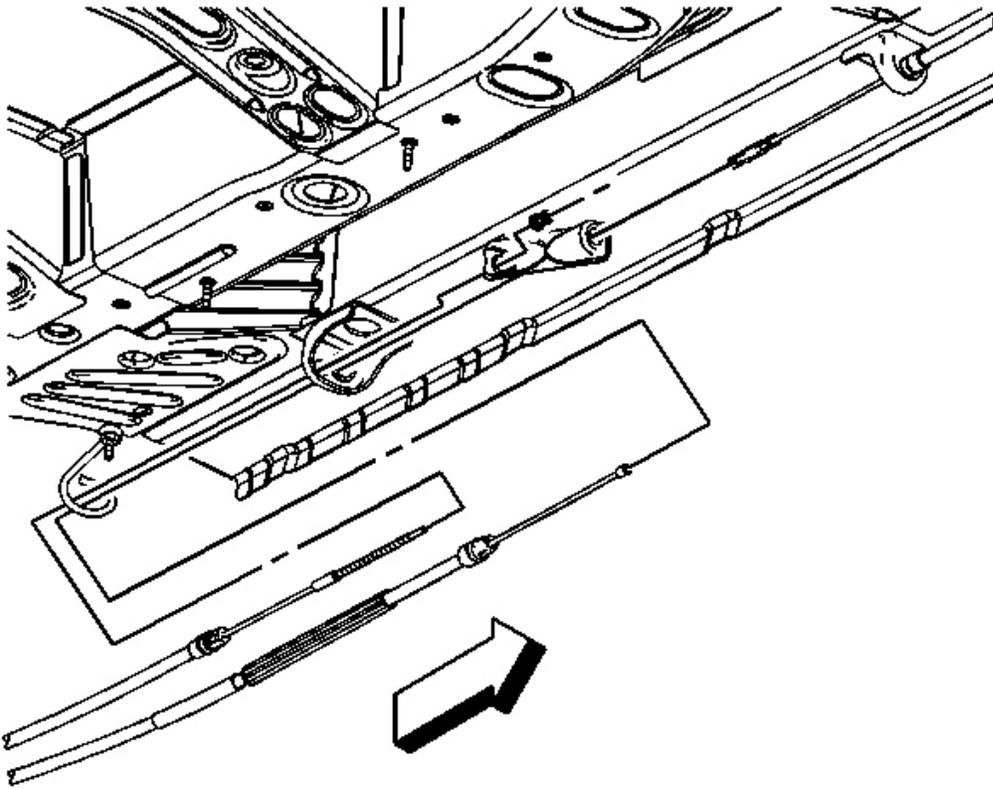


Fig. 35: View Of Park Brake Cables
Courtesy of GENERAL MOTORS CORP.

10. Remove the park brake cables from the park brake cable equalizer and park brake cable bracket. Refer to **Park Brake Cable Equalizer Replacement** .

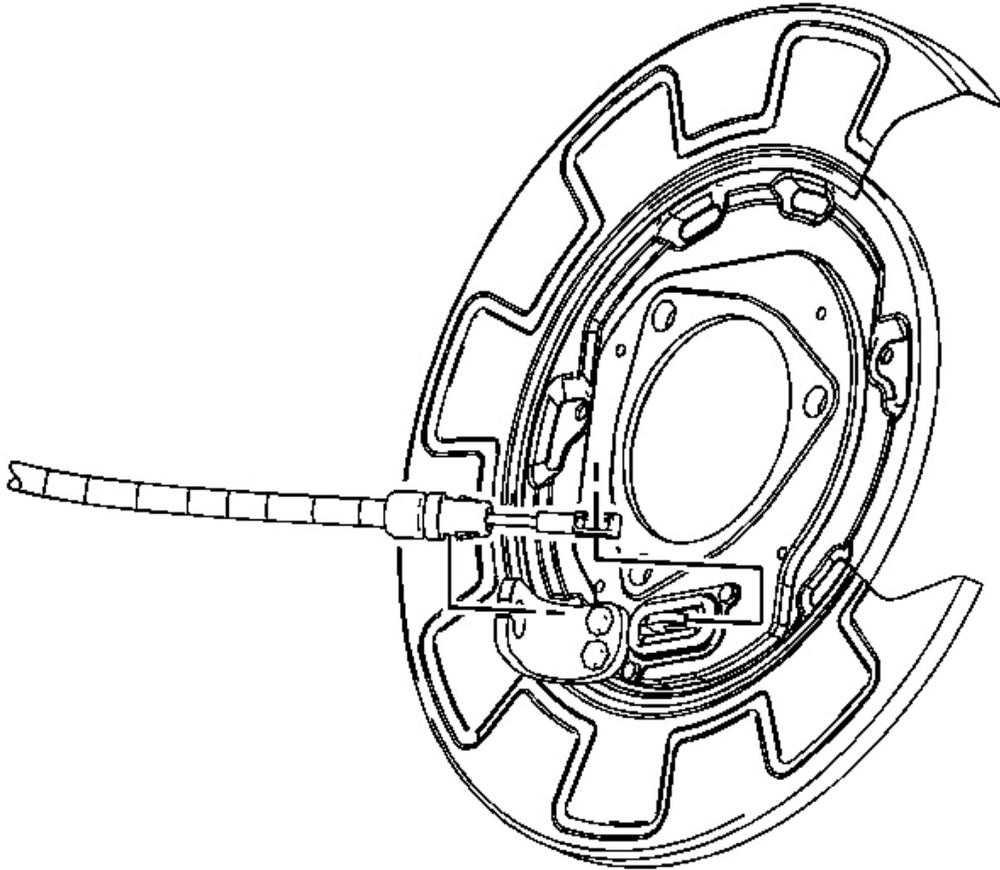


Fig. 36: View Of Right Park Brake Cable
Courtesy of GENERAL MOTORS CORP.

11. Disconnect the right park brake cable from the brake backing plate.

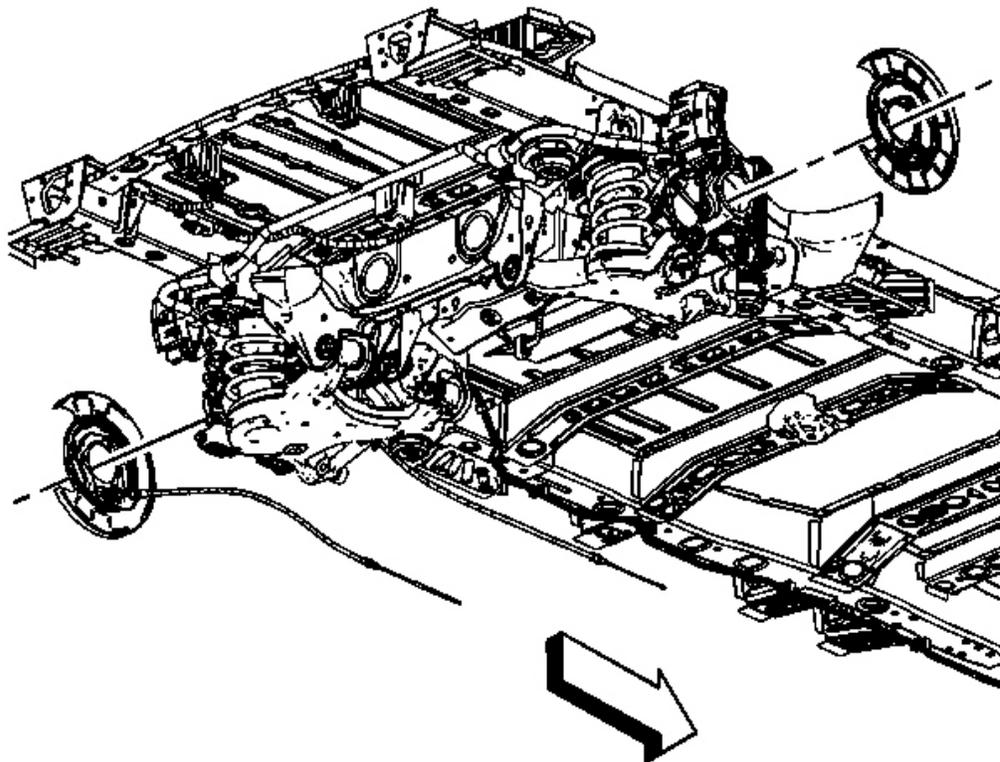


Fig. 37: Identifying Rear Brake Backing Plates
Courtesy of GENERAL MOTORS CORP.

12. Remove both the rear brake backing plates.

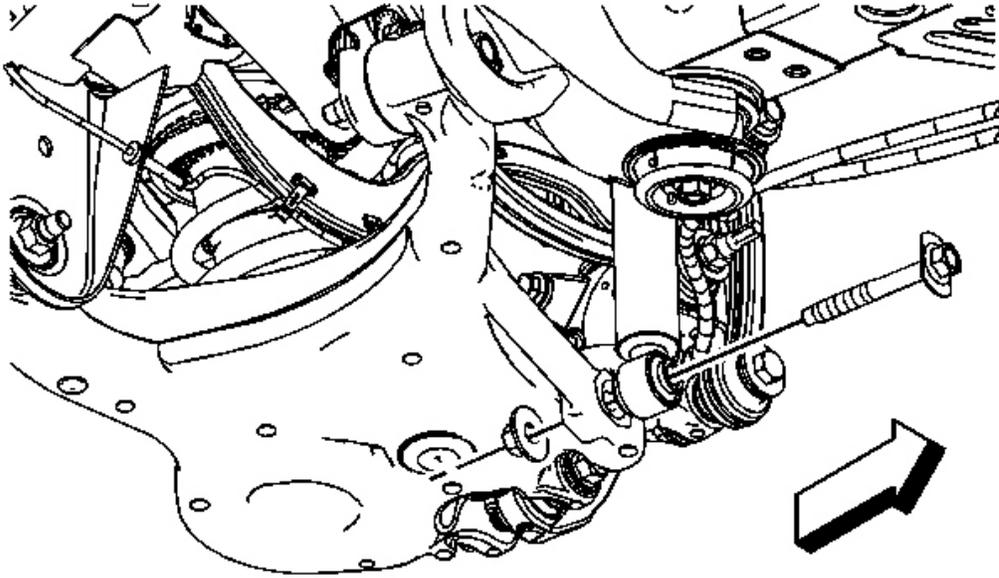


Fig. 38: Identifying Rear Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS CORP.

13. Remove the lower bolts from the rear shock absorbers. Refer to **Shock Absorber Replacement** .

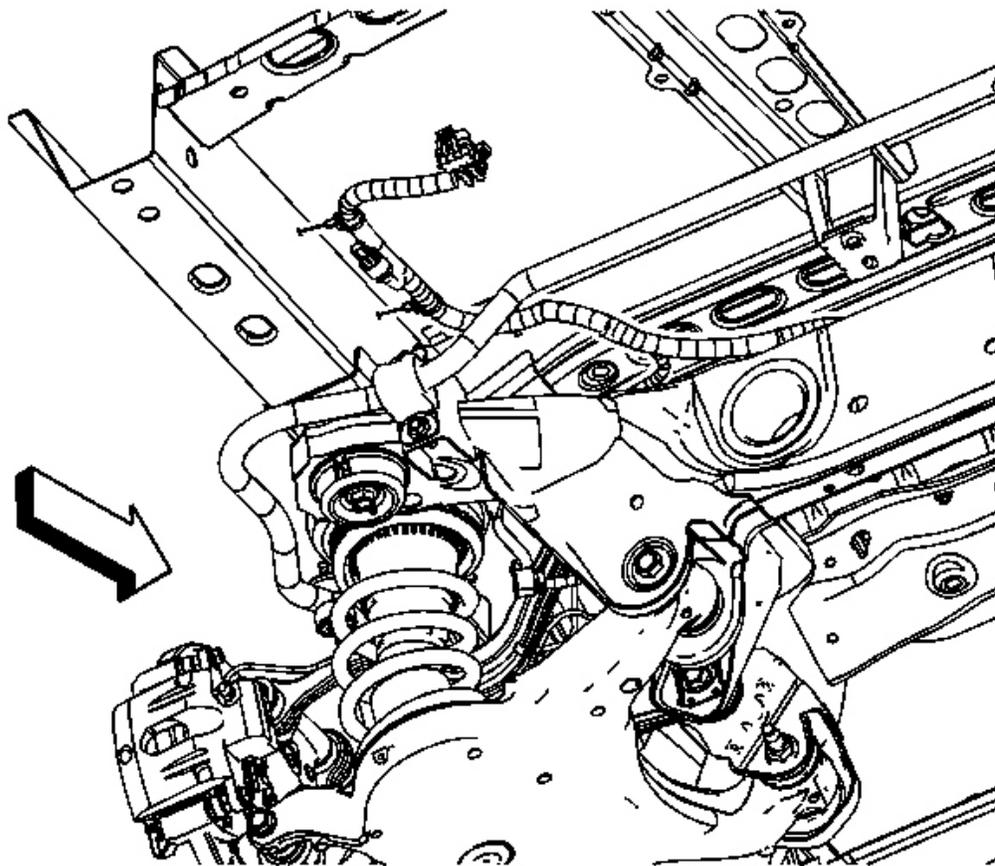


Fig. 39: Locating Rear Suspension Crossmember Wire Harness
Courtesy of GENERAL MOTORS CORP.

14. Remove the rear suspension crossmember wire harness retainers from the vehicle underbody.
15. Disconnect the rear suspension crossmember wire harness from the vehicle body wire harness.

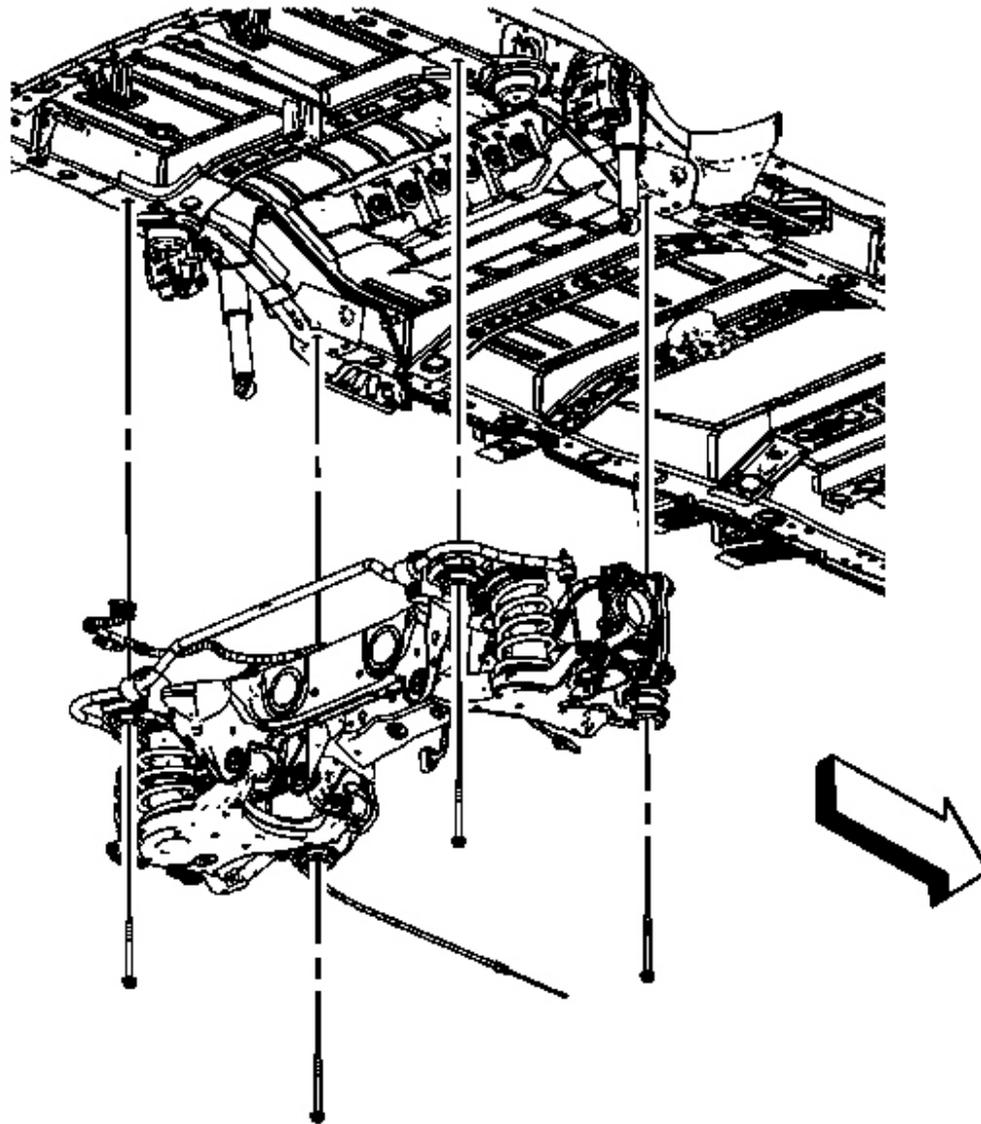


Fig. 40: Identifying Rear Suspension Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

16. Support the rear suspension crossmember with a suitable stand.
17. Remove the four bolts securing the rear suspension crossmember to vehicle.
18. With the aid of an assistant, carefully lower the rear suspension crossmember or raise the

vehicle away from the rear suspension crossmember.

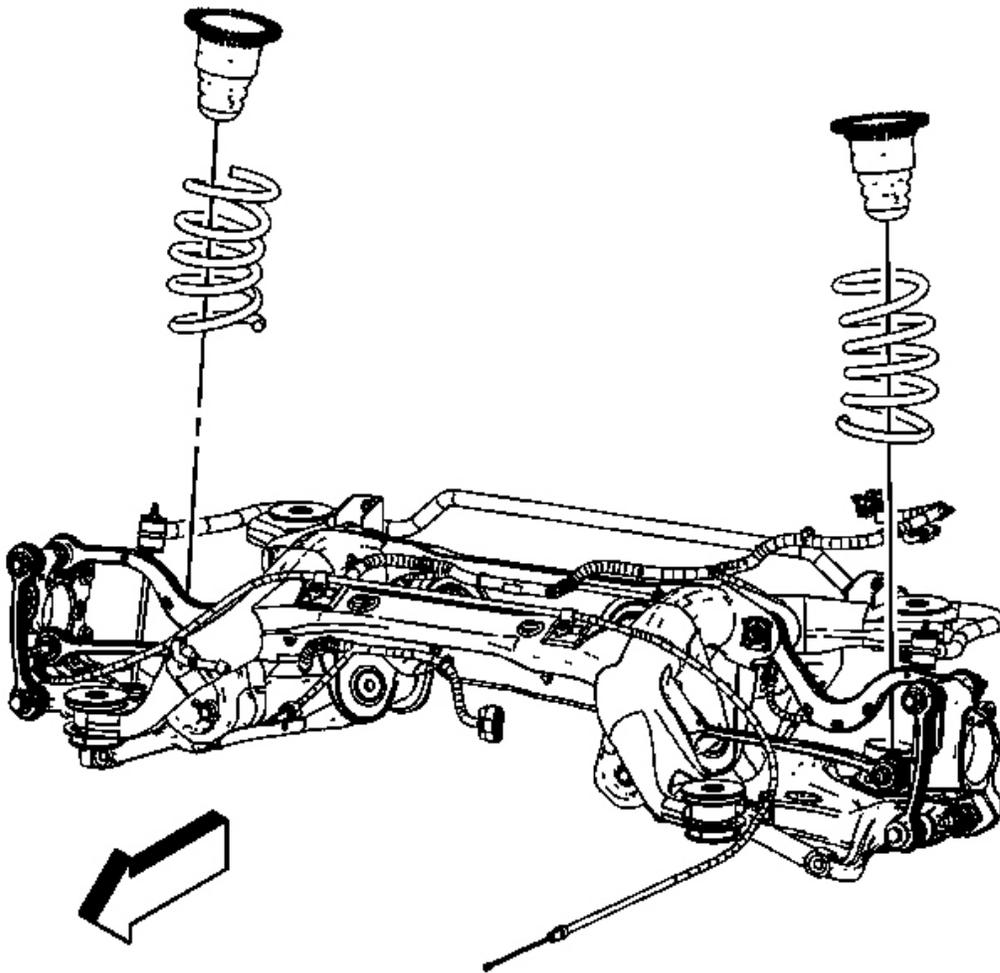


Fig. 41: View Of Rear Jounce Bumpers & Springs
Courtesy of GENERAL MOTORS CORP.

19. Remove the jounce bumpers and springs from the rear suspension crossmember.

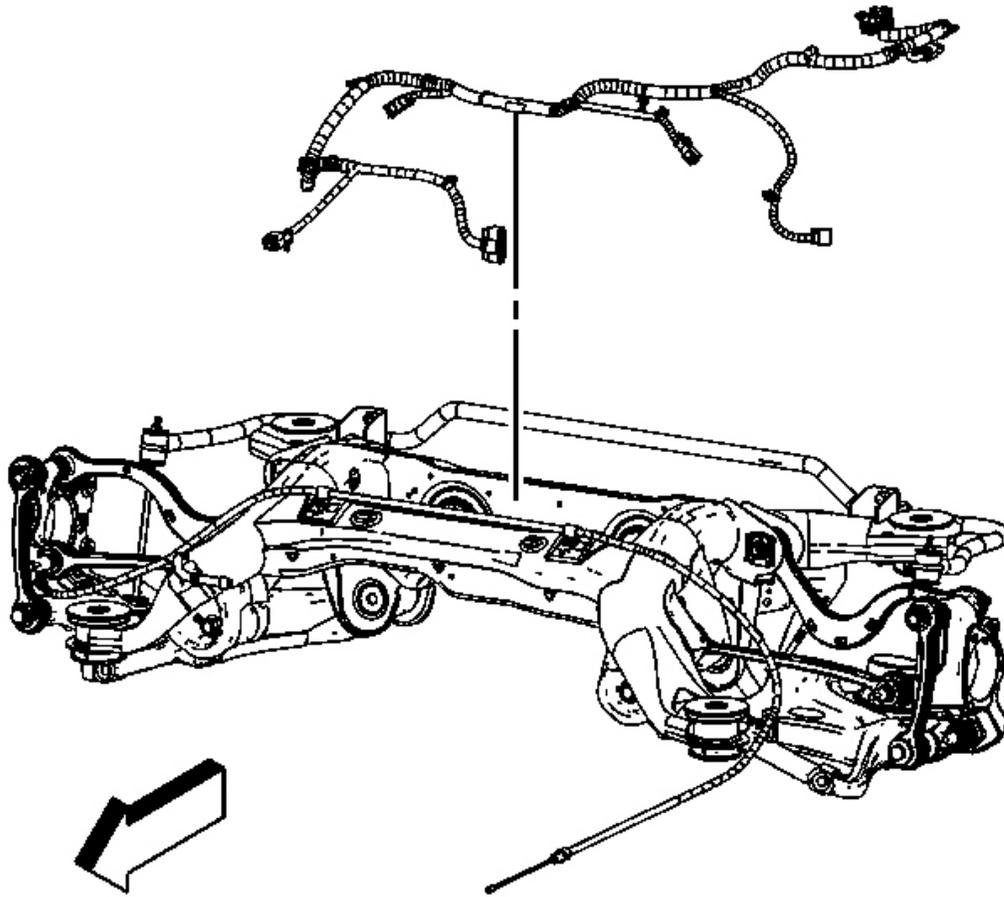


Fig. 42: Identifying Wire Harness
Courtesy of GENERAL MOTORS CORP.

20. Release the wire harness retainers from the rear suspension crossmember.
21. Remove the wire harness from the rear suspension crossmember.

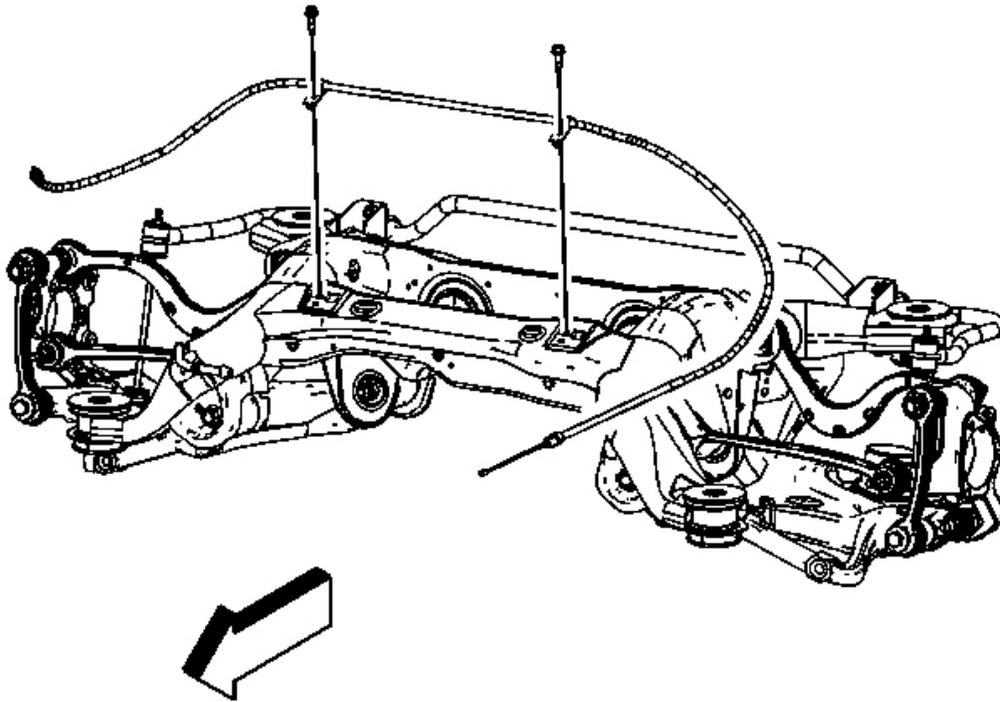


Fig. 43: Identifying Right Park Brake Cable & Bolts
Courtesy of GENERAL MOTORS CORP.

22. Remove the right park brake cable retaining bolts from the rear suspension crossmember.
23. Remove the right park brake cable from the rear suspension crossmember.

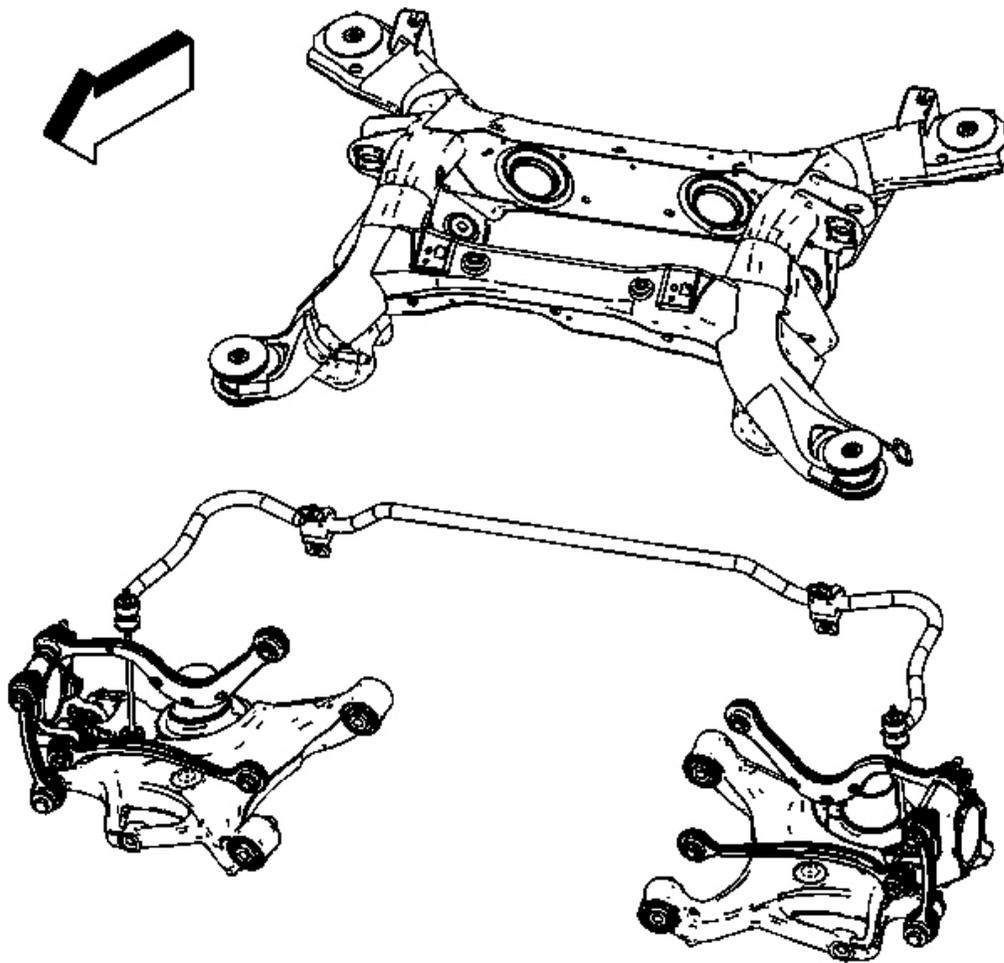


Fig. 44: View Of Rear Suspension Crossmember & Suspension Components
Courtesy of GENERAL MOTORS CORP.

24. Remove the remaining suspension components from the rear suspension crossmember:
- Stabilizer shaft insulator brackets-Refer to **Stabilizer Shaft Insulator Replacement** .
 - Upper control arm-Refer to **Upper Control Arm Replacement** .
 - Adjustment link-Refer to **Adjustment Link Replacement** .
 - Lower control arm-Refer to **Lower Control Arm Replacement** .

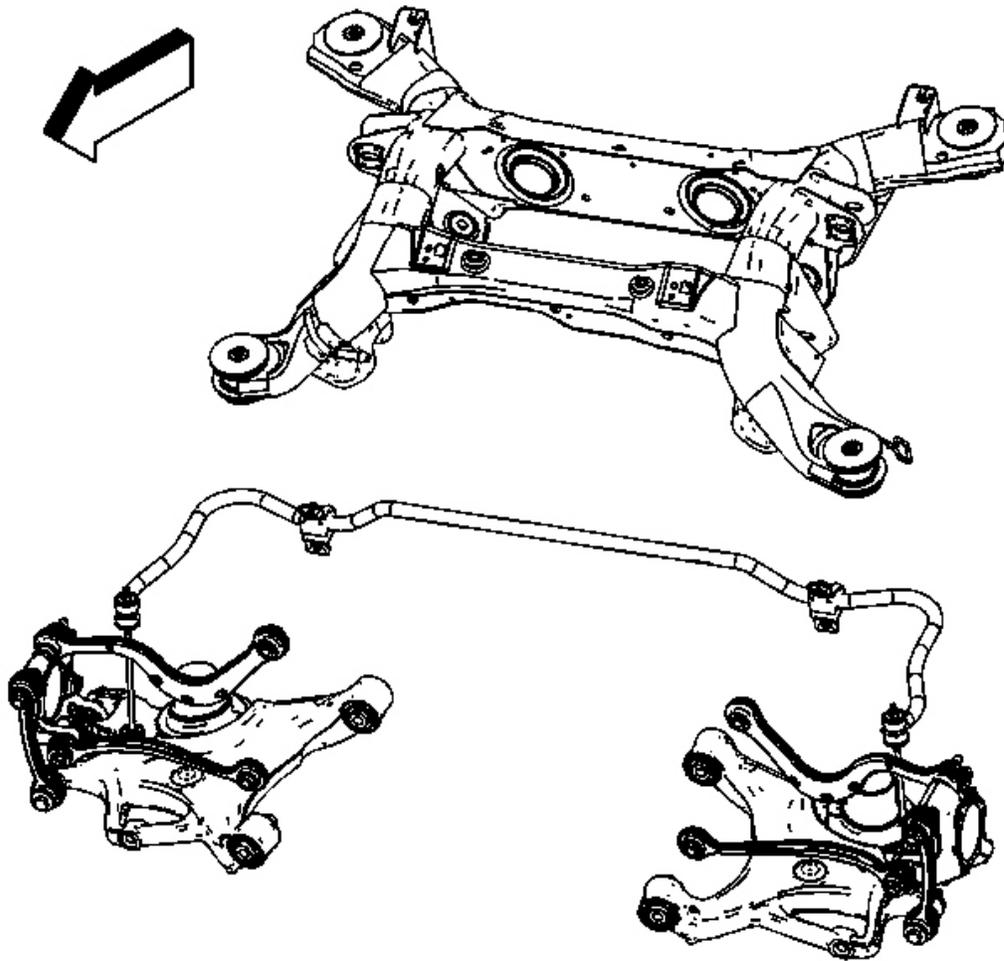


Fig. 45: View Of Rear Suspension Crossmember & Suspension Components
Courtesy of GENERAL MOTORS CORP.

1. Install the following suspension components to the rear suspension crossmember:
 - Lower control arm-Refer to **Lower Control Arm Replacement** .
 - Adjustment link-Refer to **Adjustment Link Replacement** .
 - Upper control arm-Refer to **Upper Control Arm Replacement** .
 - Stabilizer shaft insulator brackets-Refer to **Stabilizer Shaft Insulator Replacement** .

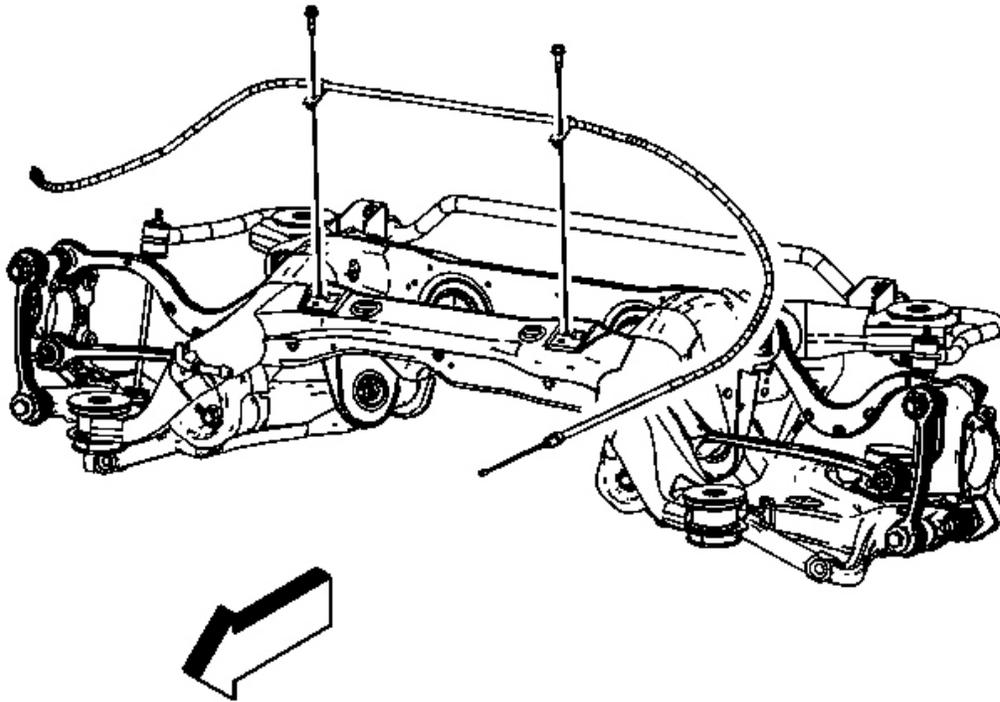


Fig. 46: Identifying Right Park Brake Cable & Bolts
Courtesy of GENERAL MOTORS CORP.

2. Install the right park brake cable to the rear suspension crossmember.

NOTE: Refer to Fastener Notice .

3. Install the right park brake cable retaining bolts to the rear suspension crossmember.

Tighten: Tighten the bolts to 10 N.m (89 lb in).

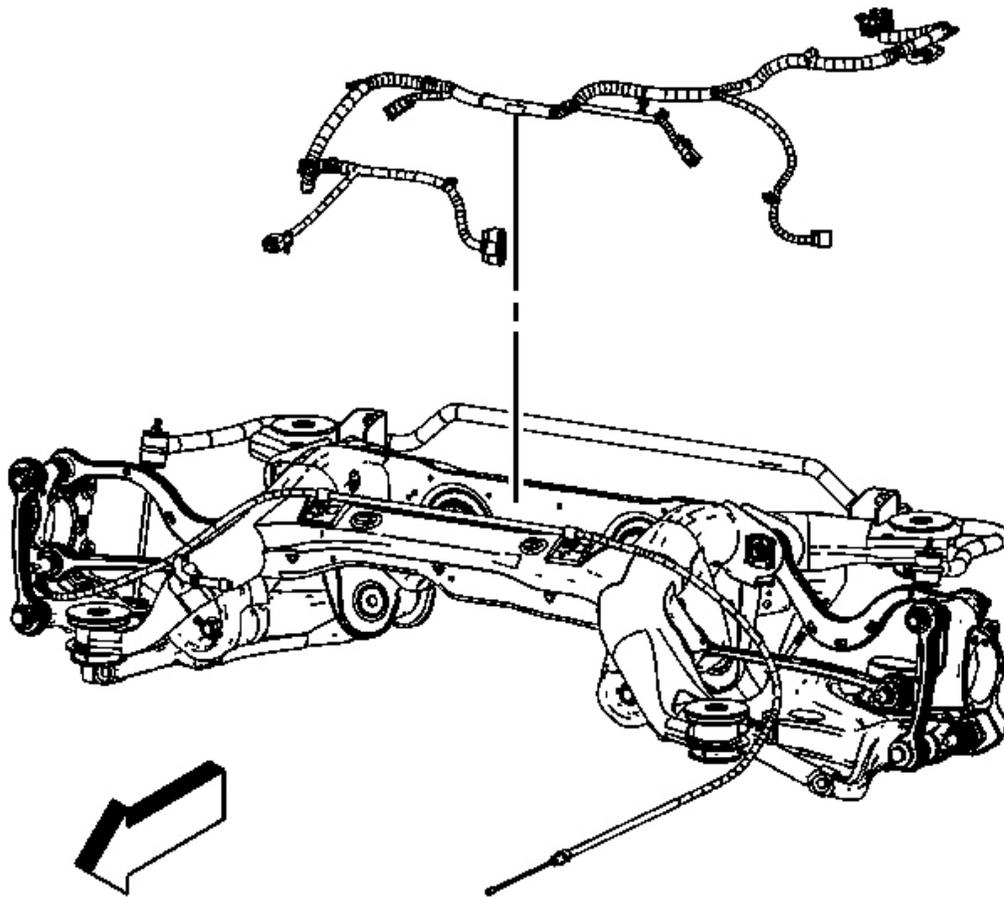


Fig. 47: Identifying Wire Harness
Courtesy of GENERAL MOTORS CORP.

4. Install the wire harness to the rear suspension crossmember.
5. Attach the wire harness retainers to the rear suspension crossmember.

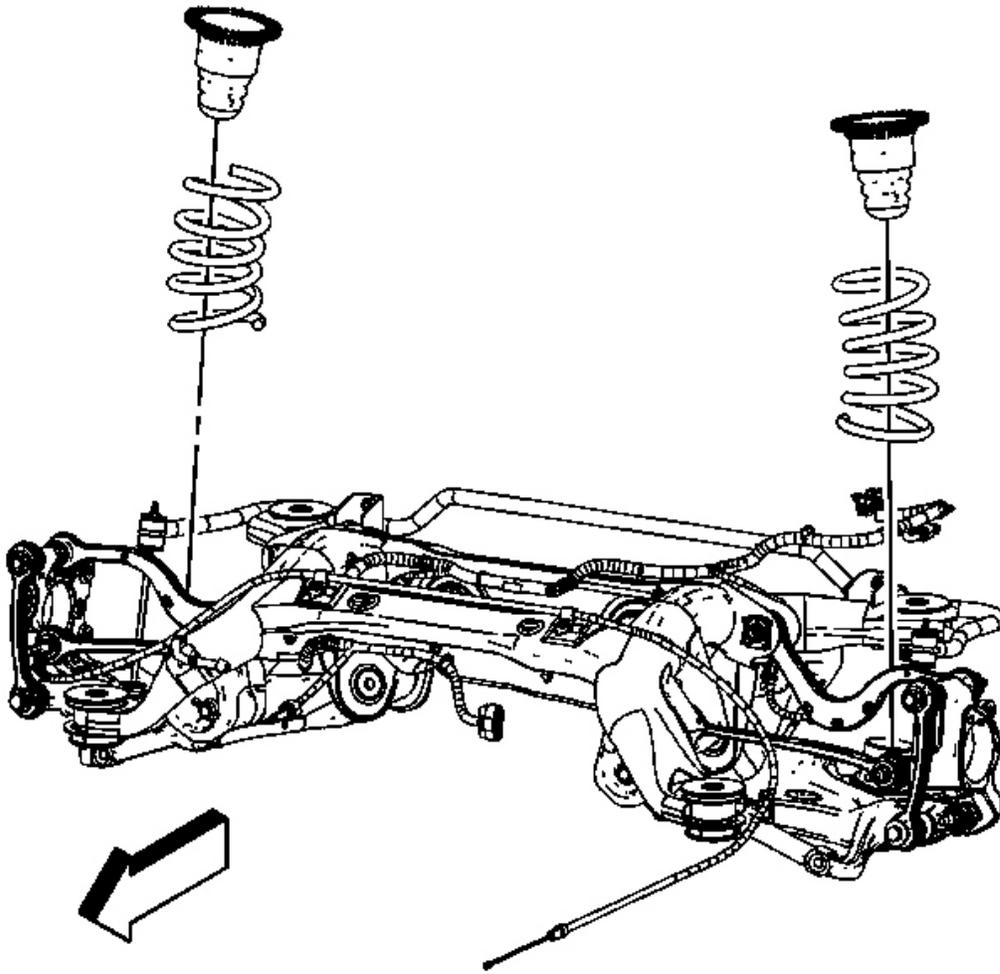


Fig. 48: View Of Rear Jounce Bumpers & Springs
Courtesy of GENERAL MOTORS CORP.

6. Install the jounce bumpers and springs to the rear suspension crossmember. Refer to **Rear Spring, Insulator and Jounce Bumper Replacement** for proper spring installation.

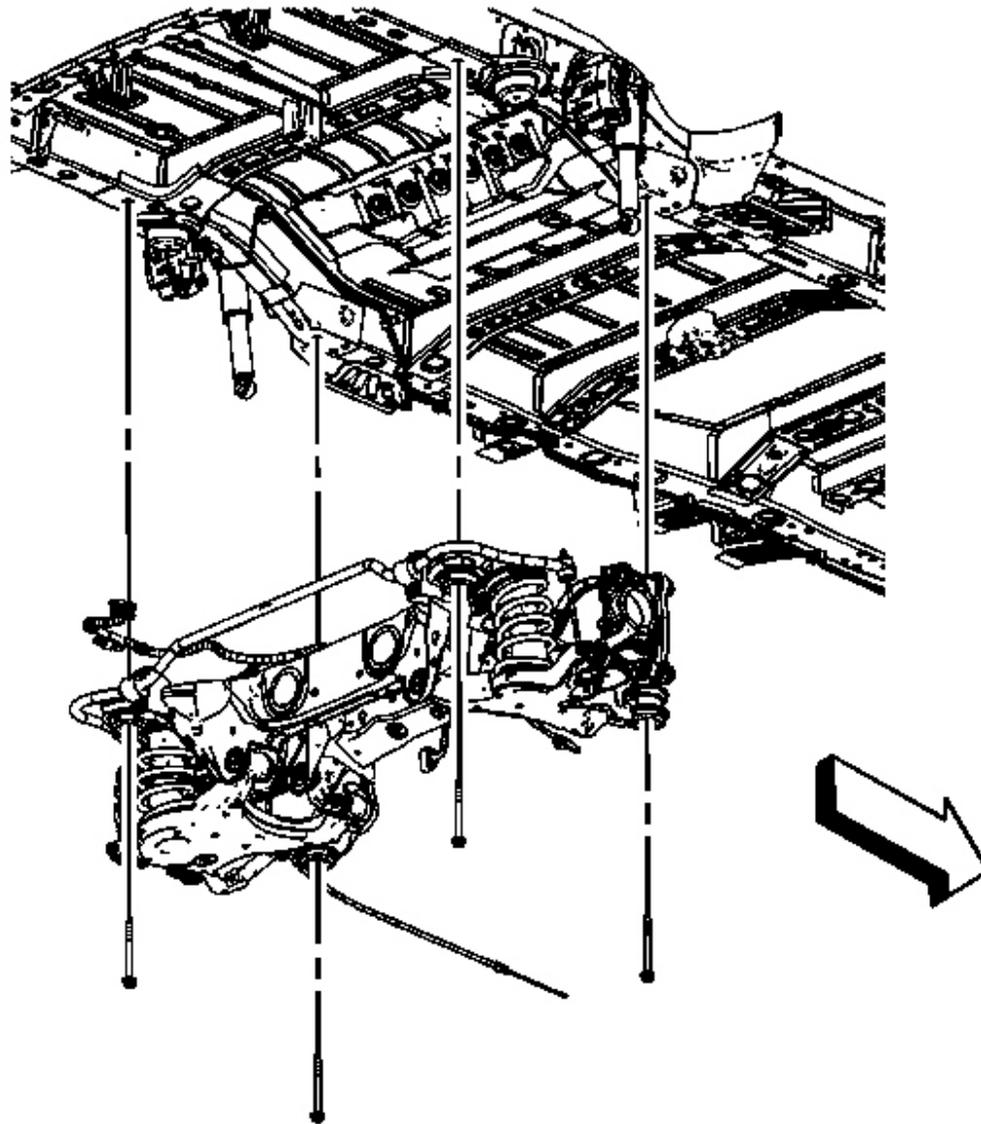


Fig. 49: Identifying Rear Suspension Crossmember And Bolts
Courtesy of GENERAL MOTORS CORP.

7. With the rear suspension crossmember mounted on a suitable stand and with the aid of an assistant, carefully lower the vehicle or raise the rear suspension crossmember into location on the vehicle.

8. Install the four bolts securing the rear suspension crossmember to vehicle.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

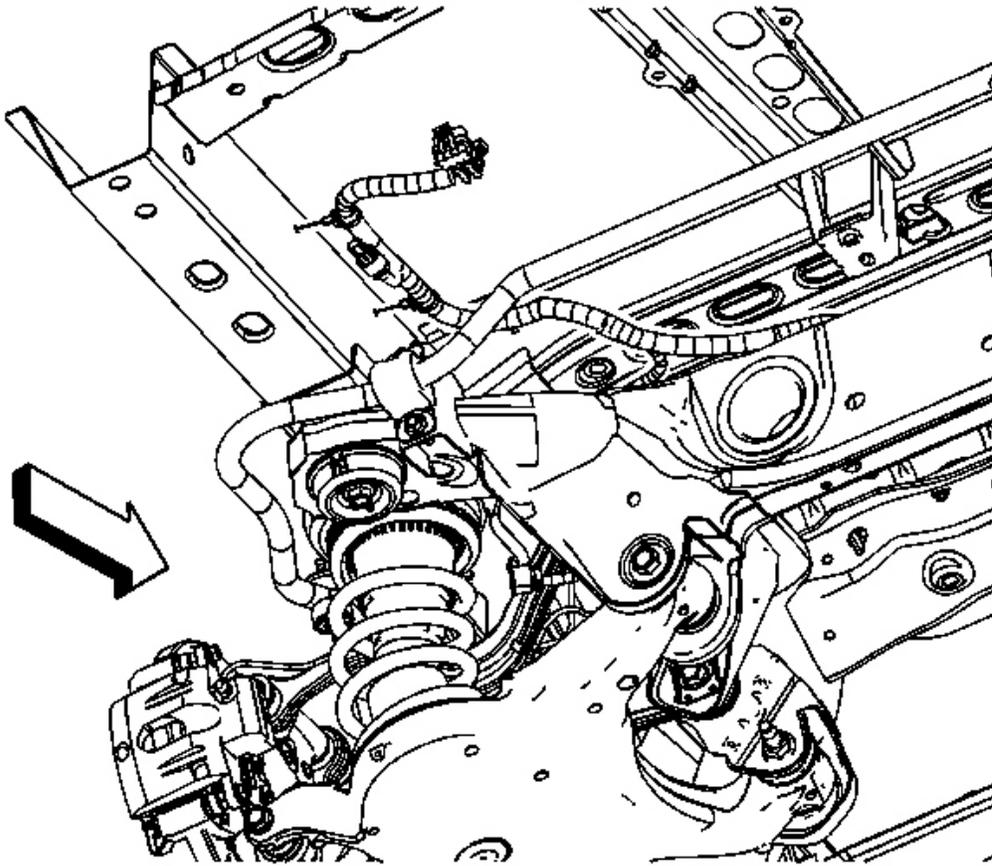


Fig. 50: Locating Rear Suspension Crossmember Wire Harness
Courtesy of GENERAL MOTORS CORP.

9. Connect the rear suspension crossmember wire harness to the vehicle body wire harness.
10. Install the rear suspension crossmember wire harness retainers to the vehicle underbody.

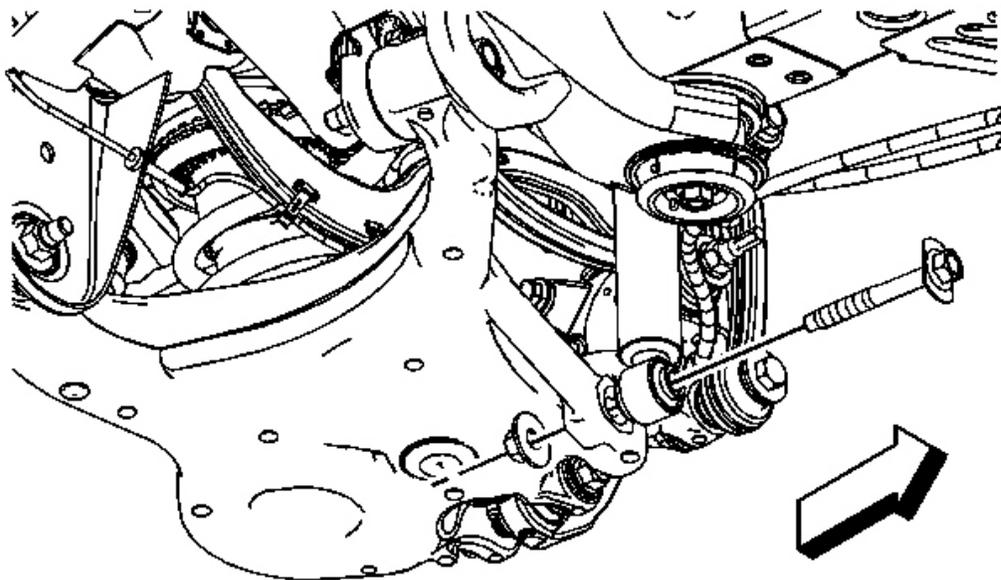


Fig. 51: Identifying Rear Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS CORP.

11. Install the lower bolts to the rear shock absorbers. Refer to **Shock Absorber Replacement** .

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

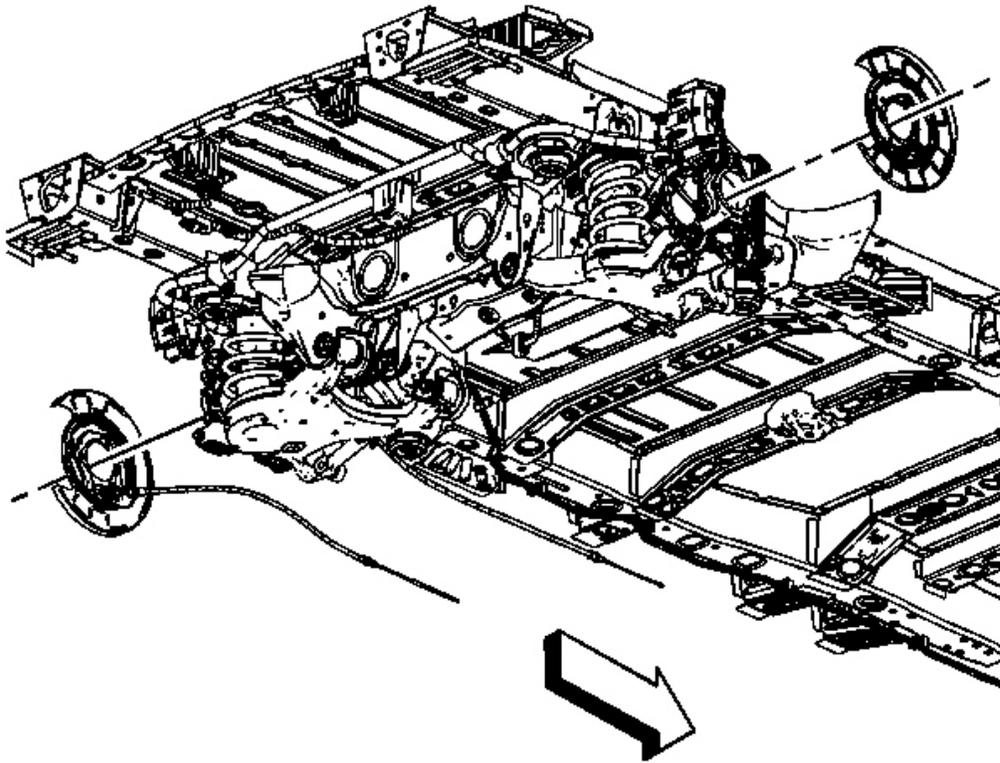


Fig. 52: Identifying Rear Brake Backing Plates
Courtesy of GENERAL MOTORS CORP.

12. Install both the rear brake backing plates.

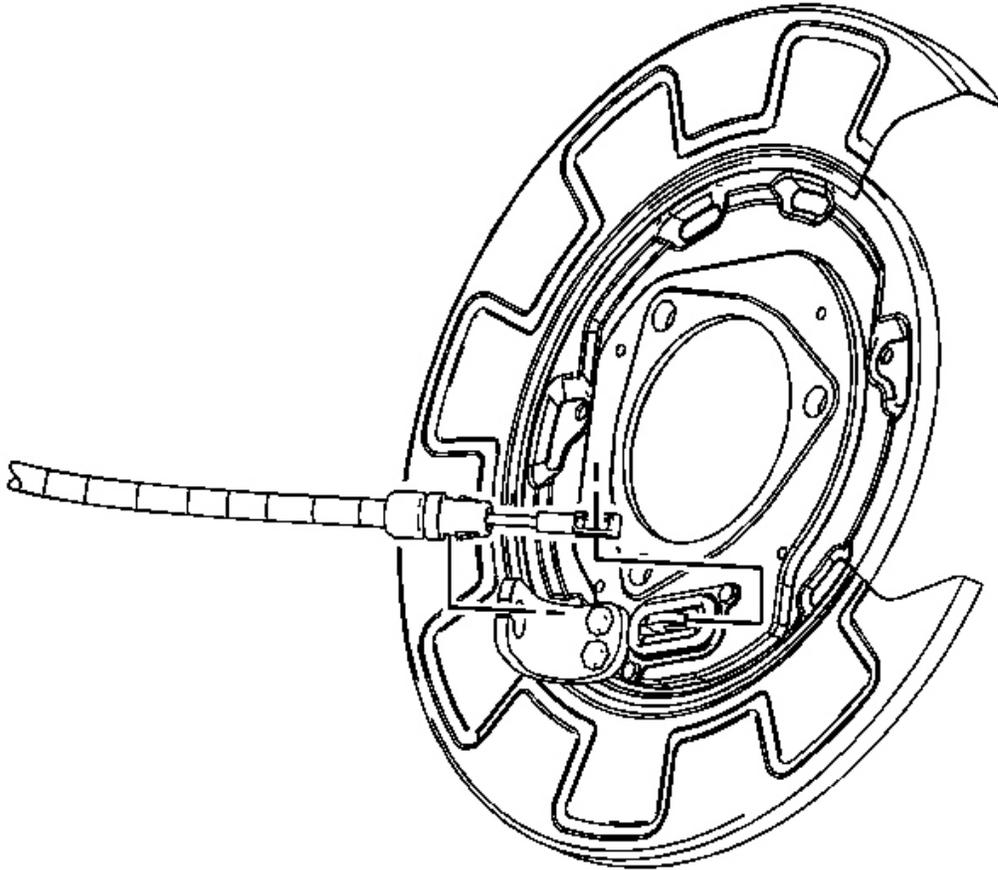


Fig. 53: View Of Right Park Brake Cable
Courtesy of GENERAL MOTORS CORP.

13. Connect the right park brake cable to the brake backing plate.

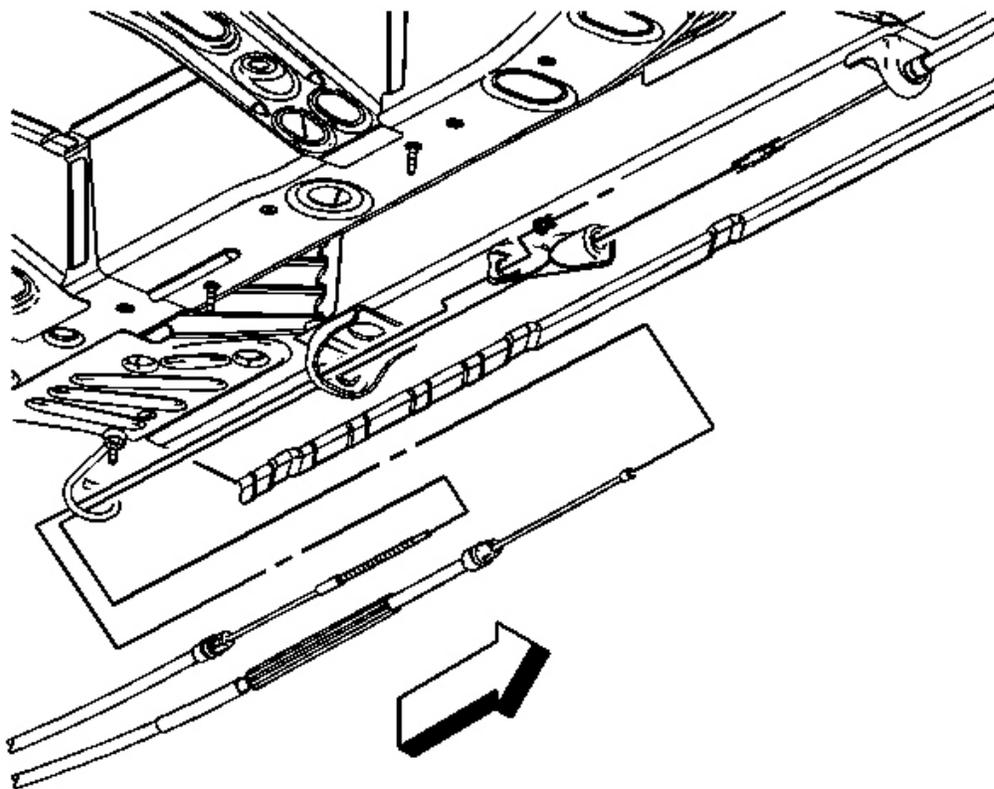


Fig. 54: View Of Park Brake Cables
Courtesy of GENERAL MOTORS CORP.

14. Install the park brake cables to the park brake cable equalizer and park brake cable bracket. Refer to **Park Brake Cable Equalizer Replacement** .

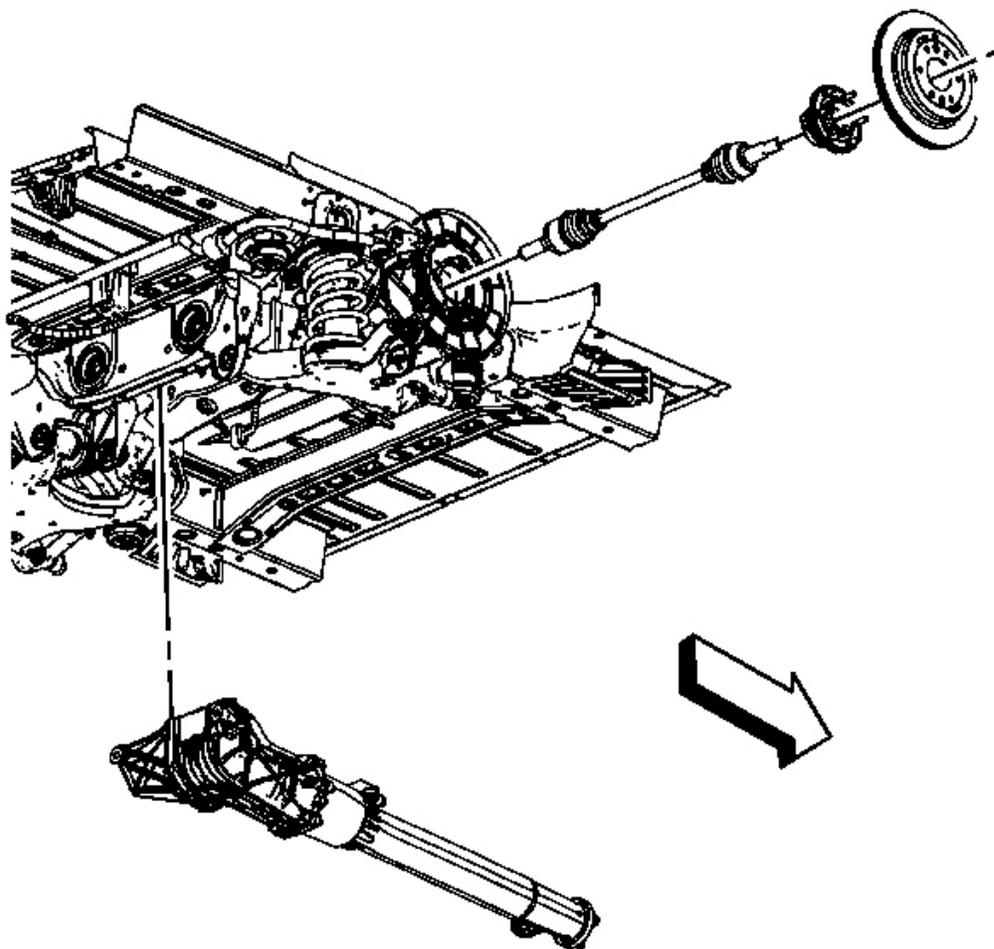


Fig. 55: Locating Rear Wheel Bearings, Axles & Differential Assembly
Courtesy of GENERAL MOTORS CORP.

15. Install the rear differential assembly, axles and wheel bearings. Refer to **Differential Replacement** .

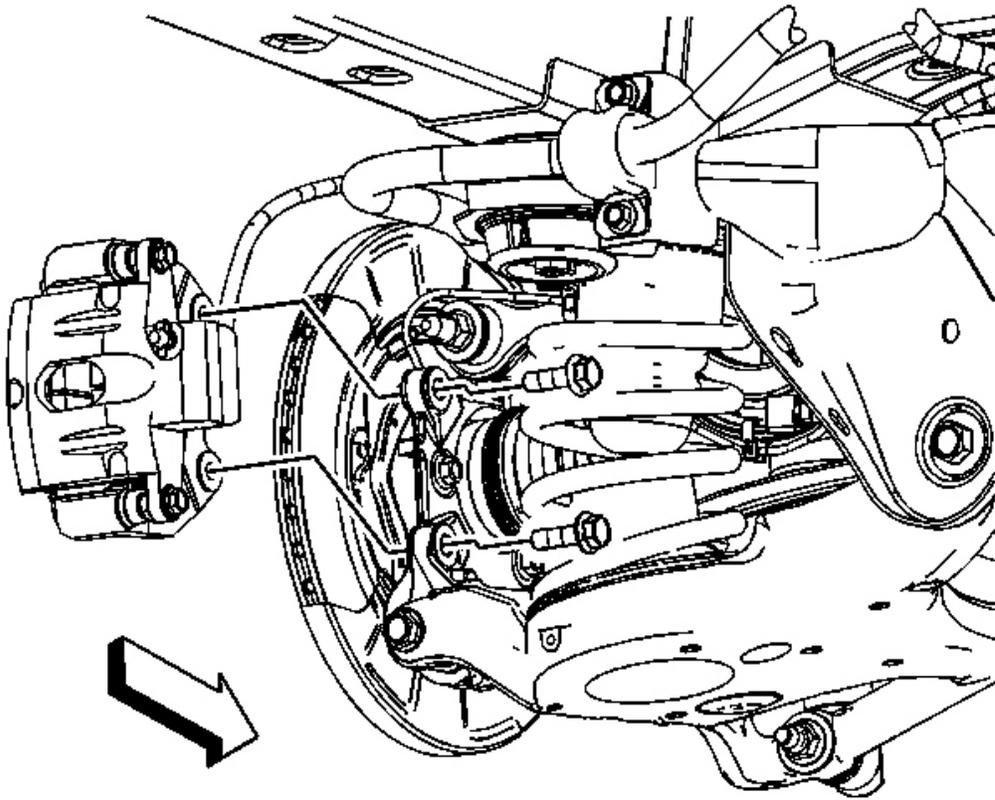


Fig. 56: View Of Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

16. Install the rear brake caliper and bracket assemblies to the rear knuckles.
17. Install the rear brake caliper bracket bolts.

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

IMPORTANT: DO NOT re-use the wheel drive shaft nut, discard and use NEW.

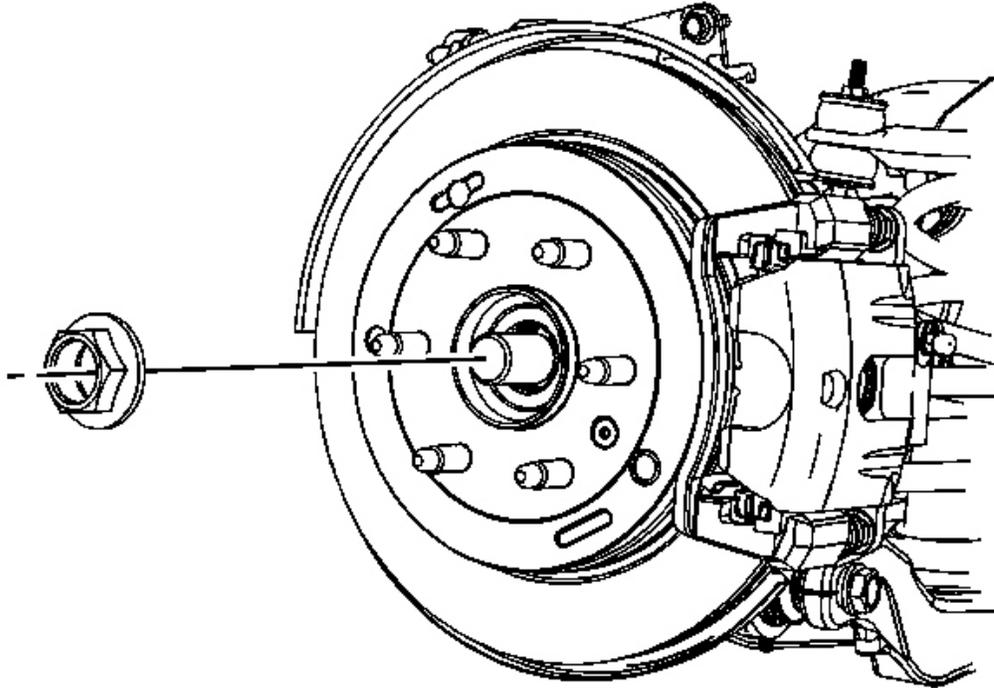


Fig. 57: Identifying Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

18. Install the wheel drive shaft nut.

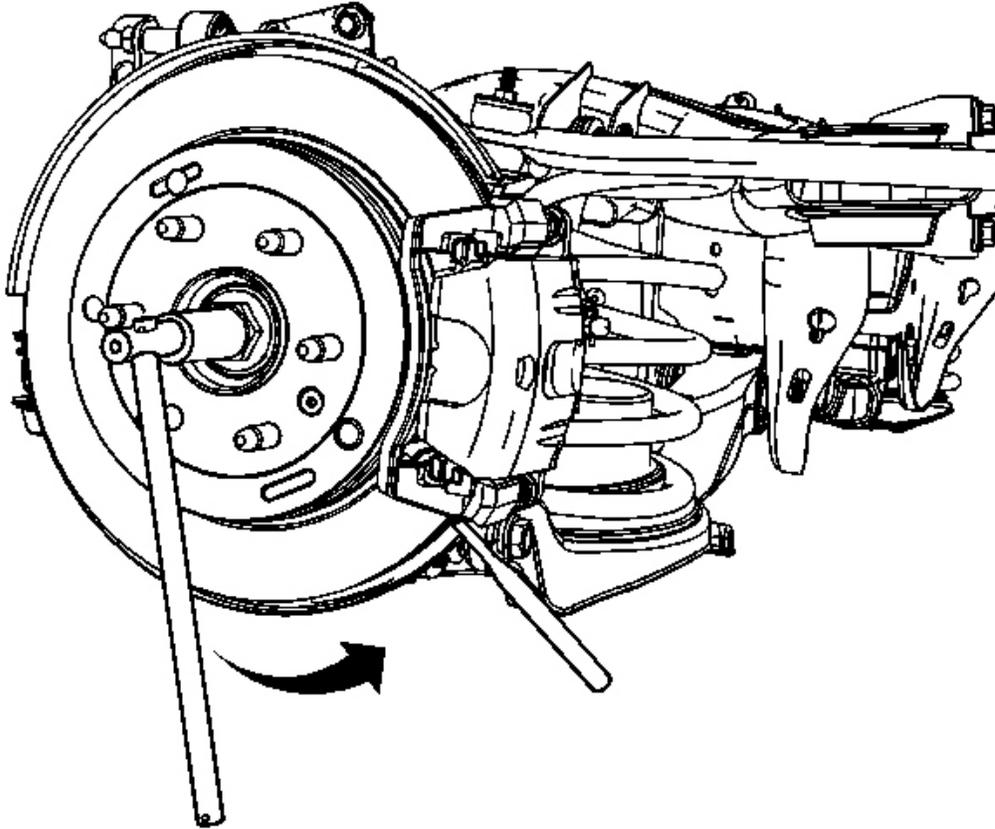


Fig. 58: View Of Tightening/Loosening Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The following step is to ensure that the wheel drive shaft assembly does not rotate while the nut is being installed.

19. Insert a brass drift or punch in the brake rotor so that the brass drift or punch rest against the brake caliper mounting bracket.
20. Using a torque wrench and socket, tighten the new wheel drive shaft nut.

Tighten: Tighten the nut to 260 N.m (192 lb ft).

21. Install the muffler. Refer to **Muffler Replacement (NB5)** or **Muffler Replacement (NEA/NEB)** .

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22. Install the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
23. Lower the vehicle.

FRONT FRAME REPLACEMENT

Tools Required

J 39580 Engine Support Stand. See **Special Tools**.

Removal Procedure

1. Install the engine support fixture. Refer to **Engine Support Fixture** .
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the front tires and wheels. Refer to **Tire and Wheel Removal and Installation** .

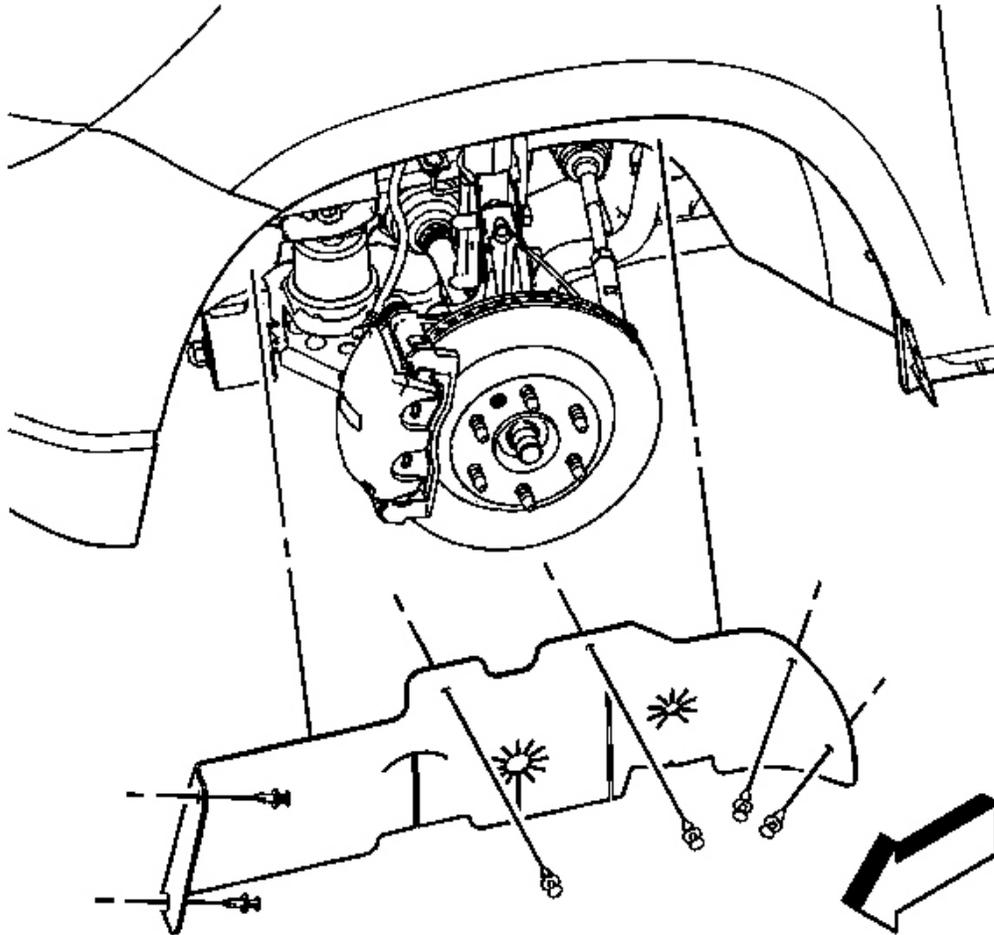


Fig. 59: Identifying Left Engine Splash Shield
Courtesy of GENERAL MOTORS CORP.

4. Remove the left engine splash shield. Refer to **Front Wheelhouse Liner Replacement (Front)** or **Front Wheelhouse Liner Replacement (Rear)**.
5. Remove the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement** .
6. Remove the propeller shaft if the vehicle is equipped with all wheel drive. Refer to **Propeller Shaft Replacement** .

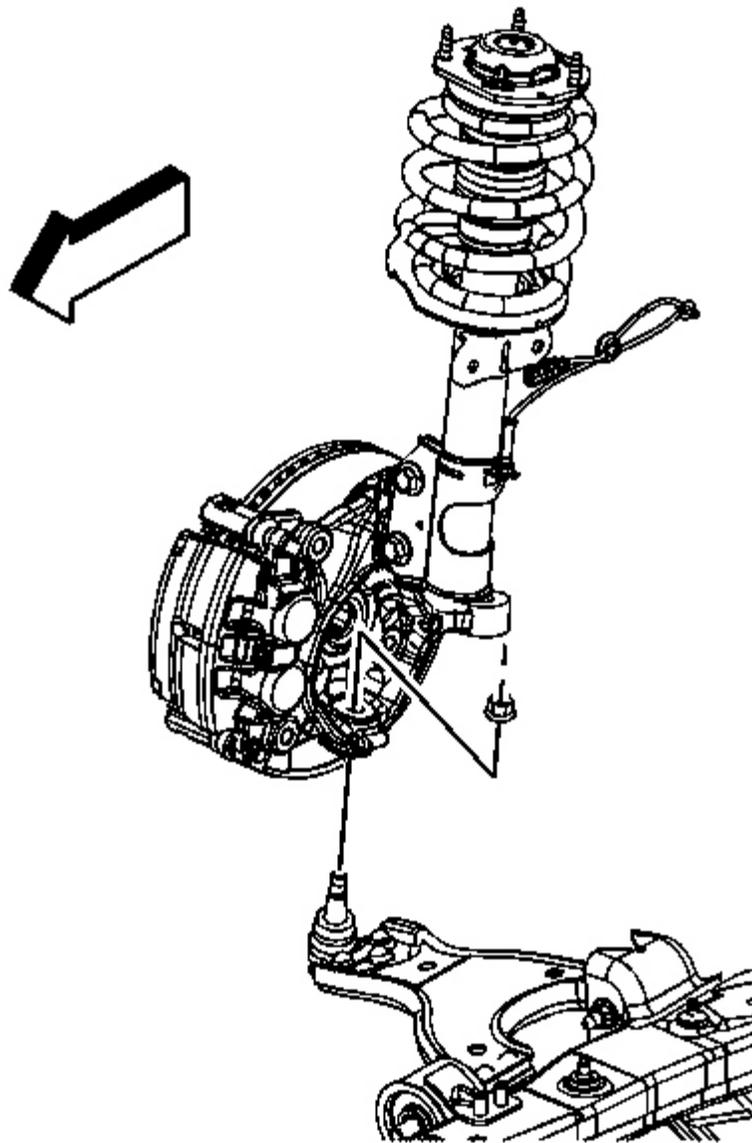


Fig. 60: View Of Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

7. Remove both lower ball joint retaining nuts. Refer to **Lower Control Arm Replacement** .
8. Remove the lower ball joints from the steering knuckles. Refer to **Lower Control Arm Replacement** .

9. Disconnect the stabilizer shaft links from the stabilizer shaft. Refer to **Stabilizer Shaft Link Replacement** .
10. Remove the power steering gear heat shields. Refer to **Steering Gear Heat Shield Replacement** .

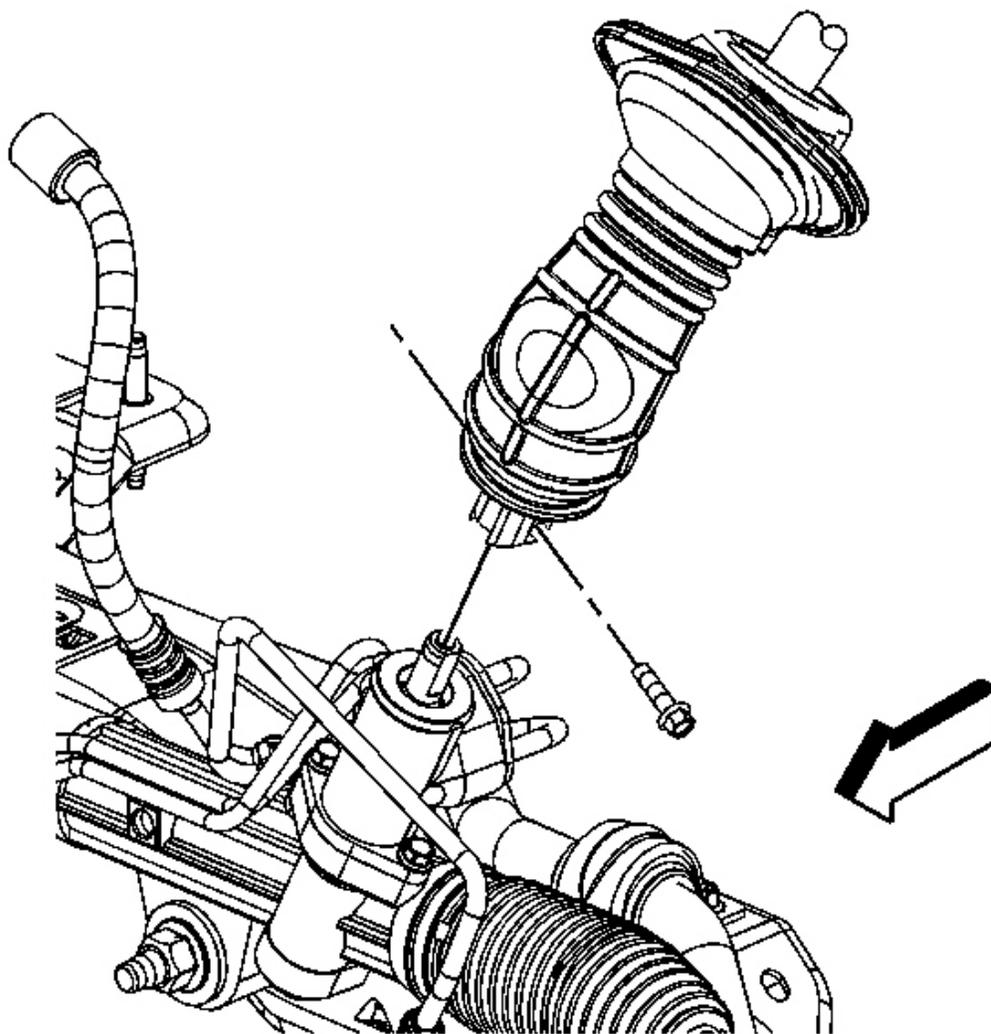


Fig. 61: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Whenever the steering gear is moved in relation to the body,

disconnect the intermediate shaft from the steering gear stub shaft.

11. Disconnect the intermediate shaft from the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .
12. Remove the power steering gear bolts. Refer to **Steering Gear Replacement** .
13. Remove the power steering gear from the frame. Refer to **Steering Gear Replacement** .
14. Use mechanics wire secure the power steering gear to the exhaust manifold.

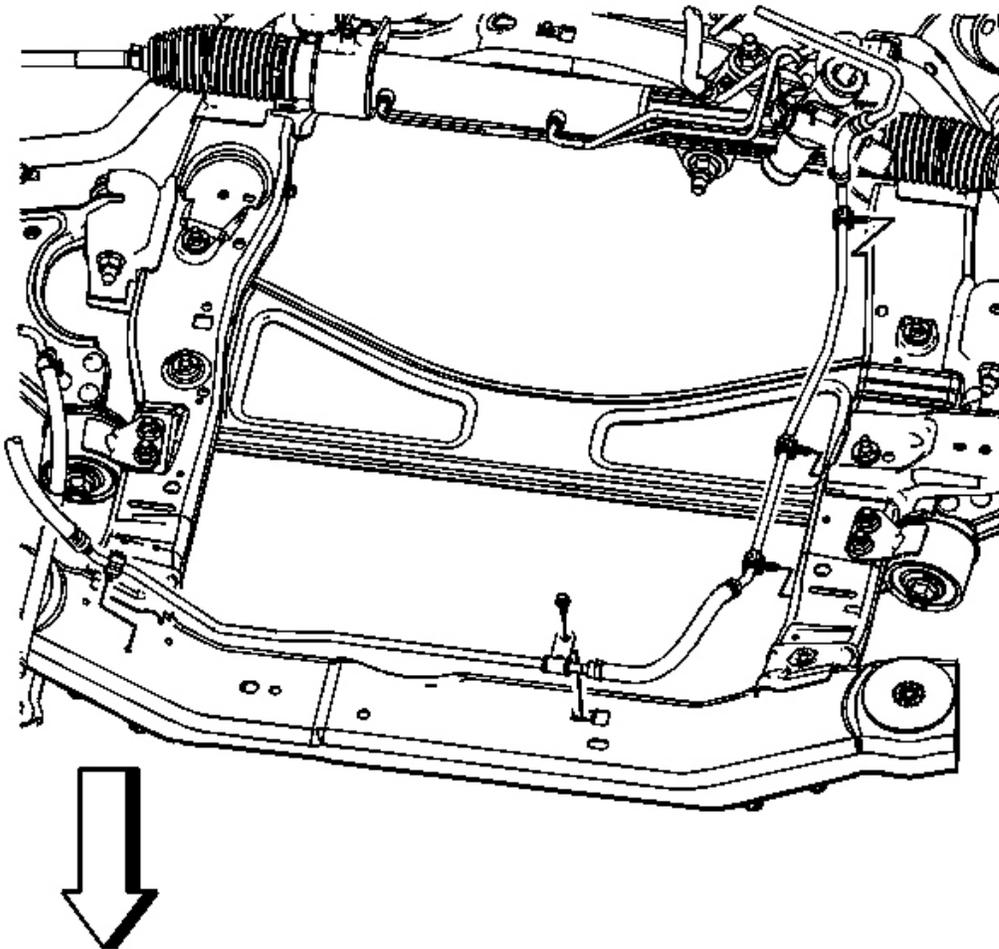


Fig. 62: Identifying Power Steering Cooler Inlet Pipe
Courtesy of GENERAL MOTORS CORP.

15. Remove the power steering cooler inlet pipe from the frame. Refer to **Power Steering Cooler Pipe/Hose Replacement** .

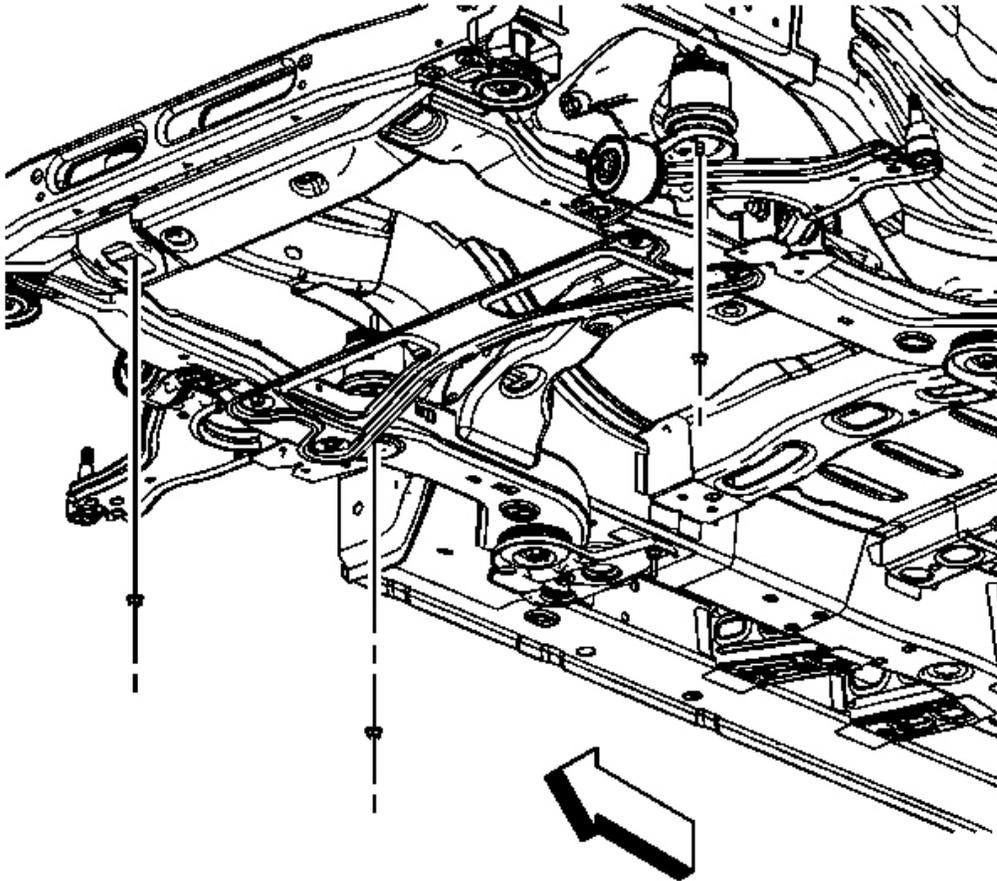


Fig. 63: Locating Engine & Transaxle Mount Lower Nuts
Courtesy of GENERAL MOTORS CORP.

16. Remove the engine and transaxle mount lower nuts.
17. Lower the vehicle until the frame contacts the **J 39580** . See **Special Tools**.

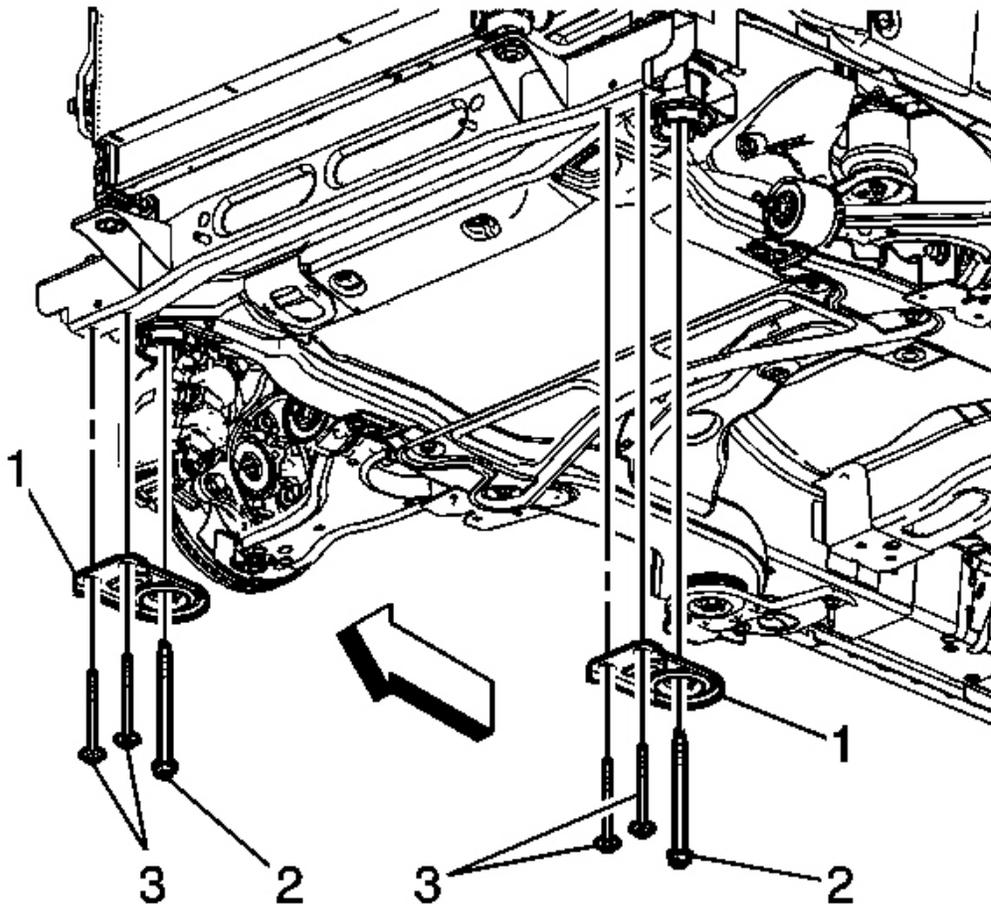


Fig. 64: Identifying Front Crossmember Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

18. Remove the front crossmember brace bolts (3).

IMPORTANT: When the frame insulator bolts are removed, always discard the bolts and replace with new bolts.

19. Remove the front frame to body bolts (2).

20. Remove the front crossmember brace (1).

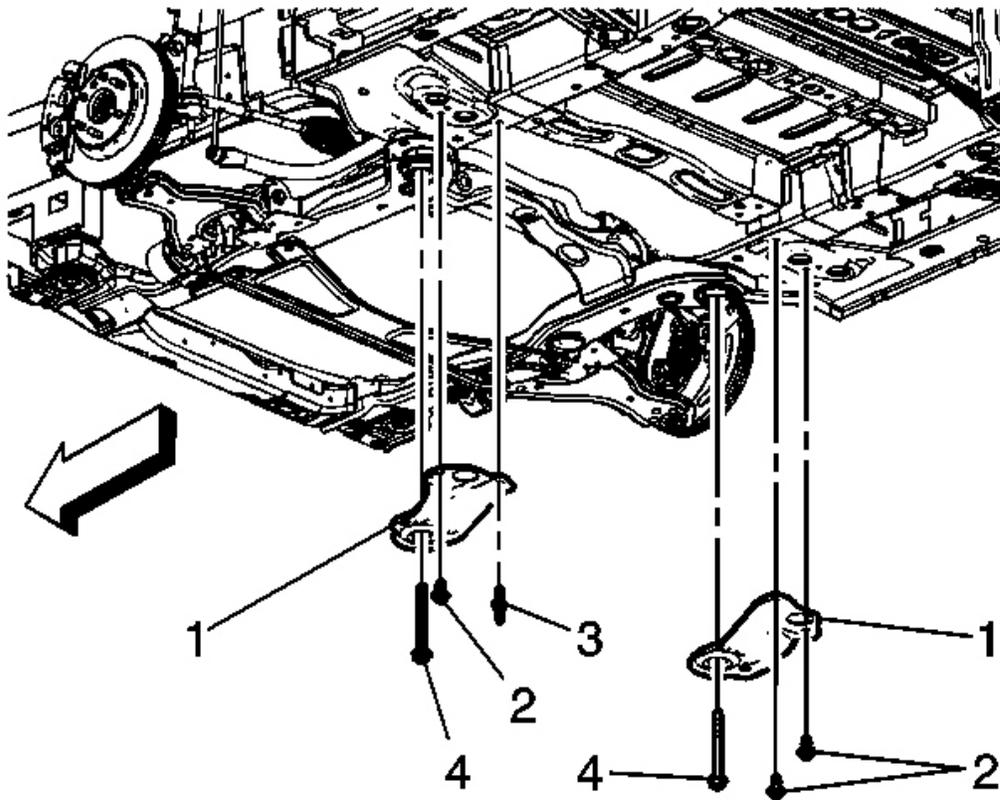


Fig. 65: Locating Reinforcements, Frame To Body Bolts, Reinforcement Bolts & Studs

Courtesy of GENERAL MOTORS CORP.

21. Remove the reinforcement bolts (2).
22. Remove the reinforcement studs (3).
23. Remove the frame to body bolts (4).
24. Remove the reinforcements (1).

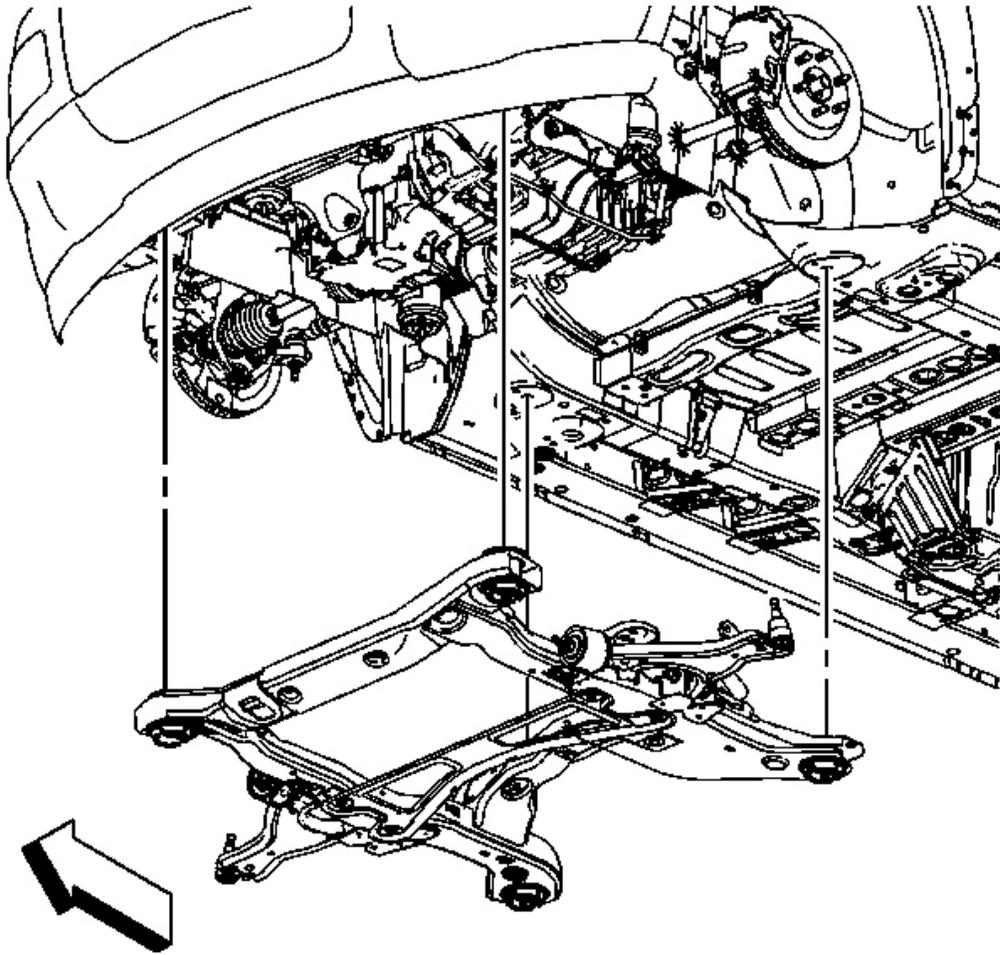


Fig. 66: View Of Frame

Courtesy of GENERAL MOTORS CORP.

25. Raise the vehicle in order to separate the frame from the vehicle.

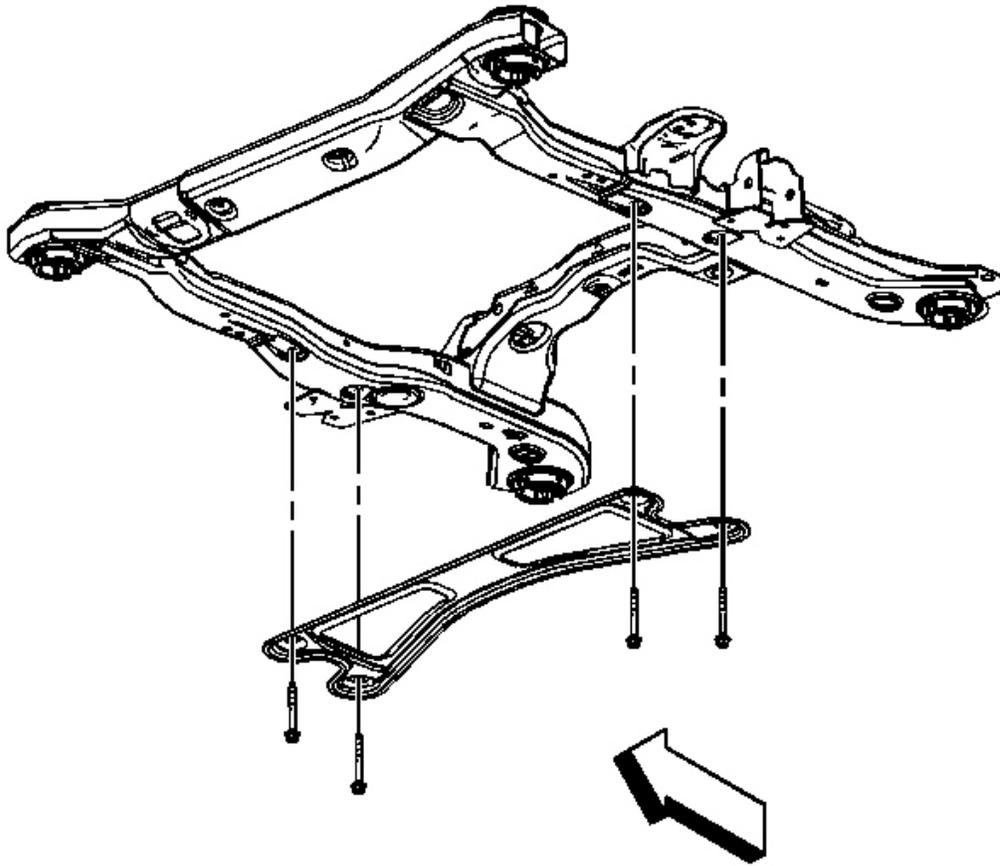


Fig. 67: Identifying Frame Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

26. Remove the frame brace bolts.
27. Remove the frame brace.

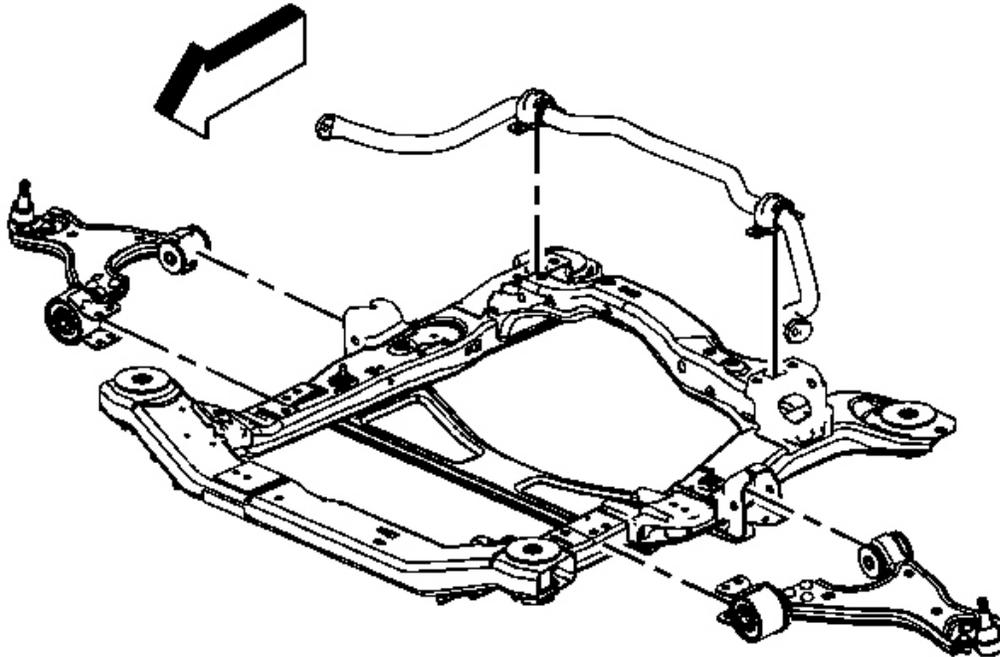


Fig. 68: View Of Stabilizer Shaft & Lower Control Arms
Courtesy of GENERAL MOTORS CORP.

28. Remove the stabilizer shaft. Refer to **Stabilizer Shaft Insulator Replacement** .
29. Remove the lower control arms. Refer to **Lower Control Arm Replacement** .
30. Remove the frame insulators from the frame. Refer to **Front Frame Cushion or Insulator Replacement** and **Rear Frame Cushion or Insulator Replacement**.

Installation Procedure

1. Install the frame insulators to the frame. Refer to **Front Frame Cushion or Insulator Replacement** and **Rear Frame Cushion or Insulator Replacement**.

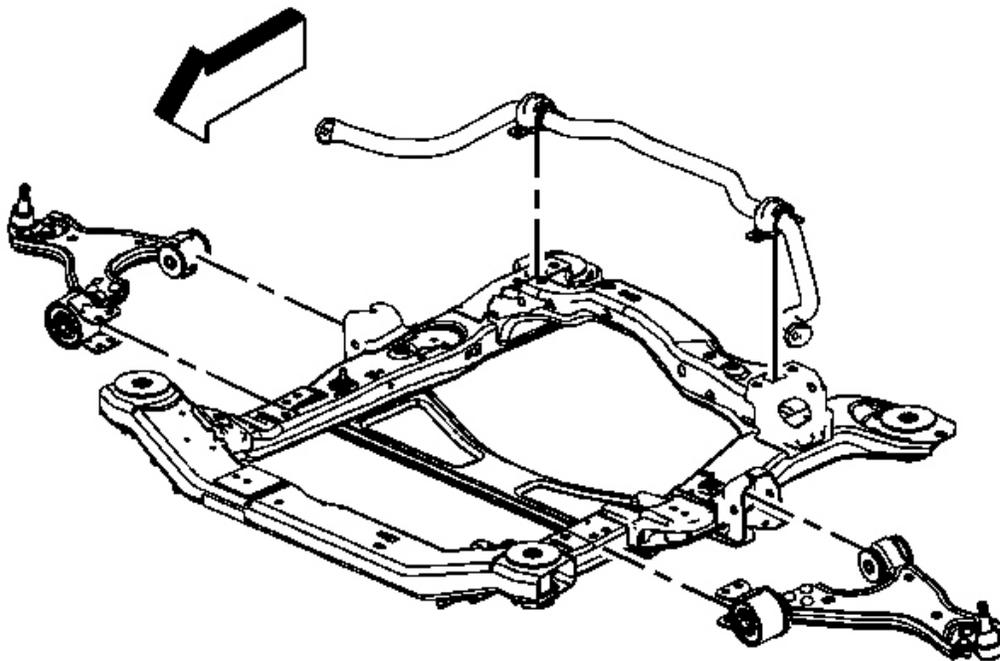


Fig. 69: View Of Stabilizer Shaft & Lower Control Arms
Courtesy of GENERAL MOTORS CORP.

2. Install the lower control arms. Refer to **Lower Control Arm Replacement** .
3. Install the stabilizer shaft. Refer to **Stabilizer Shaft Insulator Replacement** .

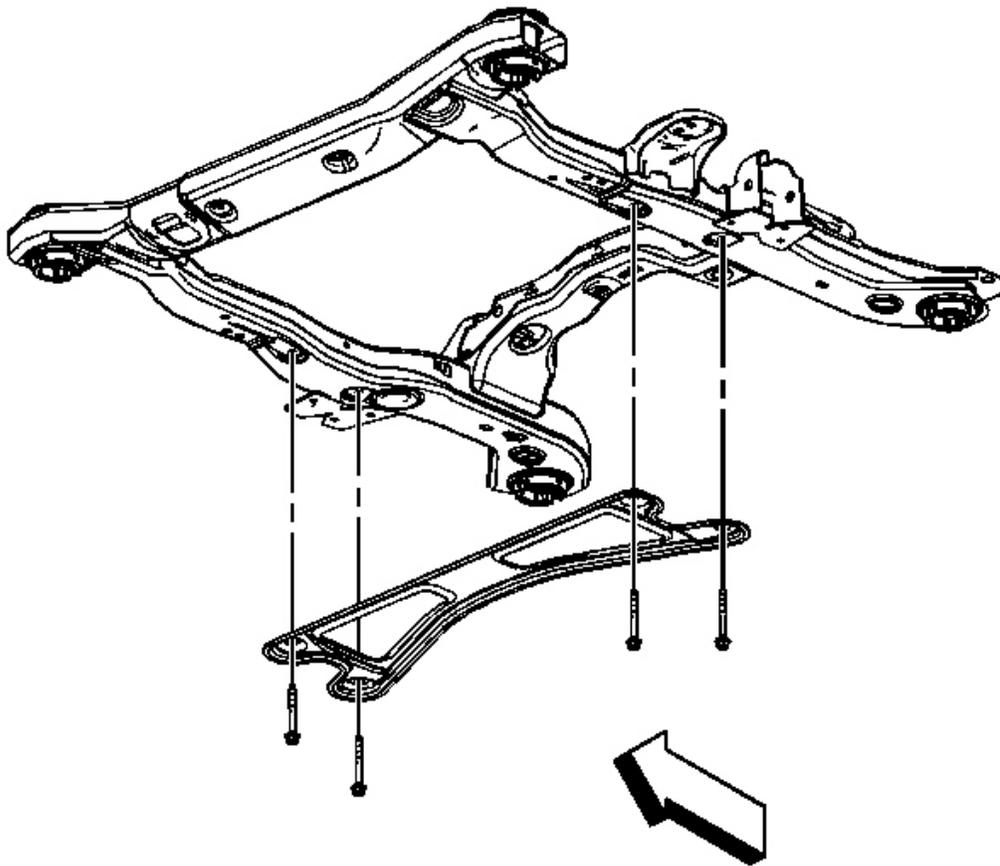


Fig. 70: Identifying Frame Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

4. Install the frame brace.

NOTE: Refer to Fastener Notice .

5. Install the frame brace bolts.

Tighten: Tighten the bolts to 60 N.m (44 lb ft).

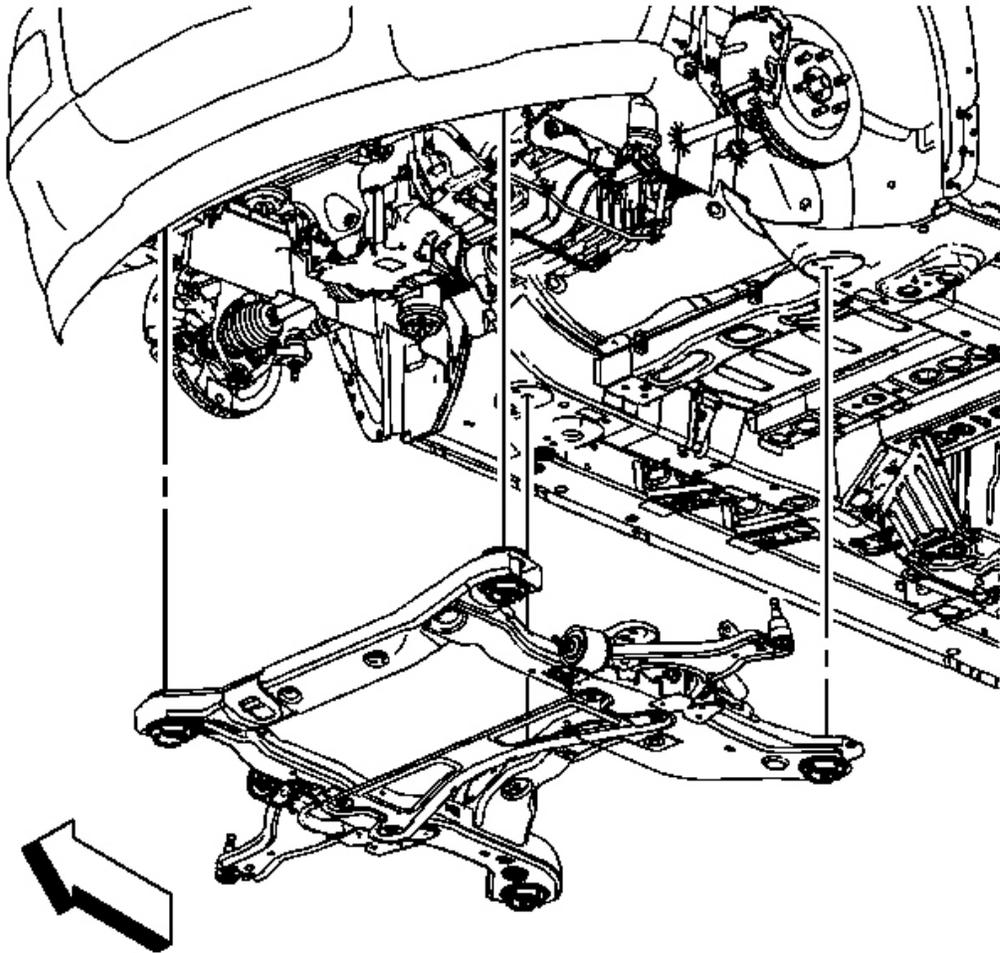


Fig. 71: View Of Frame

Courtesy of GENERAL MOTORS CORP.

6. Position the transaxle table with the frame under the vehicle.

IMPORTANT: Ensure that the power steering cooler line does not become trapped by the engine mount during this step.

7. Lower the vehicle while aligning the powertrain mounts with the frame until the vehicle is close to the frame.

IMPORTANT: Ensure that the alignment pins remain installed during the frame installation.

8. Inserting two 19 mm (0.75 in) diameter X 203 mm (8.0 in) long guide pins or drill bits into the frame rear alignment holes in order to align the frame.

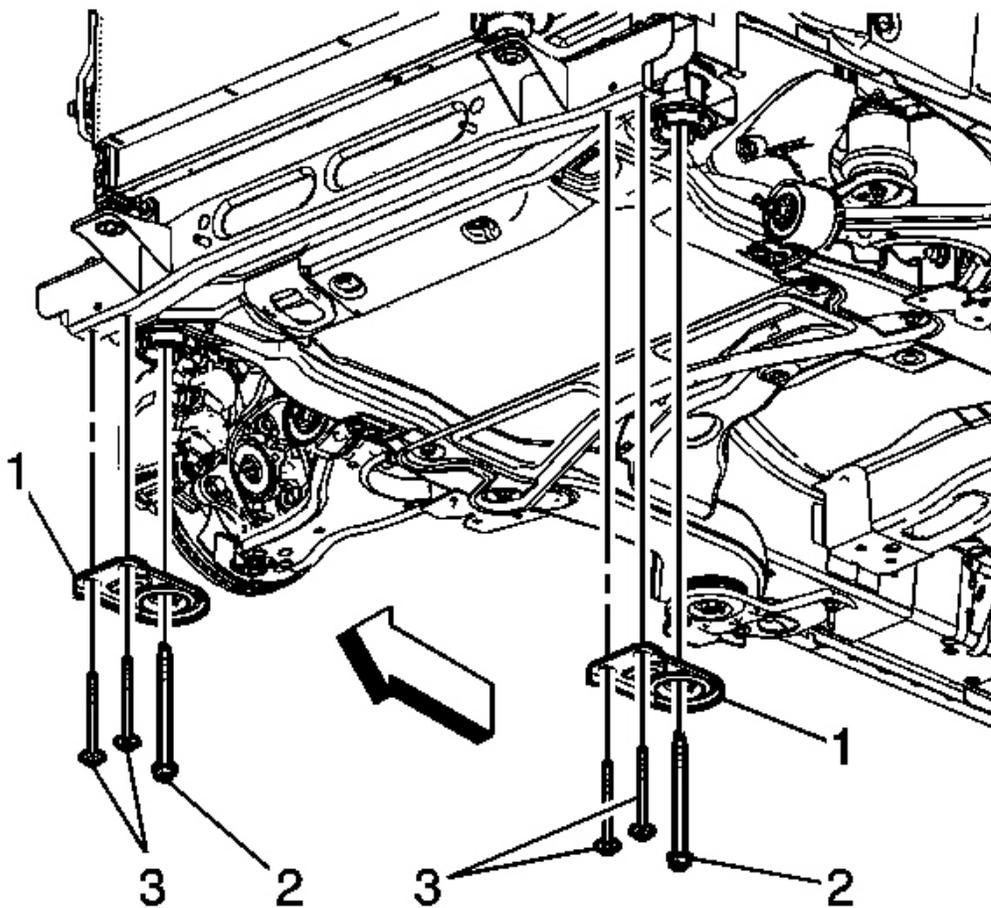


Fig. 72: Identifying Front Crossmember Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

9. Install the front crossmember brace (1).

IMPORTANT: If the frame insulator bolt does not screw in smoothly, run a

tap through the frame nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody.

Do not over tighten the insulator. Over tightening may collapse a spacer or strip a bolt.

10. Install the front frame to body bolts (2).

Tighten: Tighten the bolts to 110 N.m (81 lb ft) plus 90 degrees.

11. Install the front crossmember brace bolts (3).

Tighten: Tighten the bolt to 50 N.m (37 lb ft).

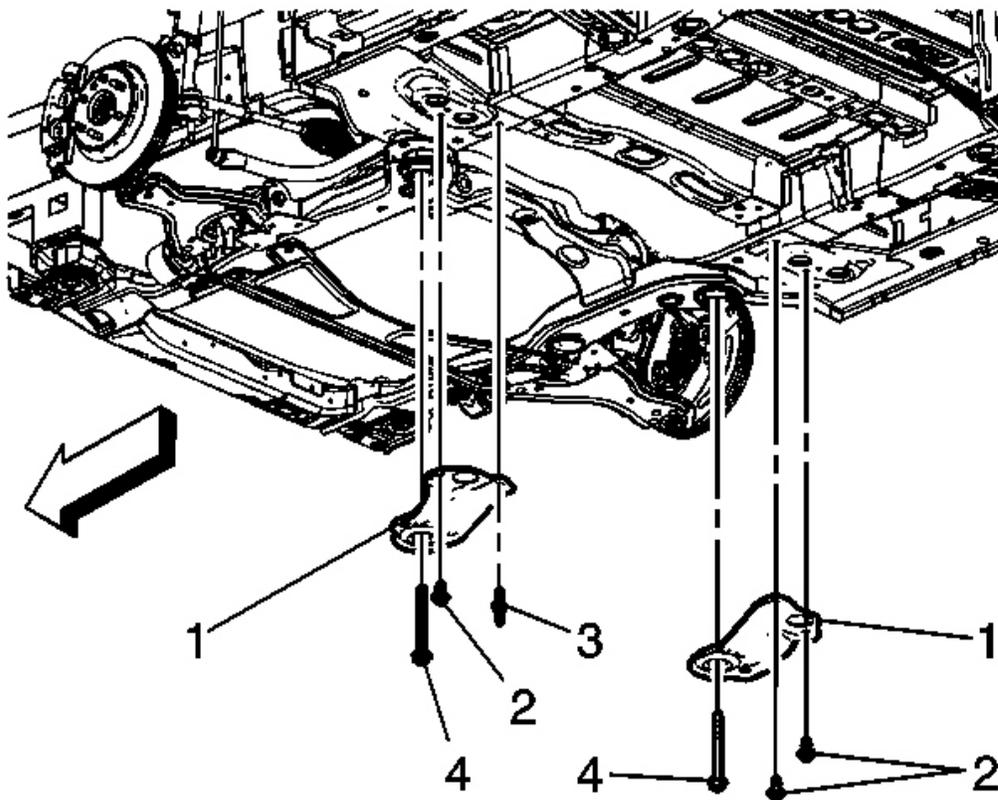


Fig. 73: Locating Reinforcements, Frame To Body Bolts, Reinforcement Bolts &

Studs

Courtesy of GENERAL MOTORS CORP.

12. Install the reinforcements (1).
13. Install the rear frame to body bolts (4).

Tighten: Tighten the bolts to 110 N.m (81 lb ft) plus 90 degrees.

14. Install the reinforcement bolts (2).

Tighten: Tighten the bolt to 60 N.m (44 lb ft).

15. Install the reinforcement studs (3).

Tighten: Tighten the stud to 60 N.m (44 lb ft).

16. Remove the alignment pins from the frame.

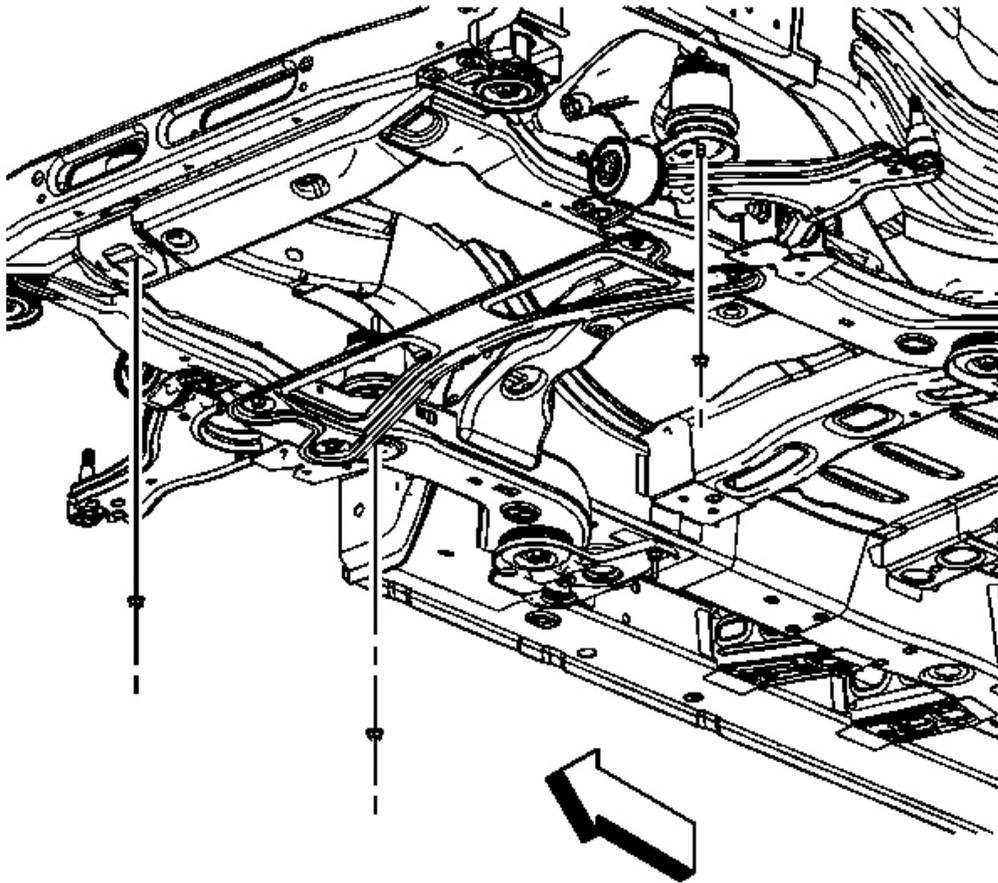


Fig. 74: Locating Engine & Transaxle Mount Lower Nuts
Courtesy of GENERAL MOTORS CORP.

17. Install the engine and transaxle mount nuts.

Tighten: Tighten the nuts to 75 N.m (55 lb ft).

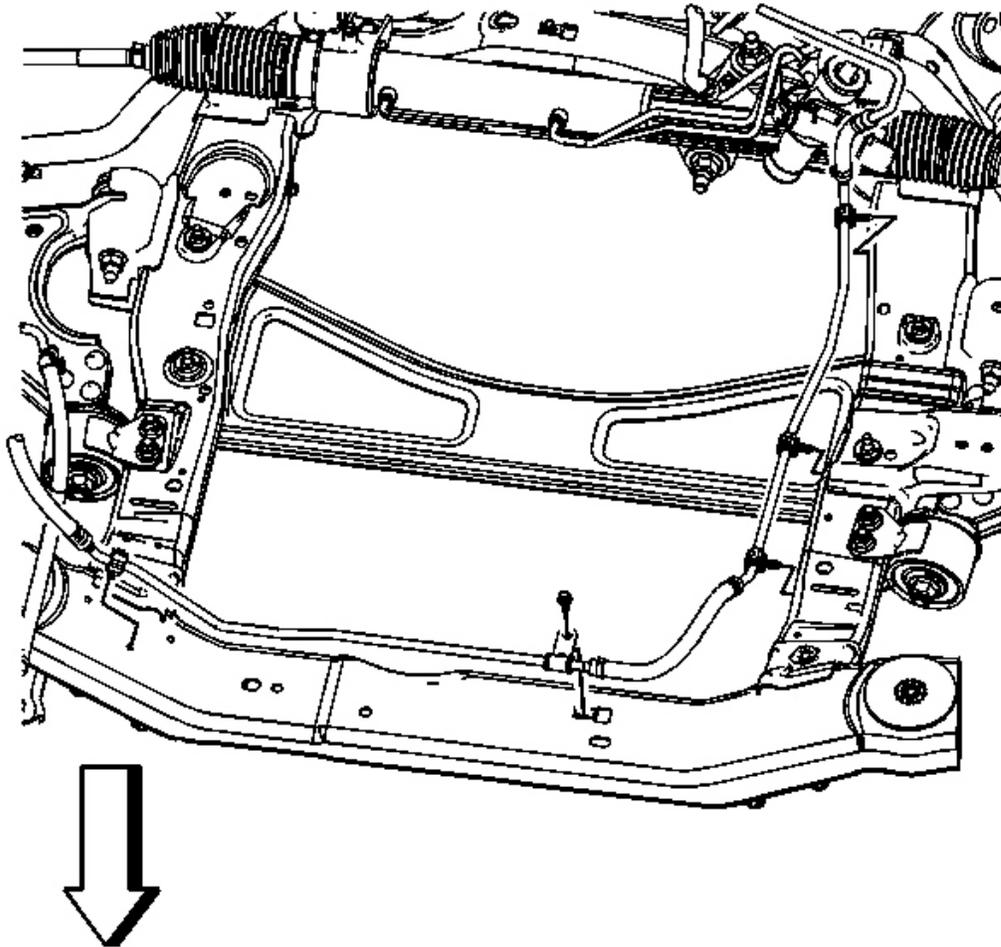


Fig. 75: Identifying Power Steering Cooler Inlet Pipe
Courtesy of GENERAL MOTORS CORP.

18. Install the power steering cooler inlet pipe to the frame. Refer to **Power Steering Cooler Pipe/Hose Replacement** .
19. Install the power steering gear to the frame. Refer to **Steering Gear Replacement** .
20. Install the power steering gear bolts. Refer to **Steering Gear Replacement** .
21. Install the power steering gear heat shield. Refer to **Steering Gear Heat Shield Replacement** .

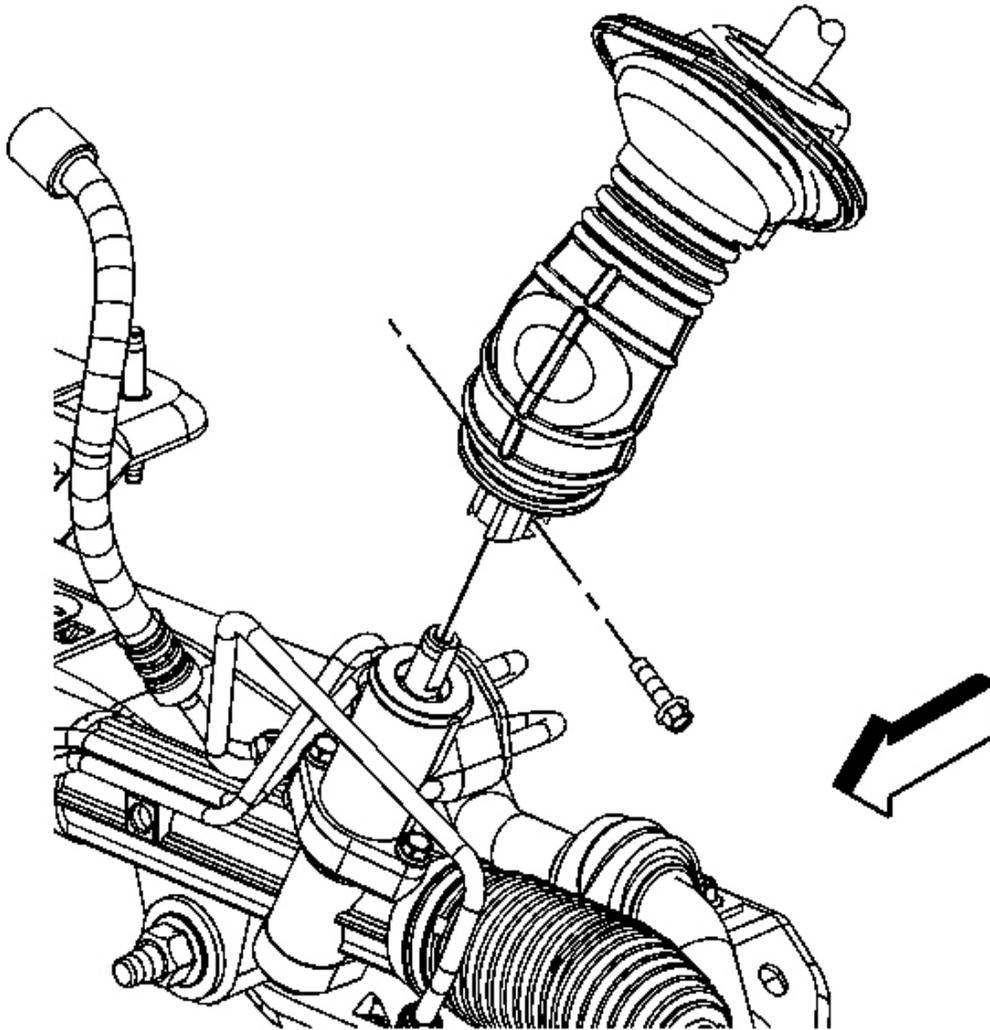


Fig. 76: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Whenever the steering gear is moved in relation to the body, disconnect the intermediate shaft from the steering gear stub shaft.

22. Disconnect the intermediate shaft from the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .

23. Connect the stabilizer shaft links to the stabilizer shaft. Refer to **Stabilizer Shaft Link Replacement** .

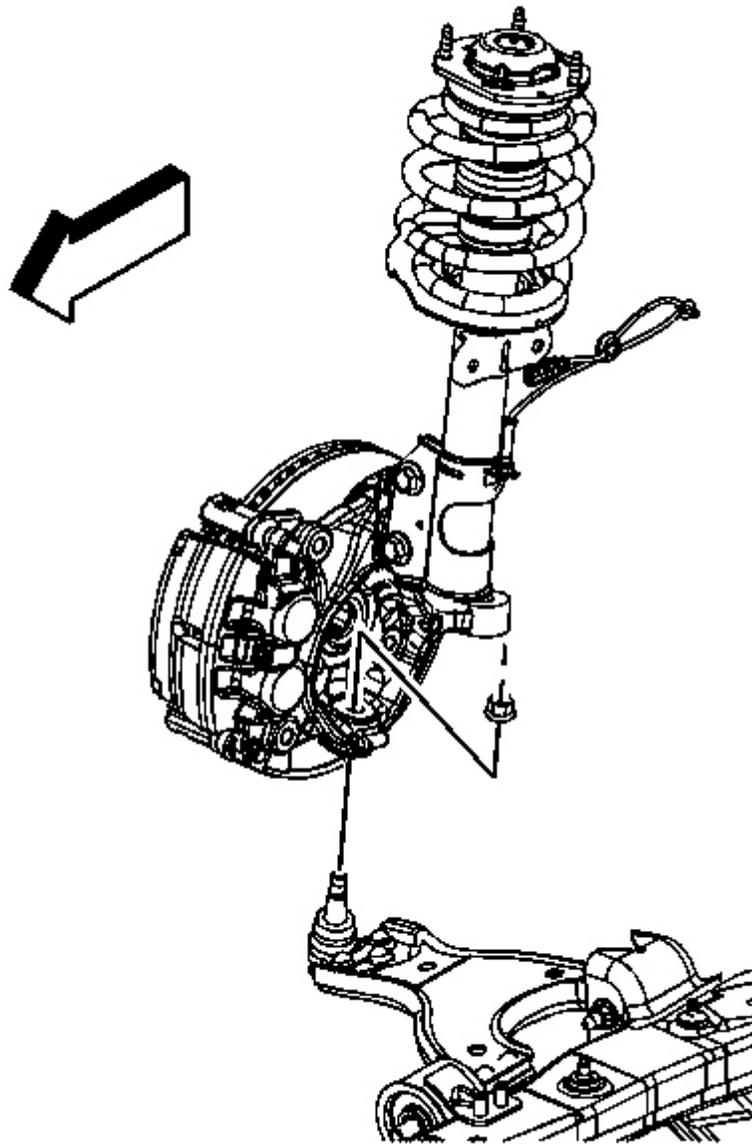


Fig. 77: View Of Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

24. Install the lower ball joints to the steering knuckles. Refer to **Lower Control Arm Replacement** .
25. Install both lower ball joint retaining nuts. Refer to **Lower Control Arm Replacement** .
26. Install the propeller shaft if the vehicle is equipped with all wheel drive. Refer to **Propeller Shaft Replacement** .
27. Install the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement** .

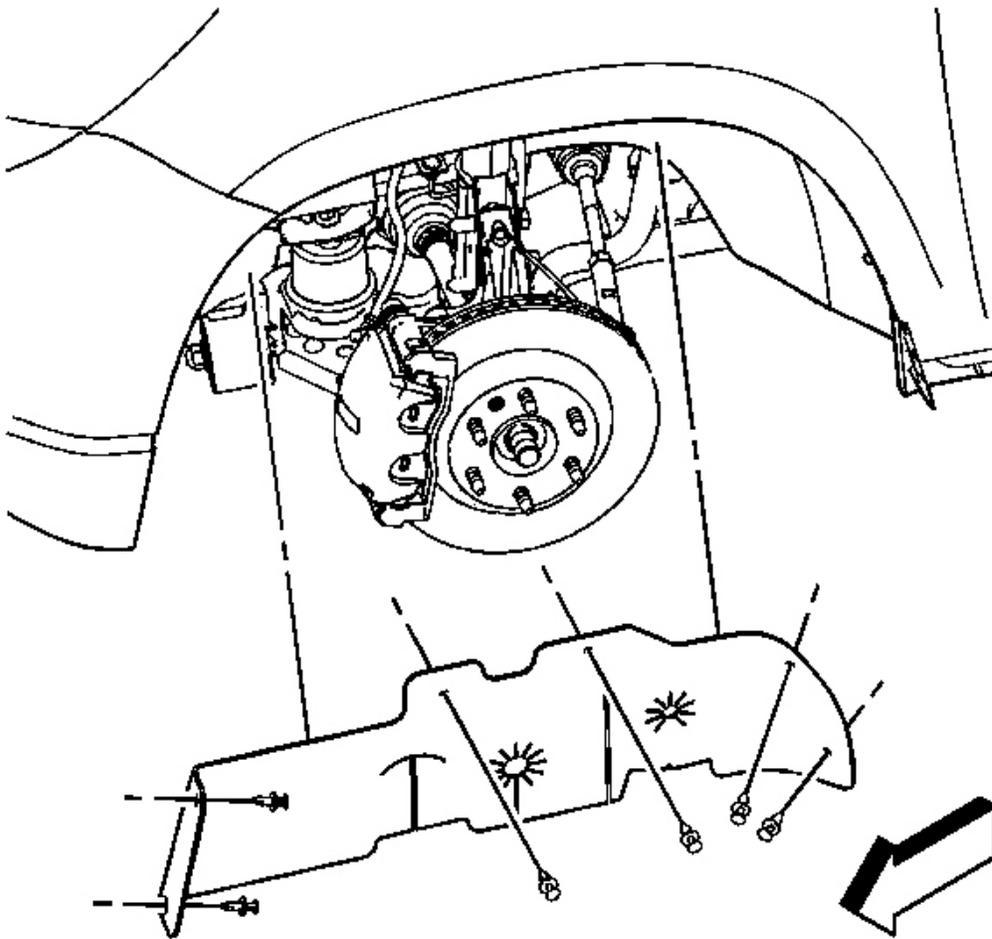


Fig. 78: Identifying Left Engine Splash Shield
Courtesy of GENERAL MOTORS CORP.

28. Install the left engine splash shield. Refer to **Front Wheelhouse Liner Replacement**

(Front) or Front Wheelhouse Liner Replacement (Rear).

29. Install the front tires and wheels. Refer to **Tire and Wheel Removal and Installation** .
30. Lower the vehicle.
31. Remove the engine support fixture.
32. Inspect the front wheel alignment and adjust the toe angle if necessary. Refer to **Measuring Wheel Alignment** .

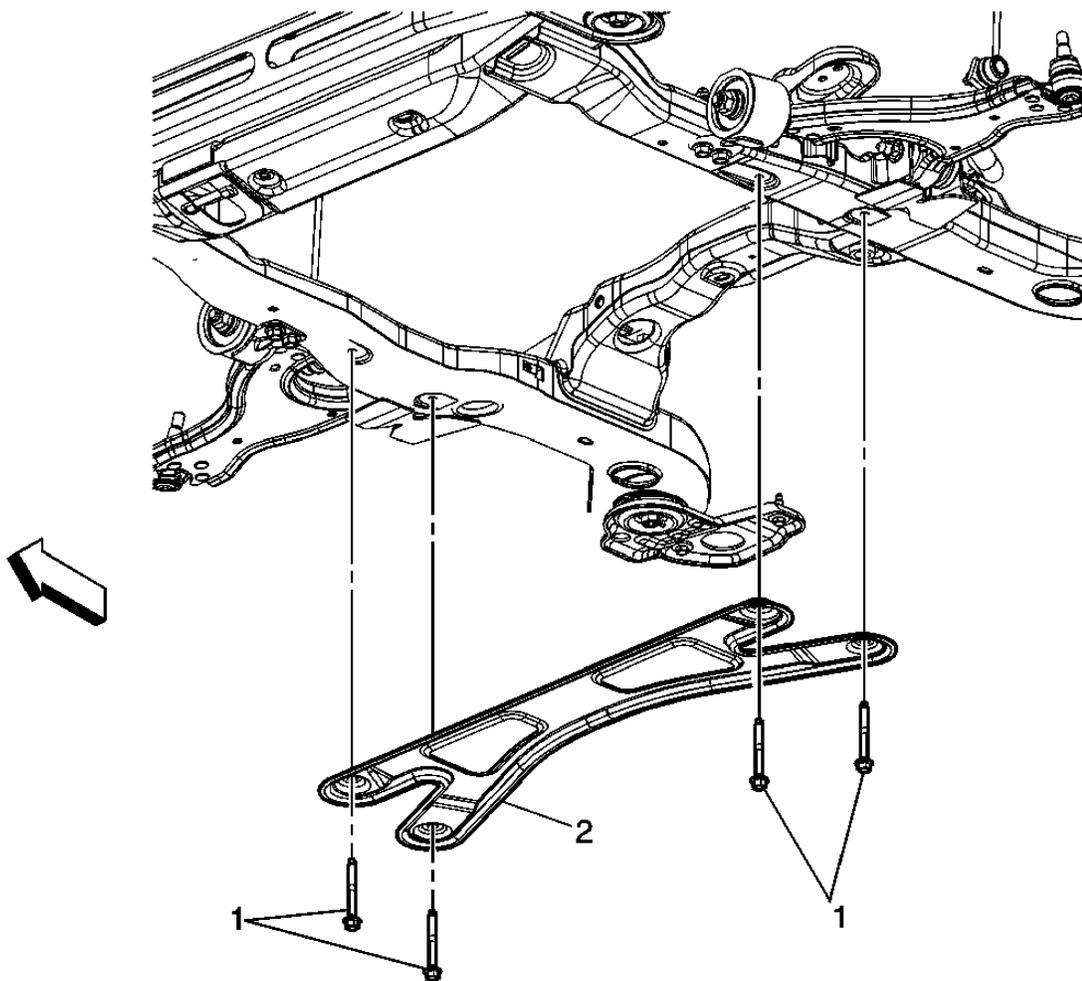
FRAME BRACE REPLACEMENT

Fig. 79: View Of Frame Brace
 Courtesy of GENERAL MOTORS CORP.

Frame Brace Replacement

Callout	Component Name
1	Bolt
2	Frame Brace

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Preliminary Procedure:

Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

1	Frame Brace Bolt (Qty: 4) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 60 N.m (44 lb ft)
2	Frame Brace

FRONT FRAME CUSHION OR INSULATOR REPLACEMENT

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

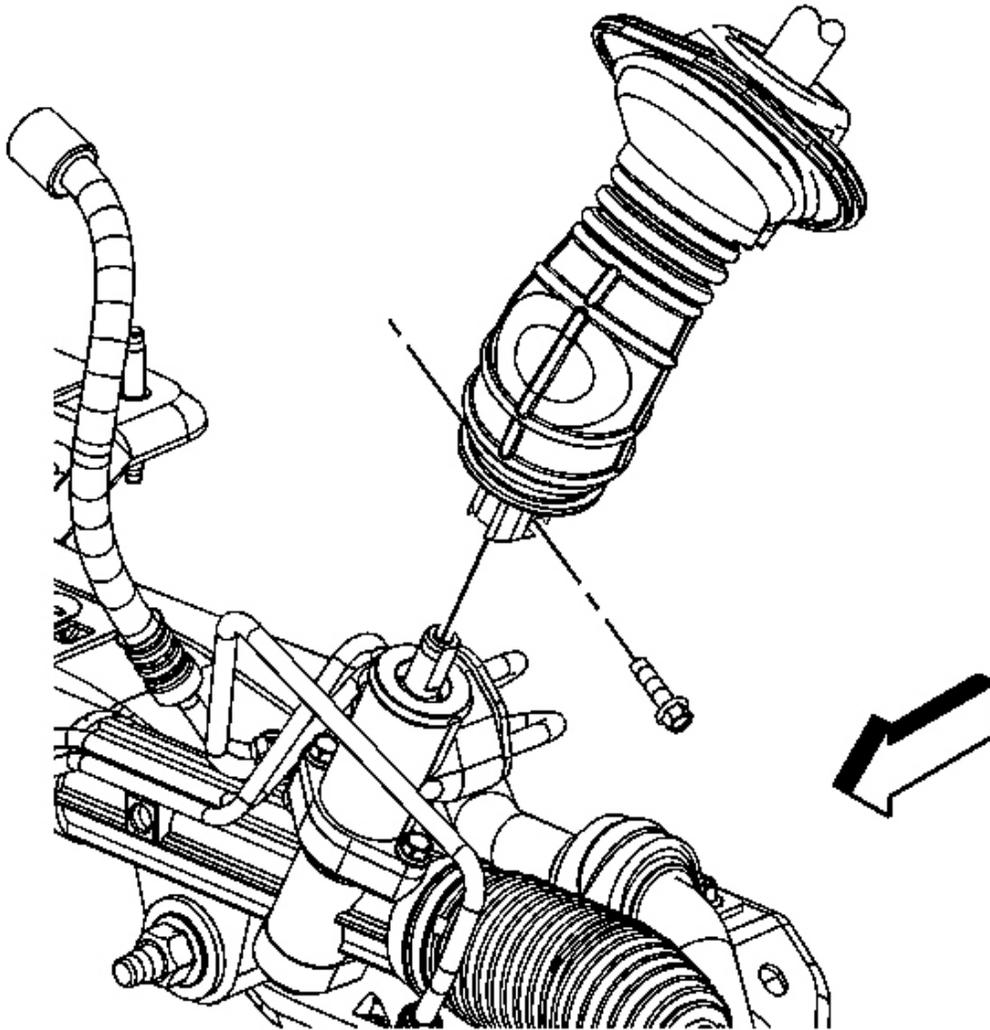


Fig. 80: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Whenever the frame is moved in relation to the body, disconnect the intermediate shaft from the steering gear stub shaft.

2. Disconnect the intermediate shaft from the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .

3. Install a jackstand under the center of the frame, between the front frame insulators.

IMPORTANT: In order to remove any frame insulator, loosen the adjacent frame insulator to permit the frame to separate from the body. Use caution when lowering or tilting the frame to prevent damage to other components.

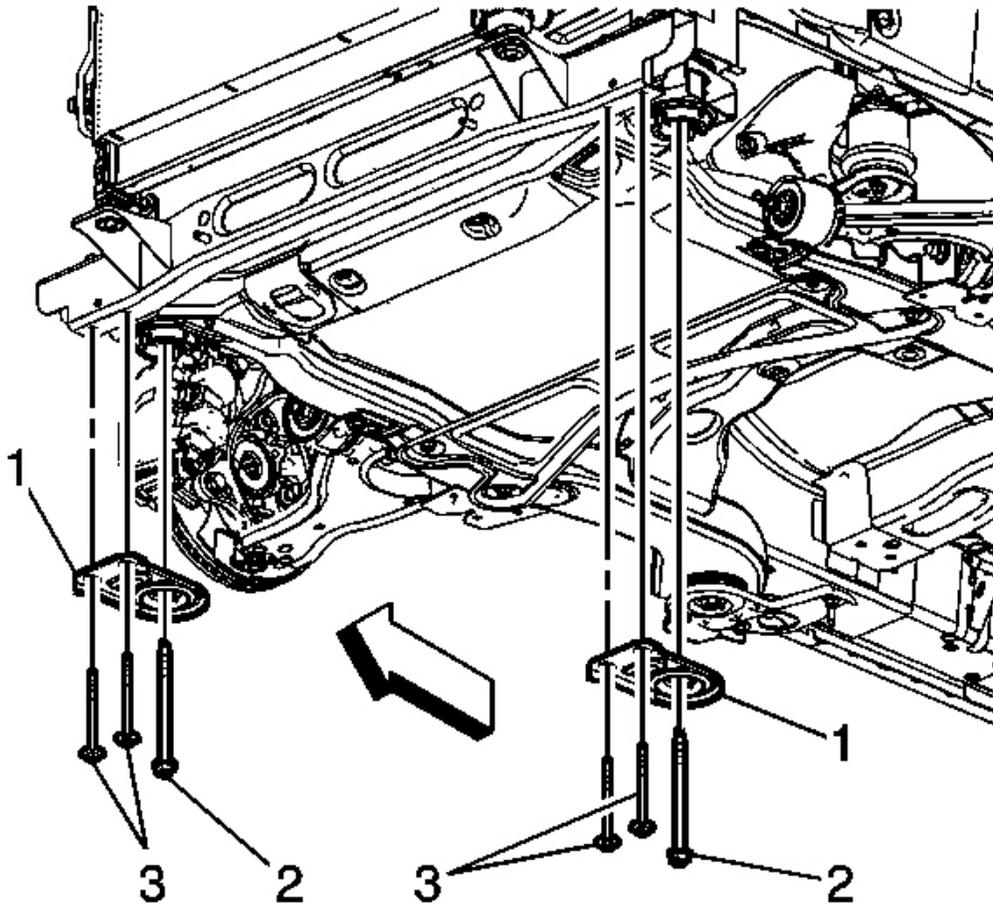


Fig. 81: Identifying Front Crossmember Brace And Bolts
Courtesy of GENERAL MOTORS CORP.

4. Remove the front crossmember brace bolts (3).

IMPORTANT: When the frame insulator bolts are removed, always discard the bolts and replace with new bolts.

5. Remove the front frame to body bolts (2).
6. Remove the (1).

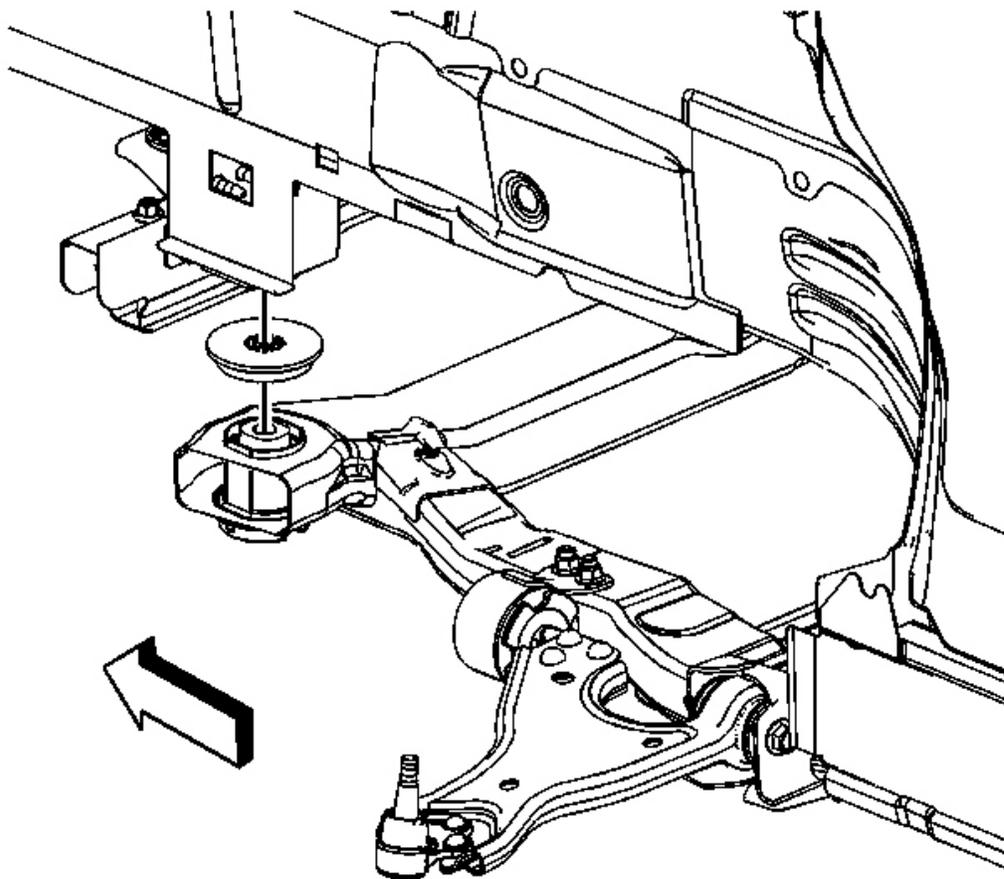


Fig. 82: Identifying Upper Insulator
Courtesy of GENERAL MOTORS CORP.

7. Lower the front of the frame only enough to service the insulator, approximately 38 mm (1.5 in).
8. Remove the upper insulator.

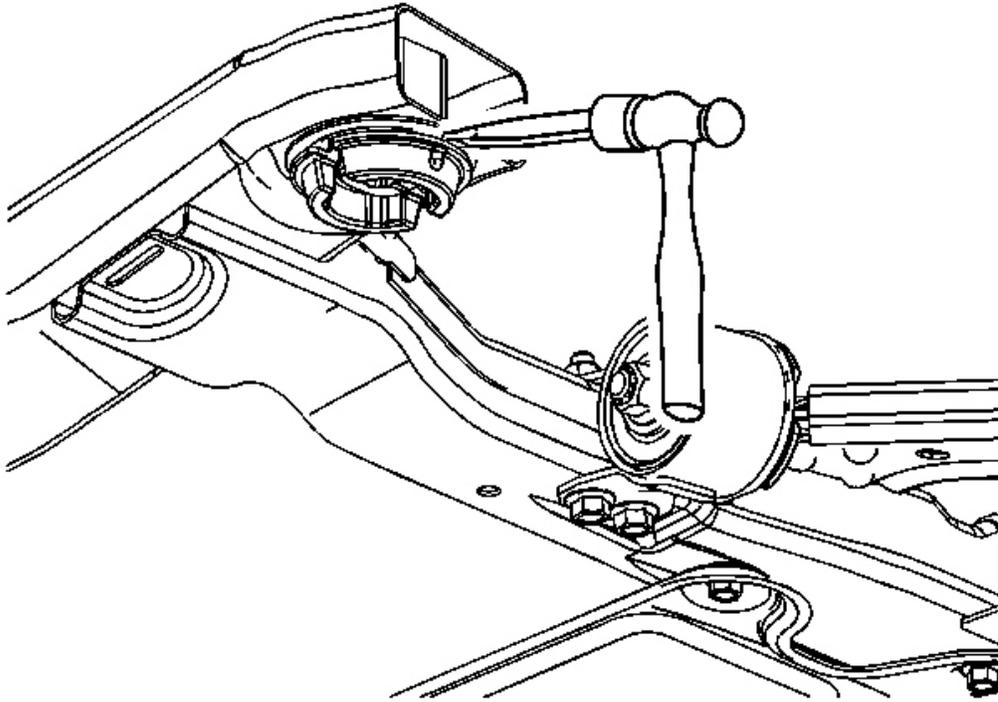


Fig. 83: View Of Lower Insulator & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

9. Remove the lower insulator using a flat chisel. Begin extracting the insulator by guiding the wedge of the chisel tip between the insulator flange lip and the vehicle frame.

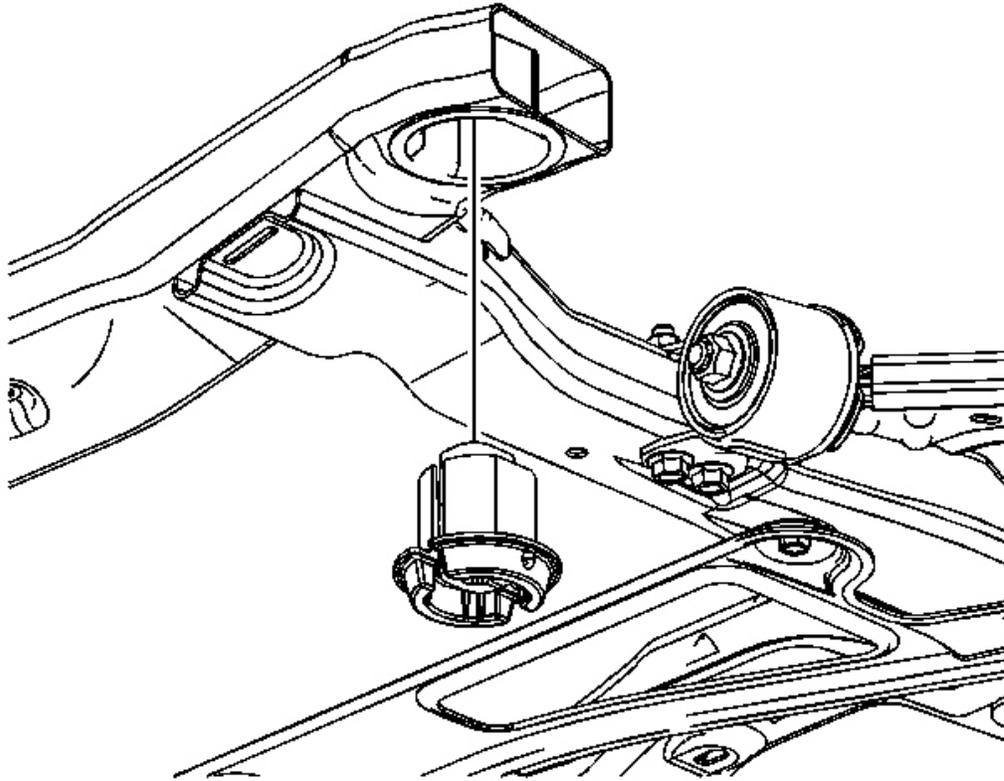


Fig. 84: Identifying Lower Insulator
Courtesy of GENERAL MOTORS CORP.

10. Continue extracting the insulator until it is fully removed from the frame.

Installation Procedure

1. Clean the frame insulator opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the frame insulator opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the frame insulator.

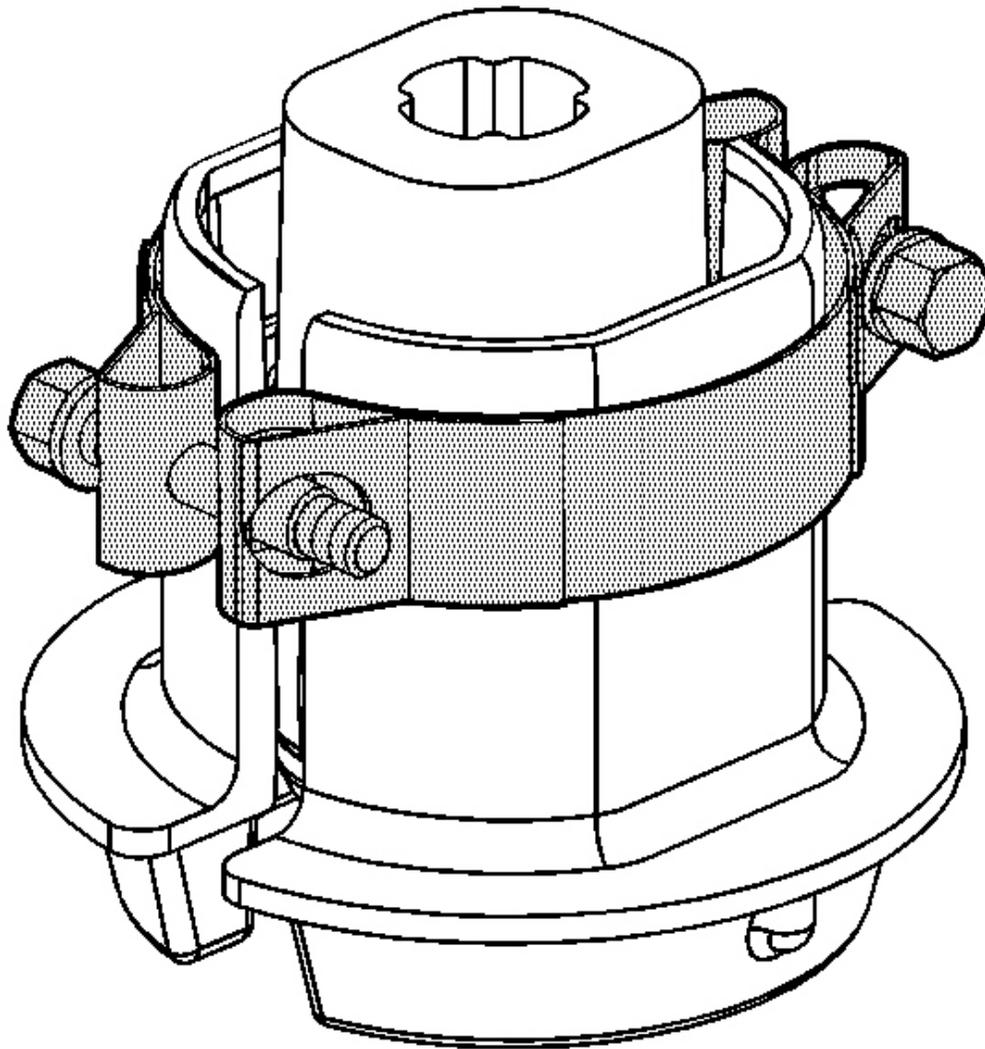


Fig. 85: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the insulator about 1/8 inch from the top of the insulator. See **Special Tools**.

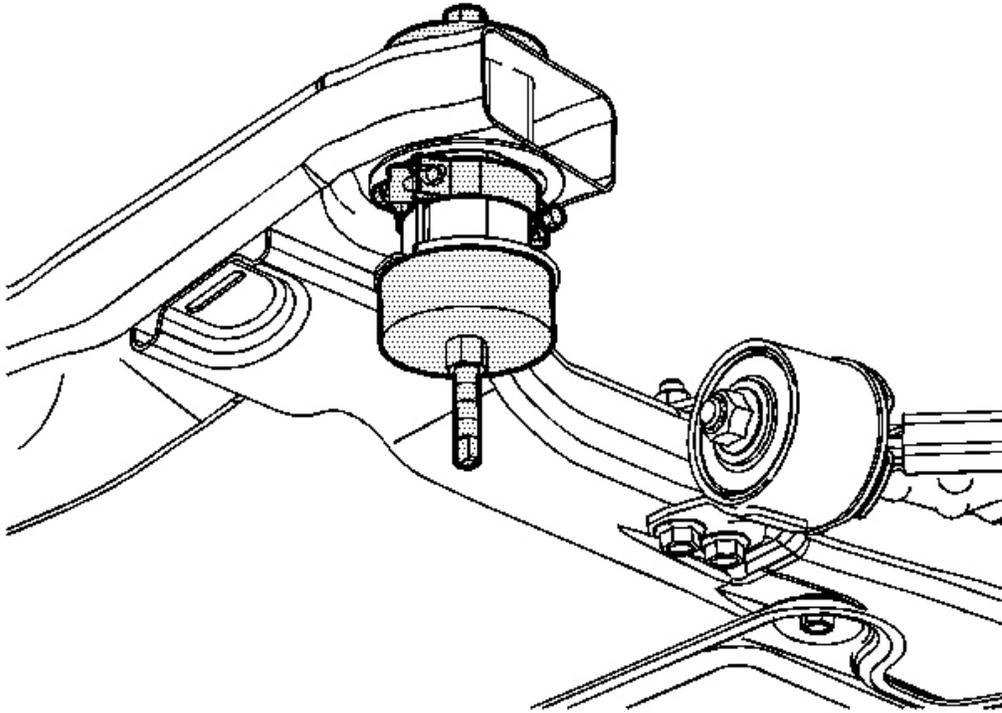


Fig. 86: View Of J-45725, Insulator & Frame
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the insulator to the front of the frame.
6. Install **J-45725** to the insulator and the frame. See **Special Tools**.

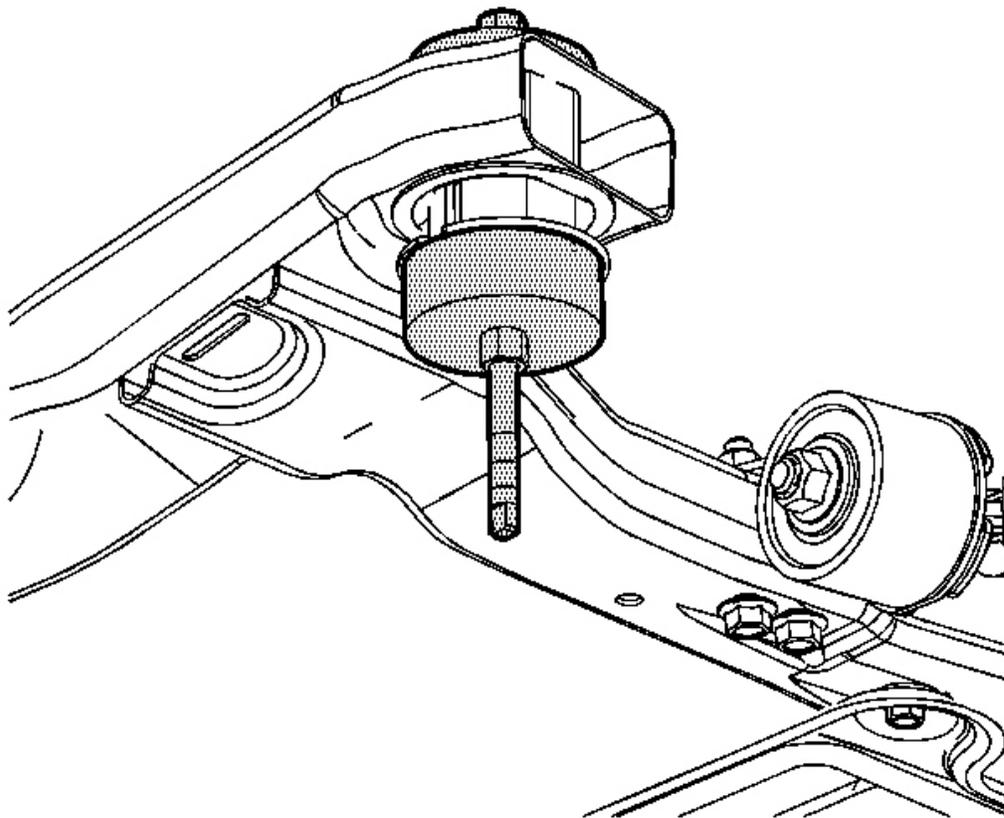


Fig. 87: View Of Insulator Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the insulator until the insulator is halfway recessed in the frame. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

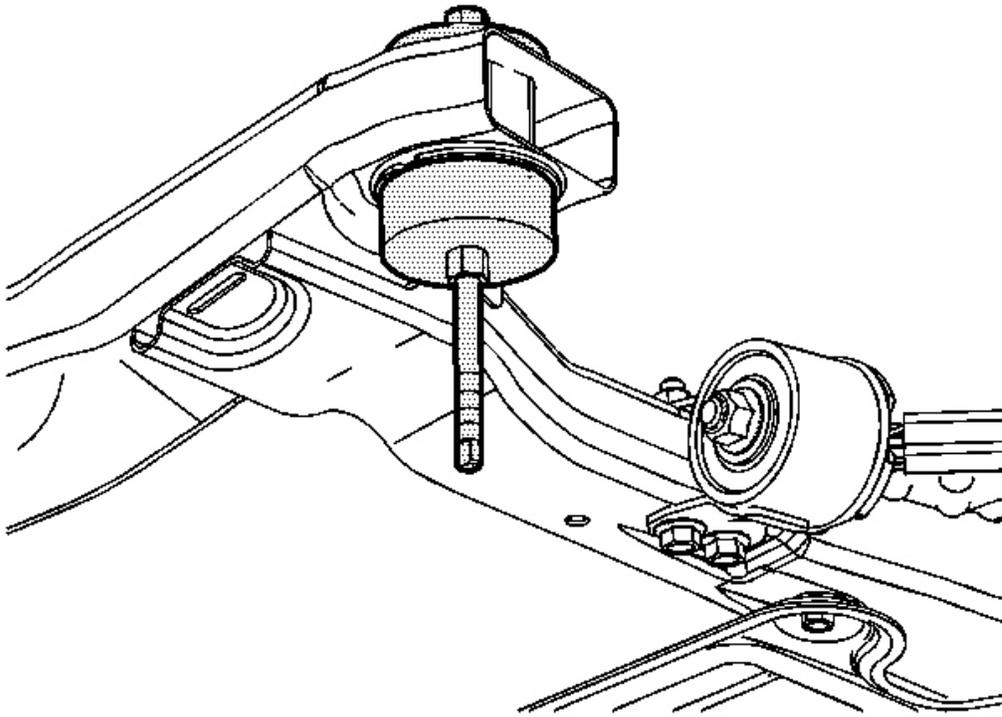


Fig. 88: Identifying Insulator Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the insulator until the flange lip of the insulator is fully seated to the bottom of the frame. See **Special Tools**.
10. Remove **J-45725** from the insulator and the frame. See **Special Tools**.

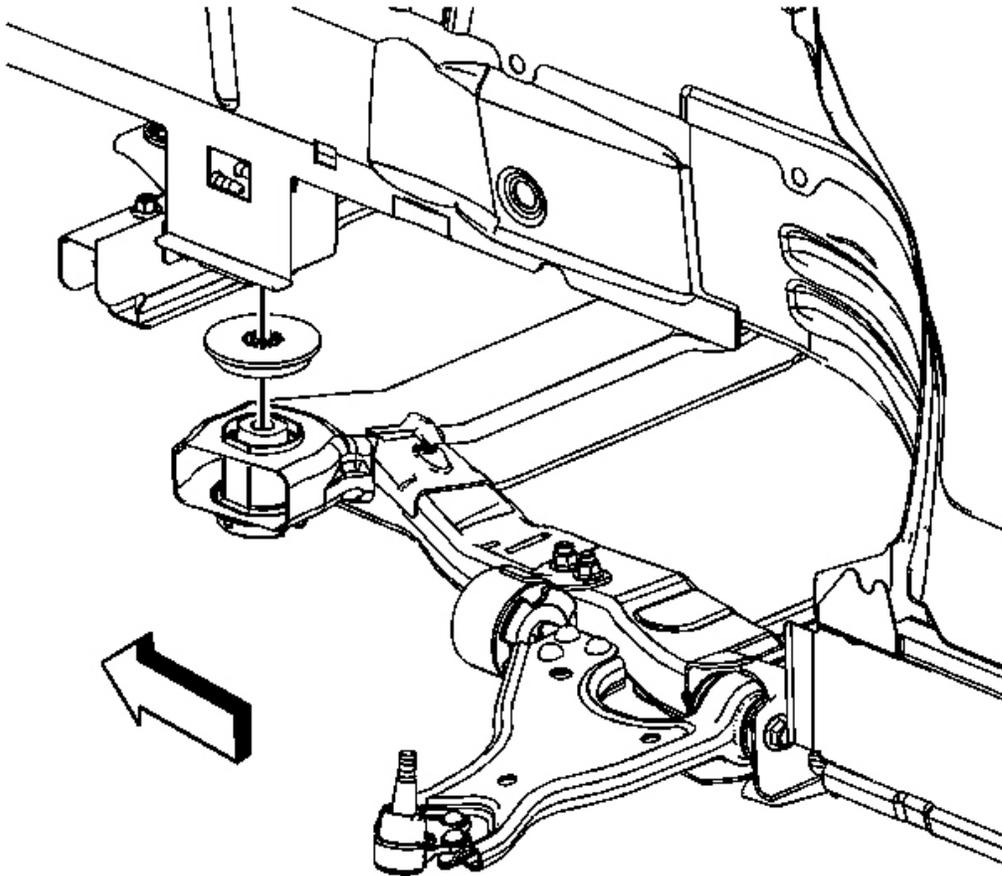


Fig. 89: Identifying Upper Insulator
Courtesy of GENERAL MOTORS CORP.

11. Install the upper insulator.
12. Raise the front of the frame.

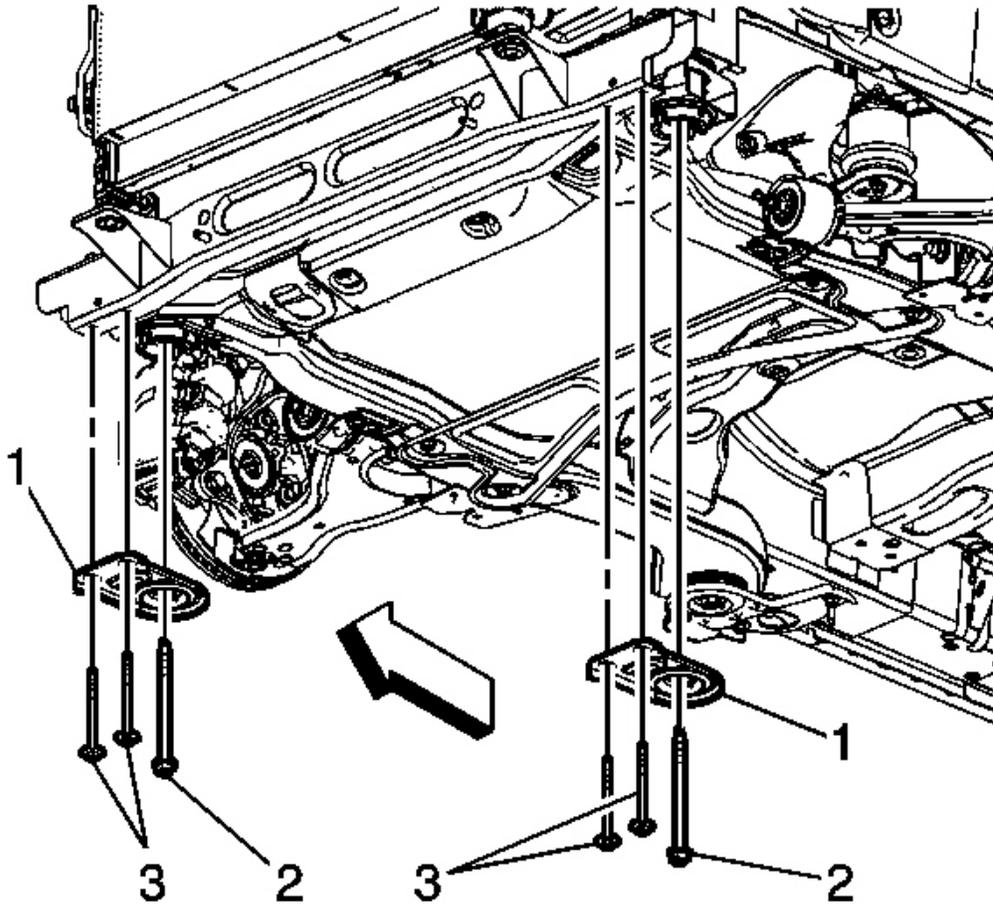


Fig. 90: Identifying Front Crossmember Brace & Bolts
Courtesy of GENERAL MOTORS CORP.

13. Install the front crossmember brace (1).

IMPORTANT: If the frame insulator bolt does not screw in smoothly, run a tap through the frame nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody.
Do not over tighten the insulator. Over tightening may collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

14. Install the front frame to body bolts (2).

Tighten: Tighten the bolts to 110 N.m (81 lb ft) plus 90 degrees.

15. Install the front crossmember brace bolts (3).

Tighten: Tighten the bolt to 50 N.m (37 lb ft).

16. Remove the jackstand.

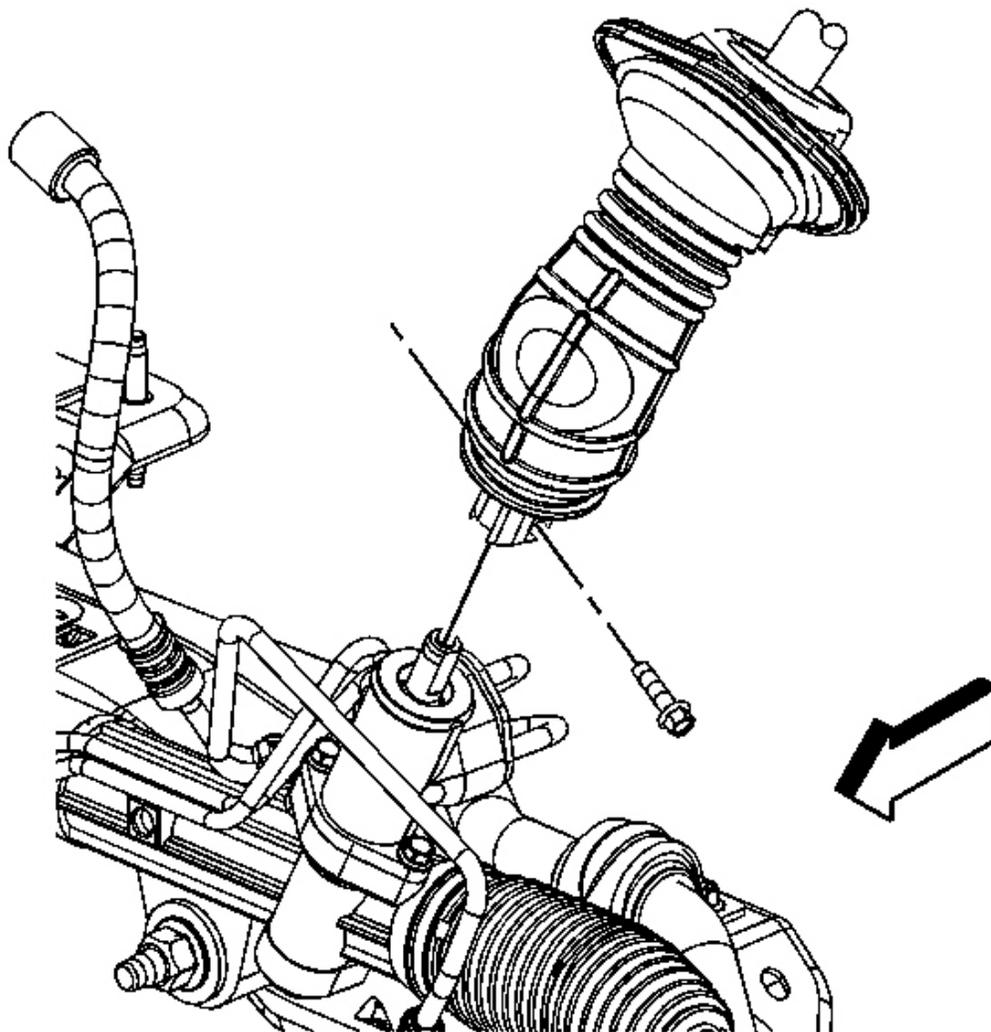


Fig. 91: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

17. Connect the intermediate shaft to the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .
18. Lower the vehicle.

REAR FRAME CUSHION OR INSULATOR REPLACEMENT

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle**.

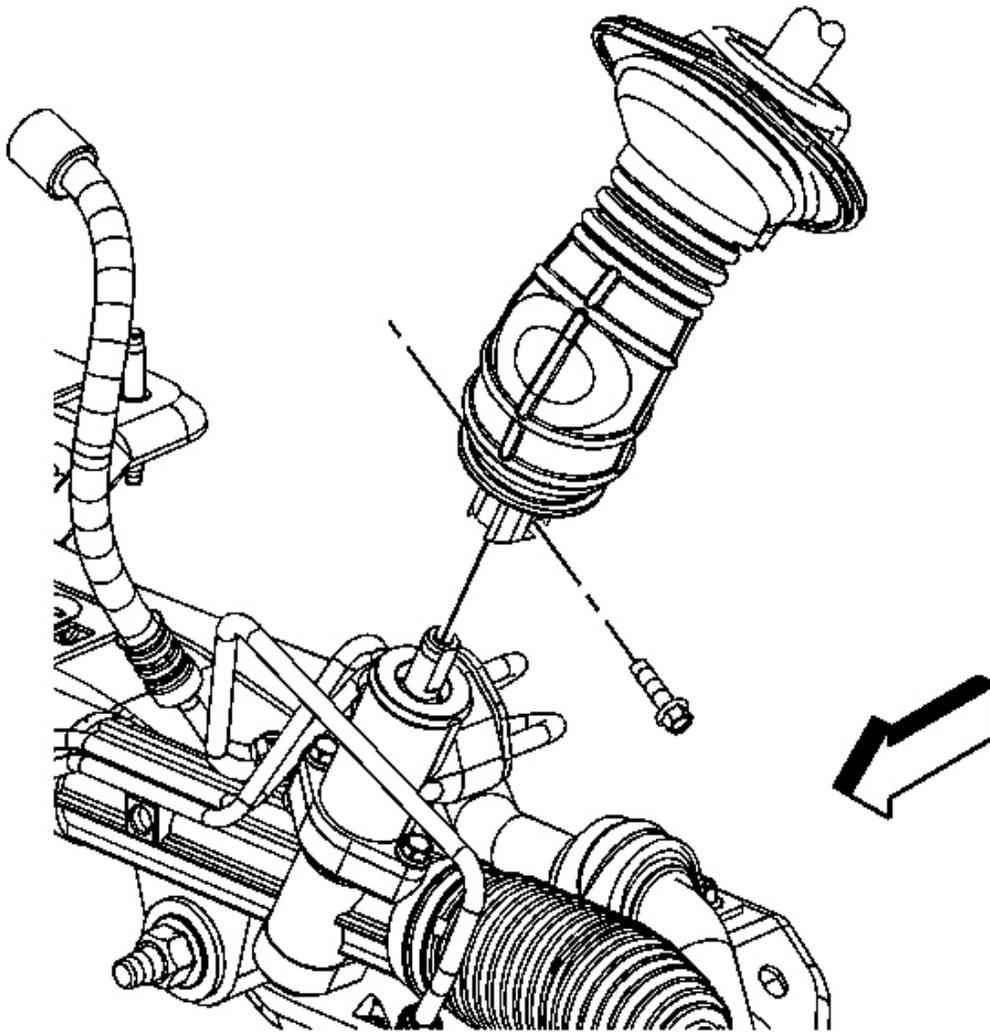


Fig. 92: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Whenever the frame is moved in relation to the body,

disconnect the intermediate shaft from the steering gear stub shaft.

2. Disconnect the intermediate shaft from the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .
3. Install a jackstand under the center of the frame, between the rear frame insulators.

IMPORTANT: In order to remove any frame insulator, loosen the adjacent frame insulator to permit the frame to separate from the body. Use caution when lowering or tilting the frame to prevent damage to other components.

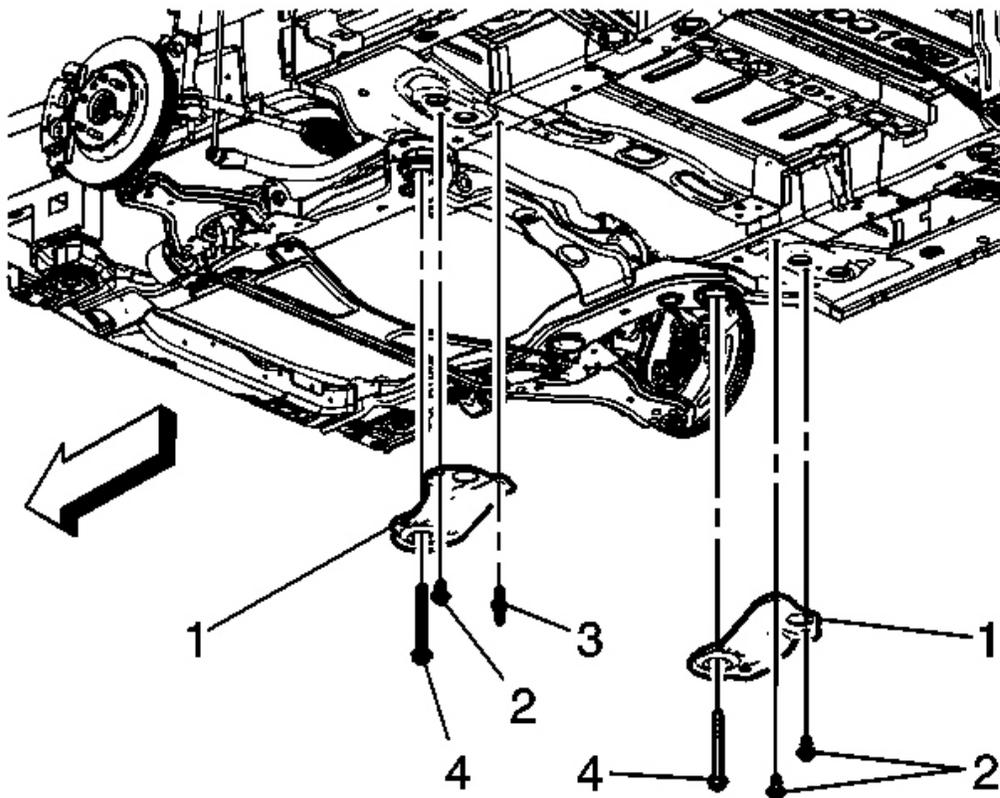


Fig. 93: Locating Reinforcements, Frame To Body Bolts, Reinforcement Bolts & Studs

Courtesy of GENERAL MOTORS CORP.

4. Remove the reinforcement bolts (2).
5. Remove the reinforcement studs (3).

IMPORTANT: When the frame insulator bolts are removed, always discard the bolts and replace with new bolts.

6. Remove the frame to body bolts (4).
7. Remove the reinforcements (1).

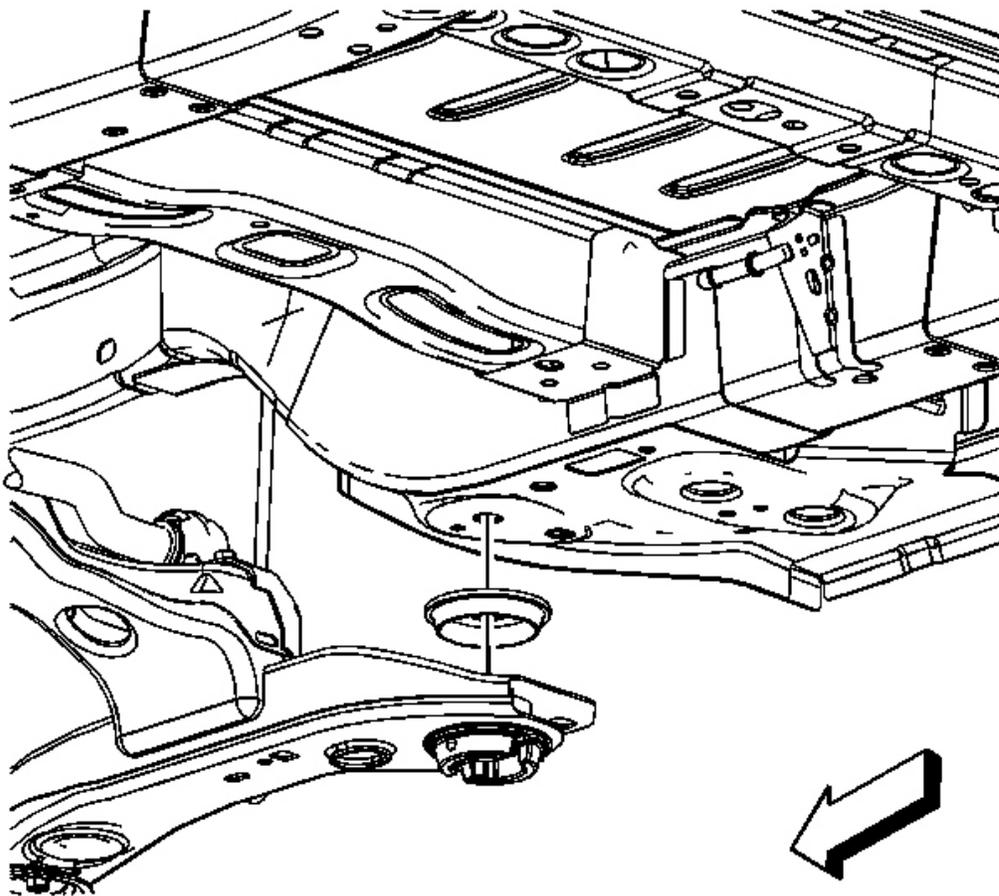


Fig. 94: View Of Rear Upper Insulator
Courtesy of GENERAL MOTORS CORP.

8. Lower the rear of the frame only enough to service the insulator, approximately 38 mm (1.5 in).
9. Remove the upper insulator.

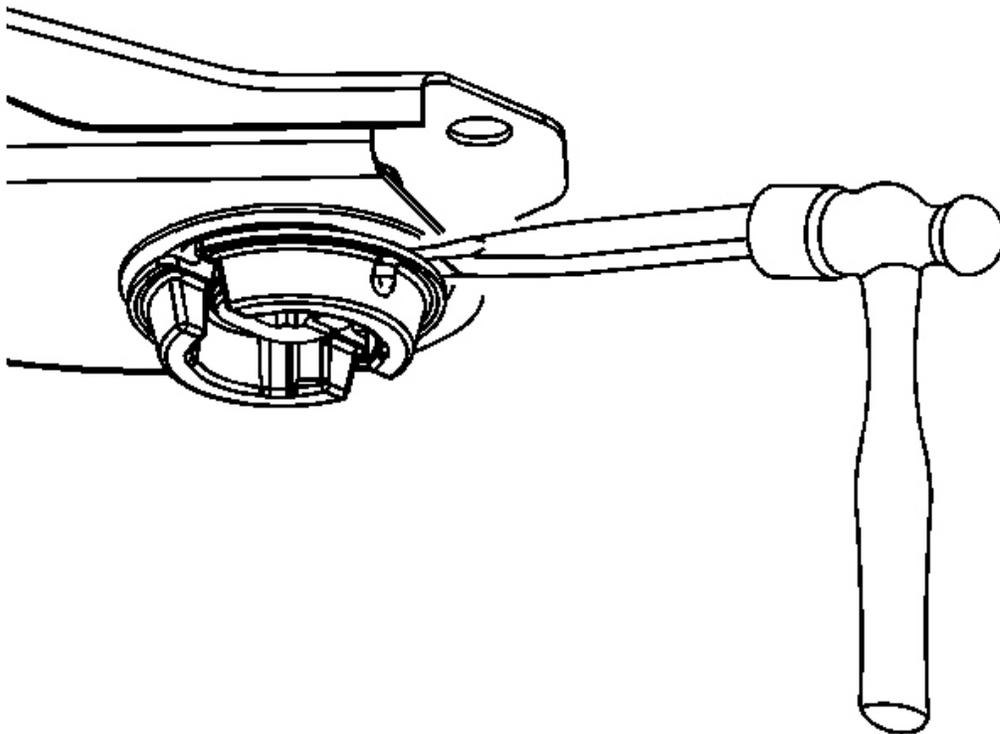


Fig. 95: Identifying Rear Lower Insulator & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

10. Remove the lower insulator using a flat chisel. Begin extracting the insulator by guiding the wedge of the chisel tip between the insulator flange lip and the vehicle frame.

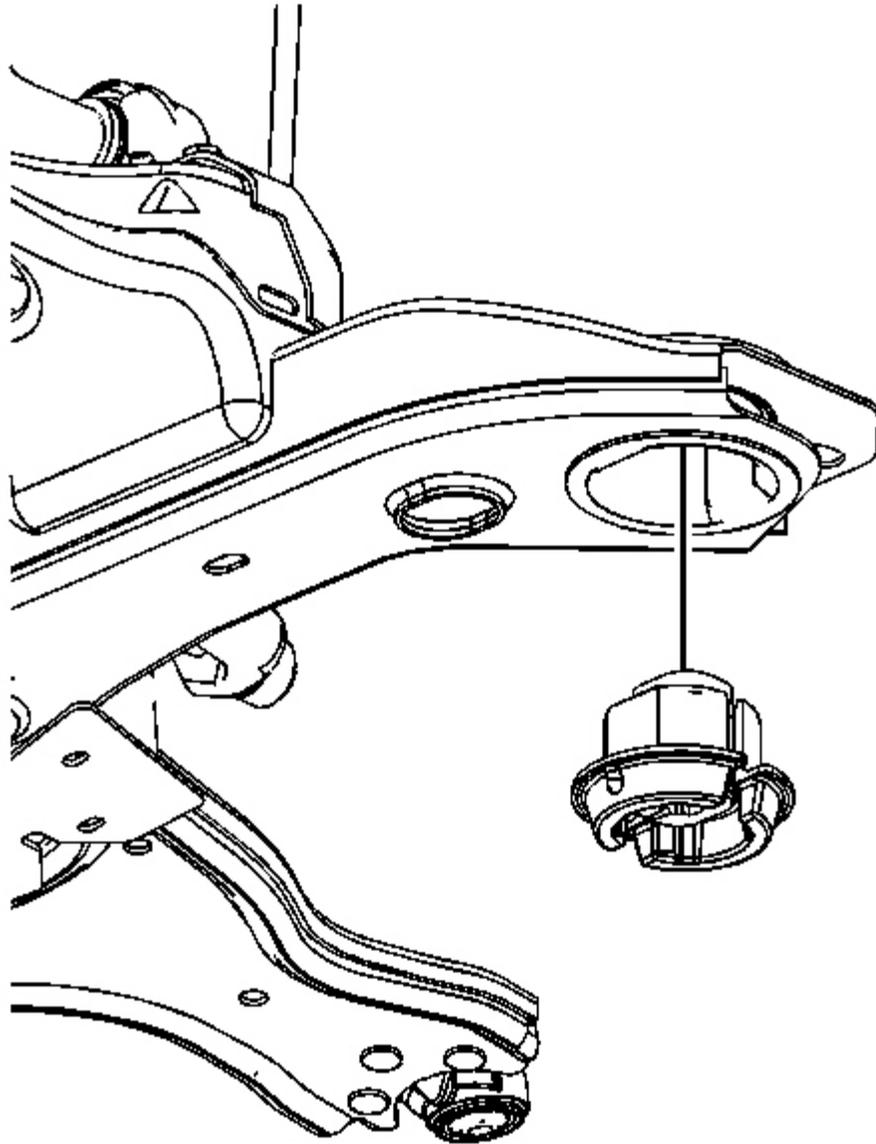


Fig. 96: Identifying Rear Lower Insulator
Courtesy of GENERAL MOTORS CORP.

11. Continue extracting the insulator until it is fully removed from the frame.

1. Clean the frame insulator opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the frame insulator opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the frame insulator.

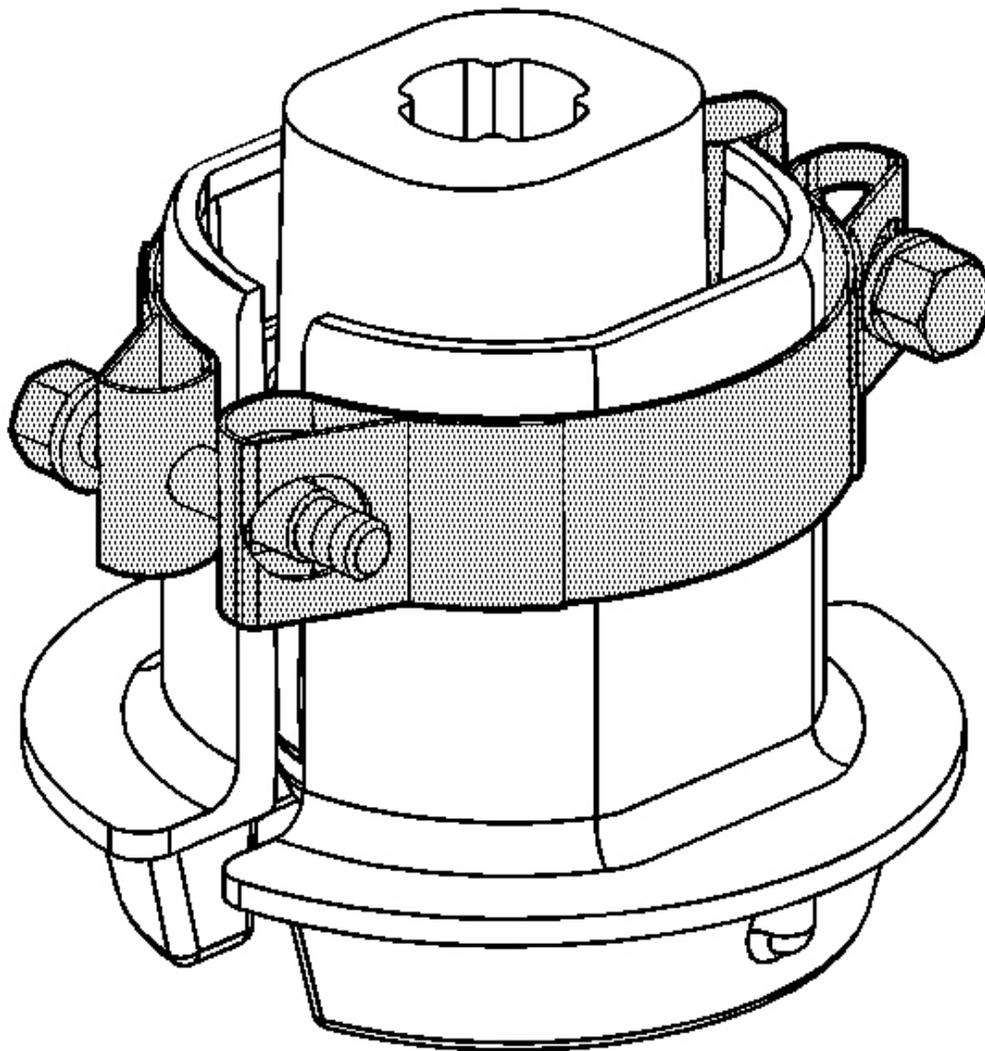


Fig. 97: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the insulator about 1/8 inch from the top of the insulator. See **Special Tools**.

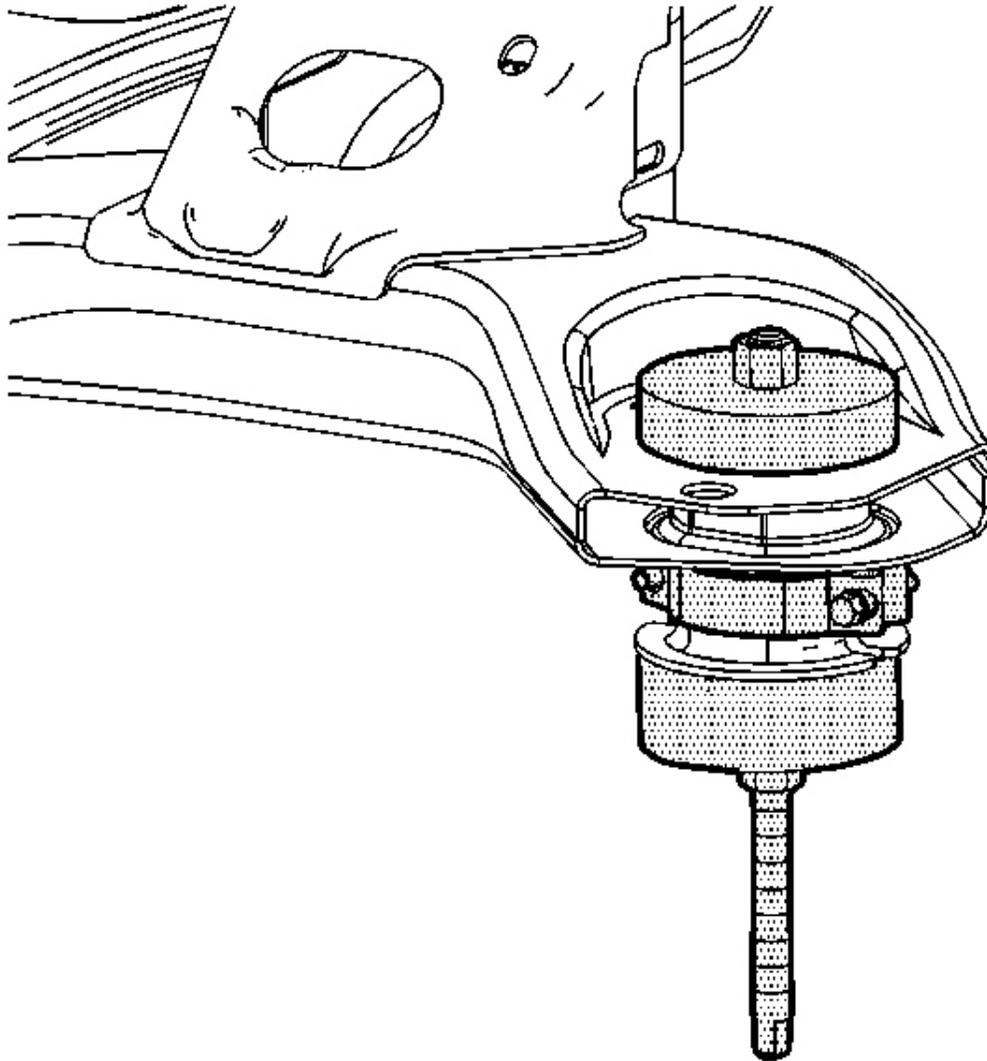


Fig. 98: Identifying Correct Position Of Insulator
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the insulator to the front of the frame.
6. Install **J-45725** to the insulator and the frame. See **Special Tools**.

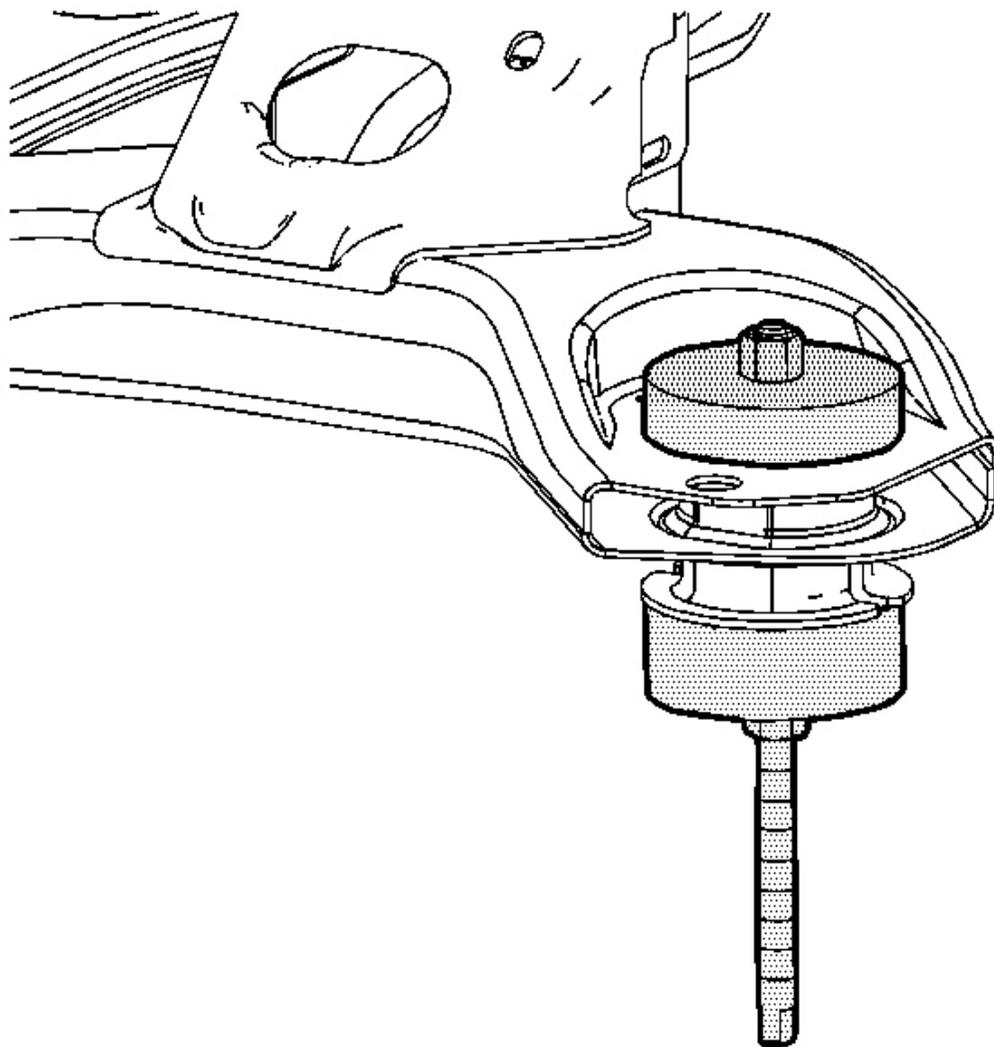


Fig. 99: View Of Insulator Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the insulator until the insulator is halfway recessed in the frame. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

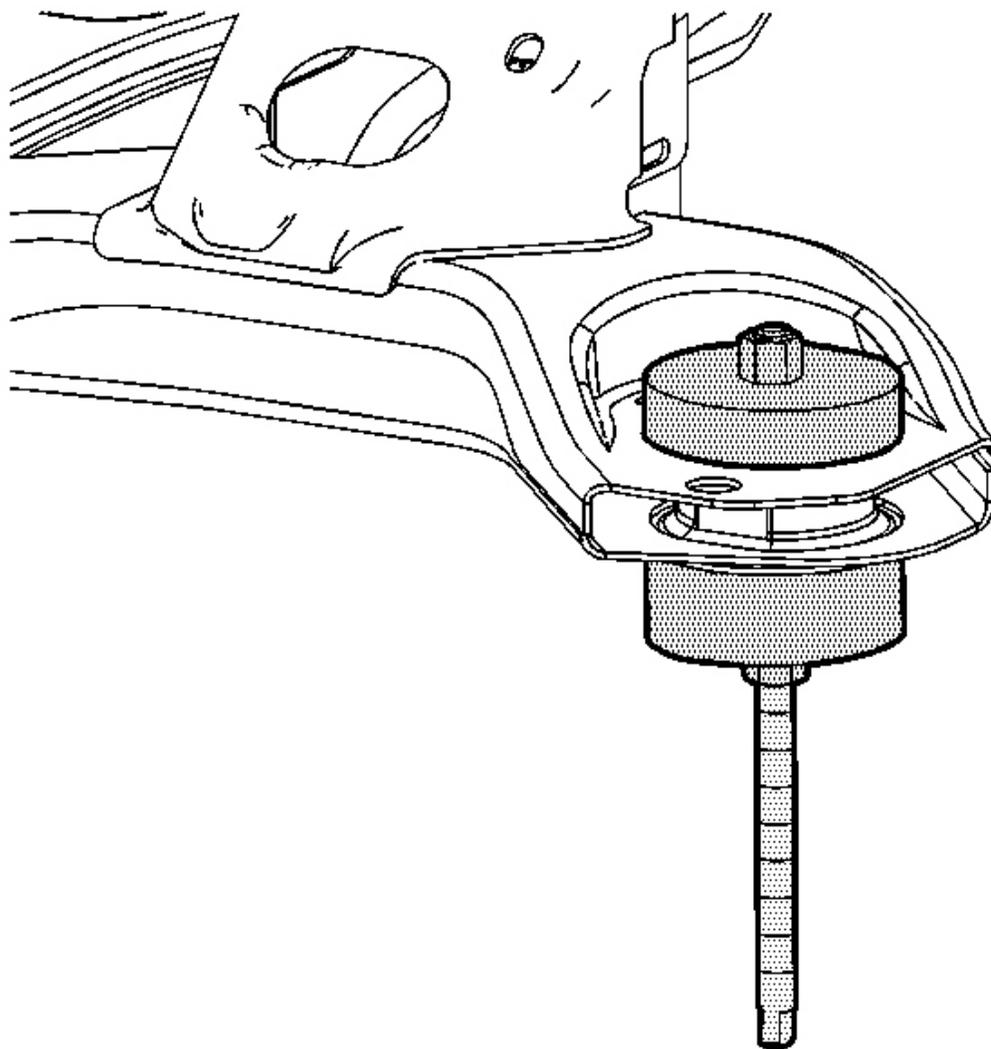


Fig. 100: View Of Insulator Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the insulator until the flange lip of the insulator is fully seated to the bottom of the frame. See **Special Tools**.
10. Remove **J-45725** from the insulator and the frame. See **Special Tools**.

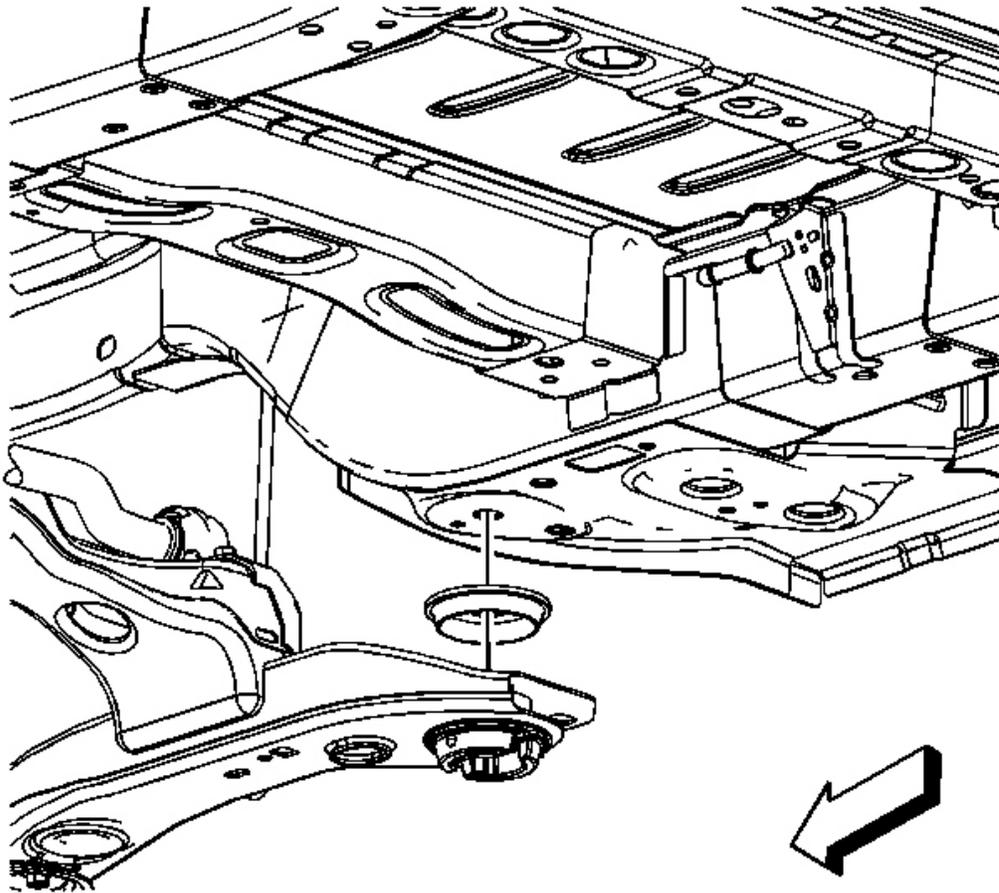


Fig. 101: View Of Rear Upper Insulator
Courtesy of GENERAL MOTORS CORP.

11. Install the upper insulator.
12. Raise the rear of the frame.

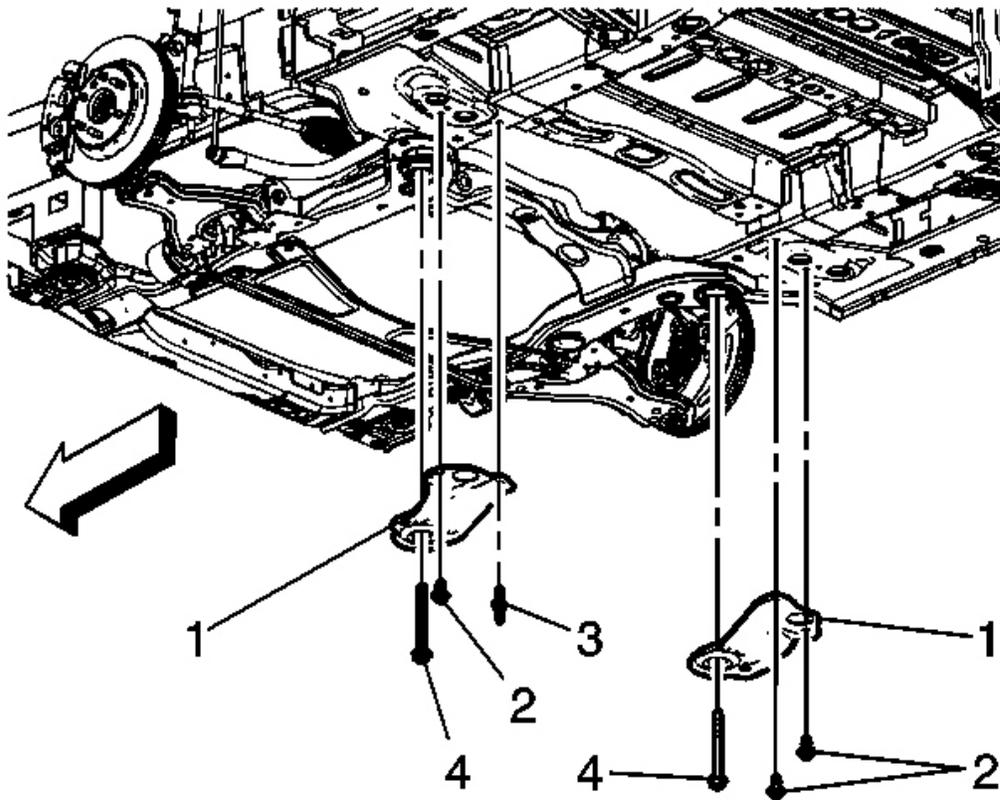


Fig. 102: Locating Reinforcements, Frame To Body Bolts, Reinforcement Bolts & Studs

Courtesy of GENERAL MOTORS CORP.

13. Install the reinforcements (1).

IMPORTANT: If the frame insulator bolt does not screw in smoothly, run a tap through the frame nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody.

Do not over tighten the insulator. Over tightening may collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

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14. Install the rear frame to body bolts (4).

Tighten: Tighten the bolts to 110 N.m (81 lb ft) plus 90 degrees.

15. Install the reinforcement bolts (2).

Tighten: Tighten the bolt to 60 N.m (44 lb ft).

16. Install the reinforcement studs (3).

Tighten: Tighten the stud to 60 N.m (44 lb ft).

17. Remove the jackstand.

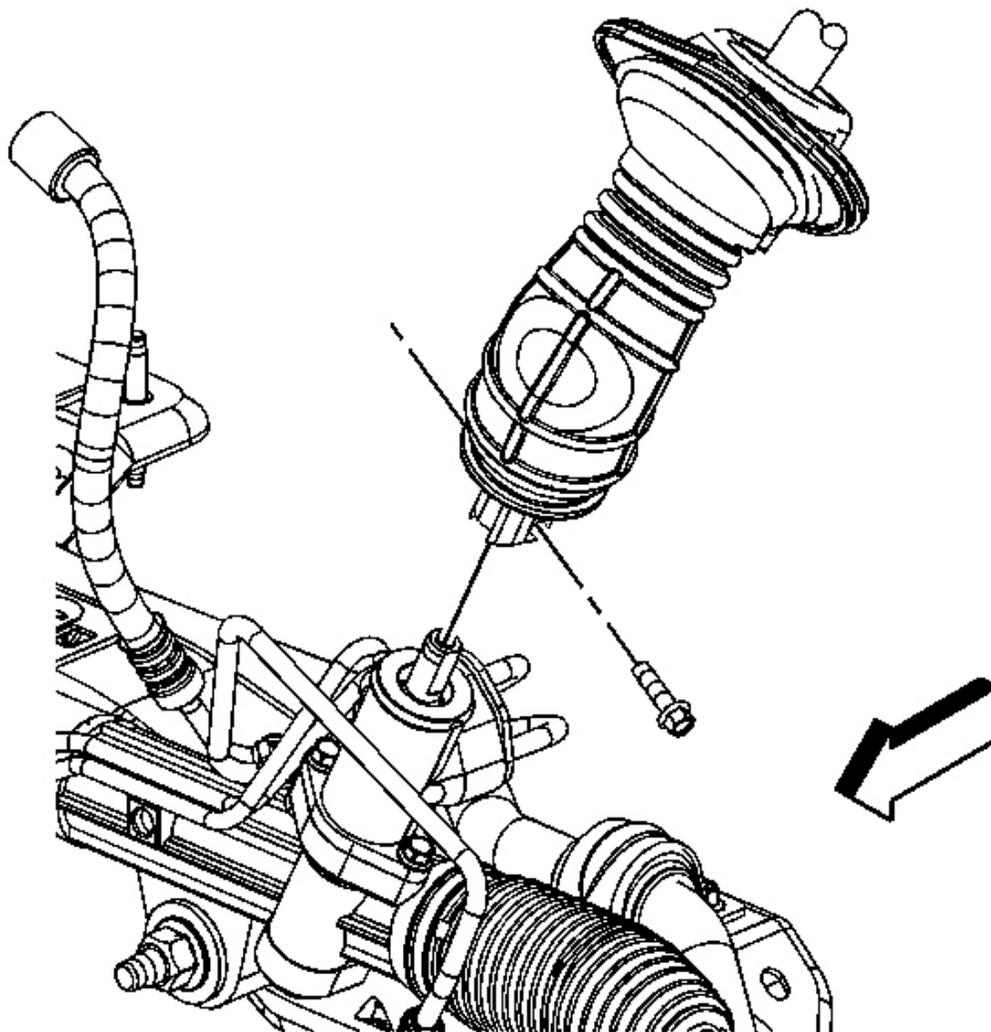


Fig. 103: Locating Steering Gear Stub Shaft
Courtesy of GENERAL MOTORS CORP.

18. Connect the intermediate shaft to the steering gear stub shaft. Refer to **Intermediate Steering Shaft Replacement** .
19. Lower the vehicle.

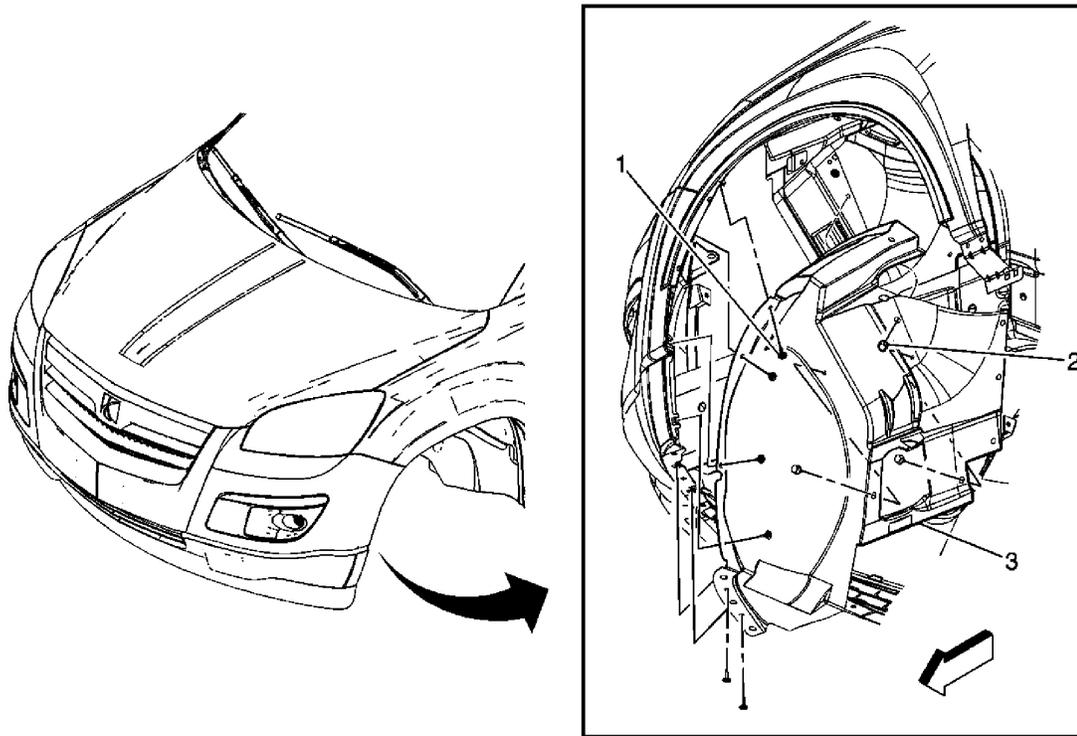


Fig. 104: Identifying Front Wheelhouse Liner
 Courtesy of GENERAL MOTORS CORP.

Front Wheelhouse Liner Replacement (Front)

Callout	Component Name
Preliminary Procedure	
1. Remove the tire/wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 2. Remove engine splash shield. Refer to <u>Engine Splash Shield Replacement</u> .	
1	Front Wheelhouse Liner Screw - Front (Qty: 6) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 2.5 N.m (22 lb in)
2	Front Wheelhouse Liner Plastic Retainer - Front (Qty: 4)
3	Front Wheelhouse Liner - Front

FRONT WHEELHOUSE LINER REPLACEMENT (REAR)

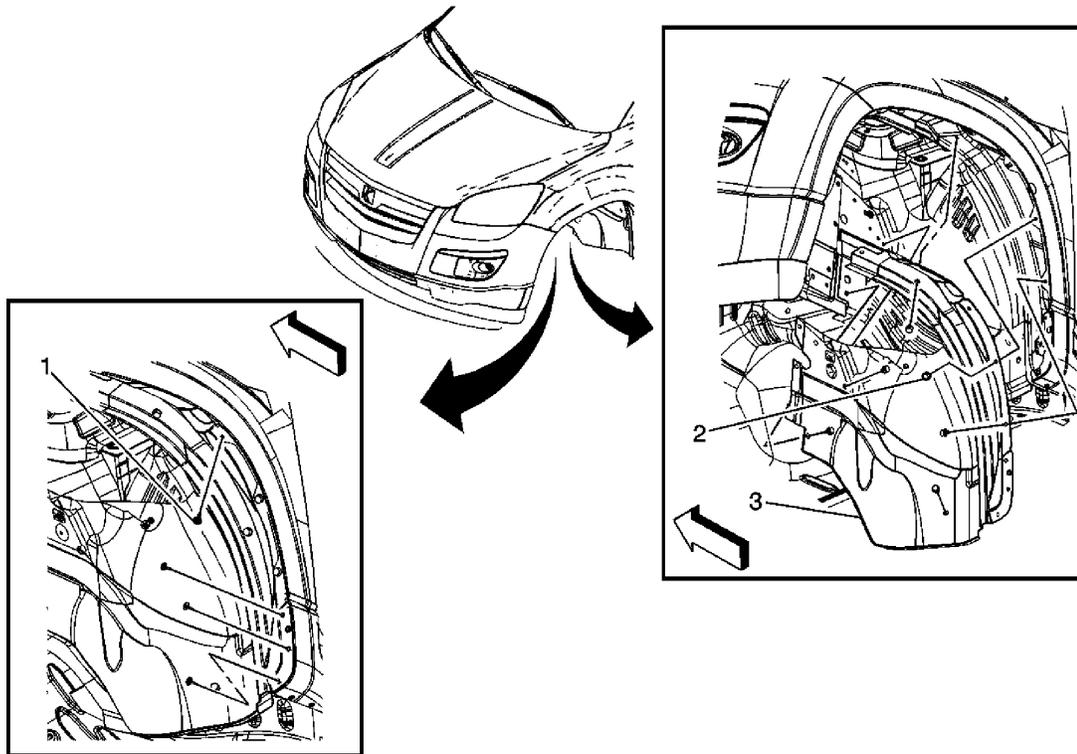


Fig. 105: View Of Front Wheelhouse Rear Liner
 Courtesy of GENERAL MOTORS CORP.

Front Wheelhouse Liner Replacement (Rear)

Callout	Component Name
Preliminary Procedure:	
Remove the tire/wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Front Wheelhouse Liner Screw - Rear (Qty: 4) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 2.5 N.m (22 lb in)
2	Front Wheelhouse Liner Plastic Retainer - Rear (Qty: 10)
3	Front Wheelhouse Liner - Rear

REAR WHEELHOUSE LINER PANEL REPLACEMENT

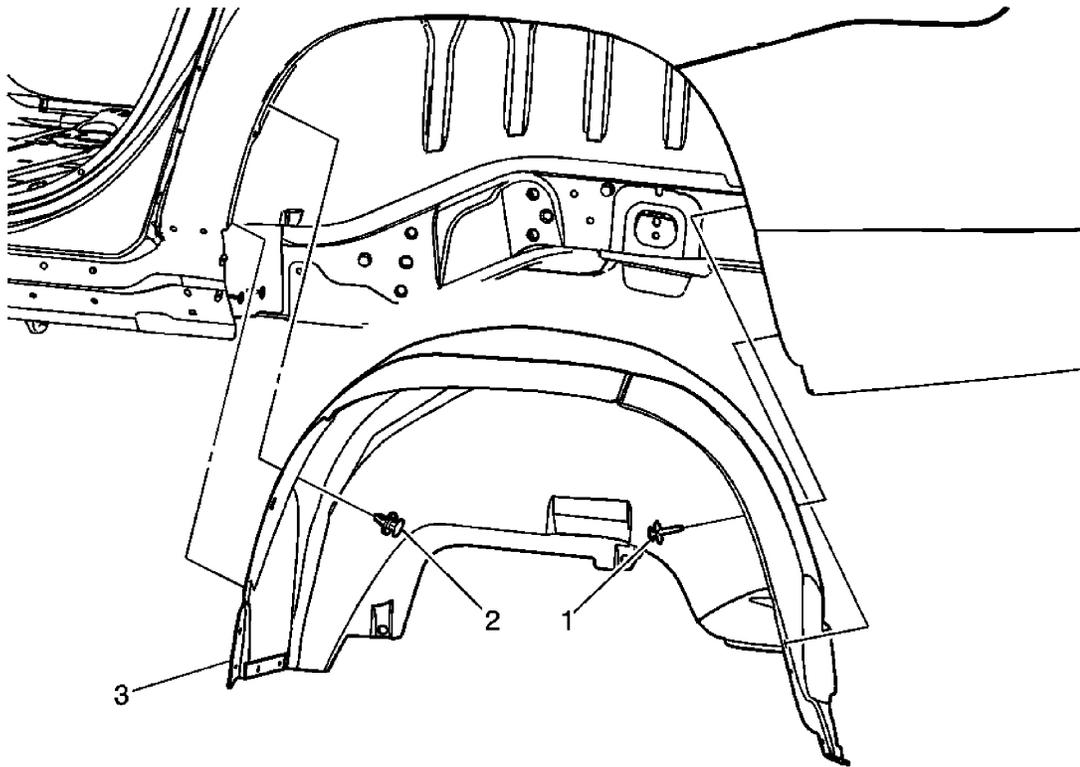


Fig. 106: Identifying Rear Wheelhouse Panel Liner
 Courtesy of GENERAL MOTORS CORP.

Rear Wheelhouse Liner Panel Replacement

Callout	Component Name
Preliminary Procedure: Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Rear Wheelhouse Liner Screw (Qty: 5) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 2.5 N.m (22 lb in)
2	Rear Wheelhouse Liner Plastic Retainer (Qty: 3)
3	Rear Wheelhouse Liner Procedure 1. Disconnect the electrical connectors, harnesses and attached

components from the rear wheelhouse liner as needed.

2. Install using the reverse procedure, with the proper alignment of the rear wheelhouse liner.

ENGINE SPLASH SHIELD REPLACEMENT

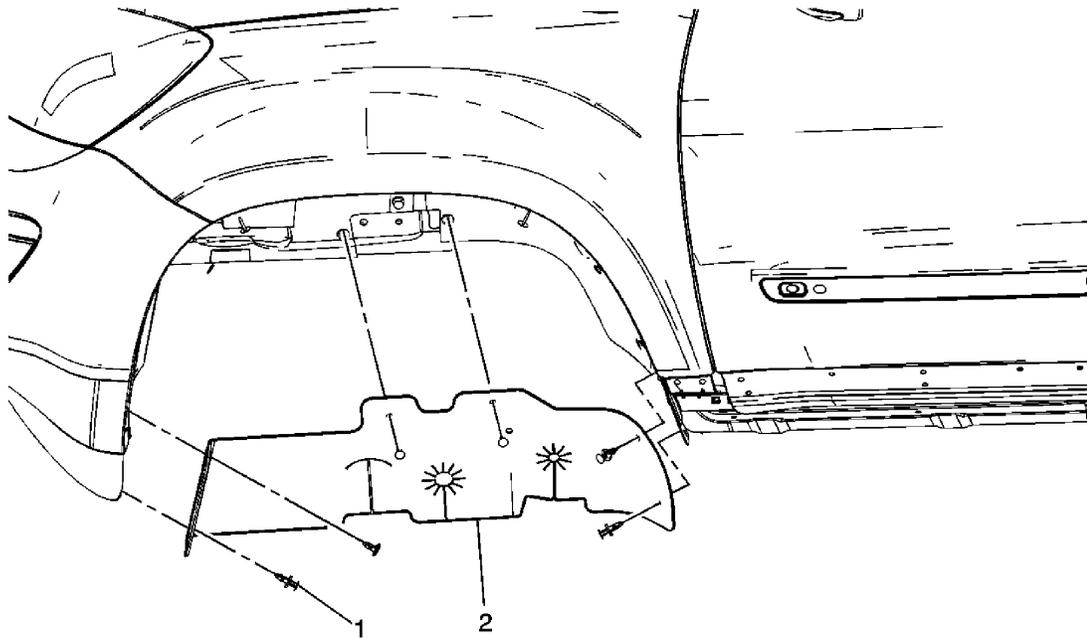


Fig. 107: View Of Engine Splash Shield
 Courtesy of GENERAL MOTORS CORP.

Engine Splash Shield Replacement

Callout	Component Name
Preliminary Procedure: Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Engine Splash Shield Plastic Retainer (Qty: 6)
2	Engine Splash Shield

DRIVETRAIN AND FRONT SUSPENSION FRAME REINFORCEMENT REPLACEMENT

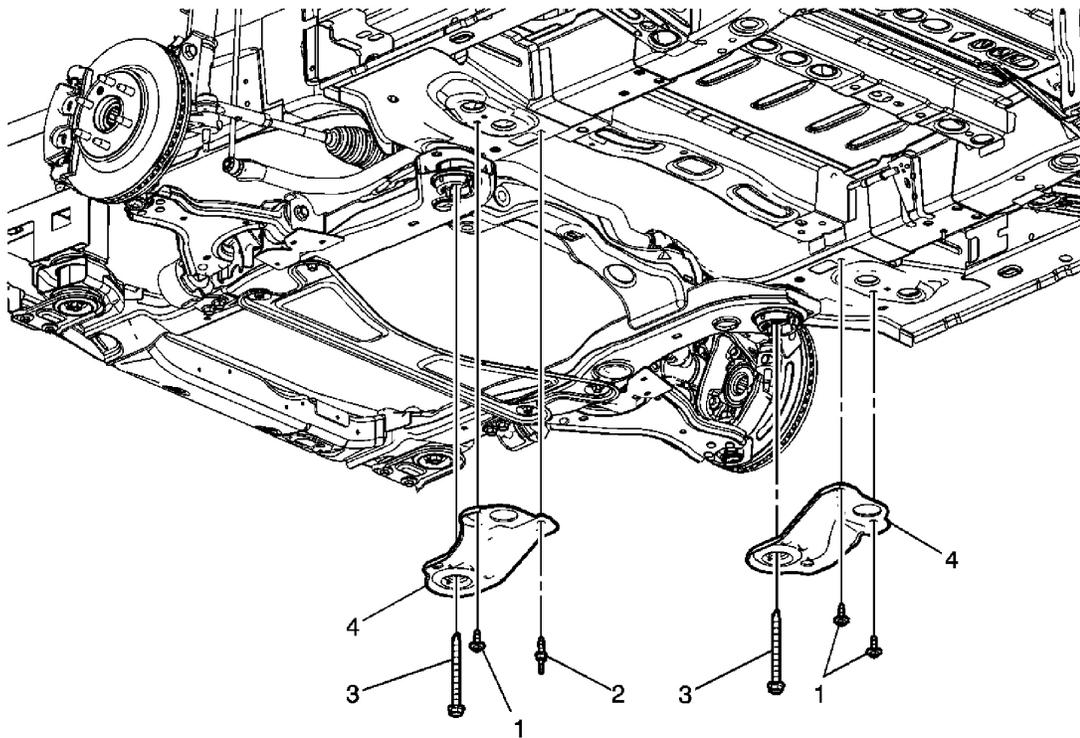


Fig. 108: View Of Drivetrain And Front Suspension Frame Reinforcement
 Courtesy of GENERAL MOTORS CORP.

Drivetrain and Front Suspension Frame Reinforcement Replacement

Callout	Component Name
Preliminary Procedures	
<ol style="list-style-type: none"> 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the underbody rear side rail. Refer to <u>Underbody Rear Side Rail Replacement</u>. 3. Support the frame with a jack stand. 	
1	Frame Reinforcement Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 60 N.m (44 lb ft)
2	Frame Reinforcement Stud (Qty: 2) Tighten: 60 N.m (44 lb ft)

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3	Frame Bolt (Qty: 2) Tighten: 110 N.m (81 lb ft) plus 90 degrees
4	Frame Reinforcement (Qty: 2)

REAR SUSPENSION SUPPORT LOWER MOUNT REPLACEMENT - FRONT (FRONT WHEEL DRIVE)

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Remove the spare tire.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .

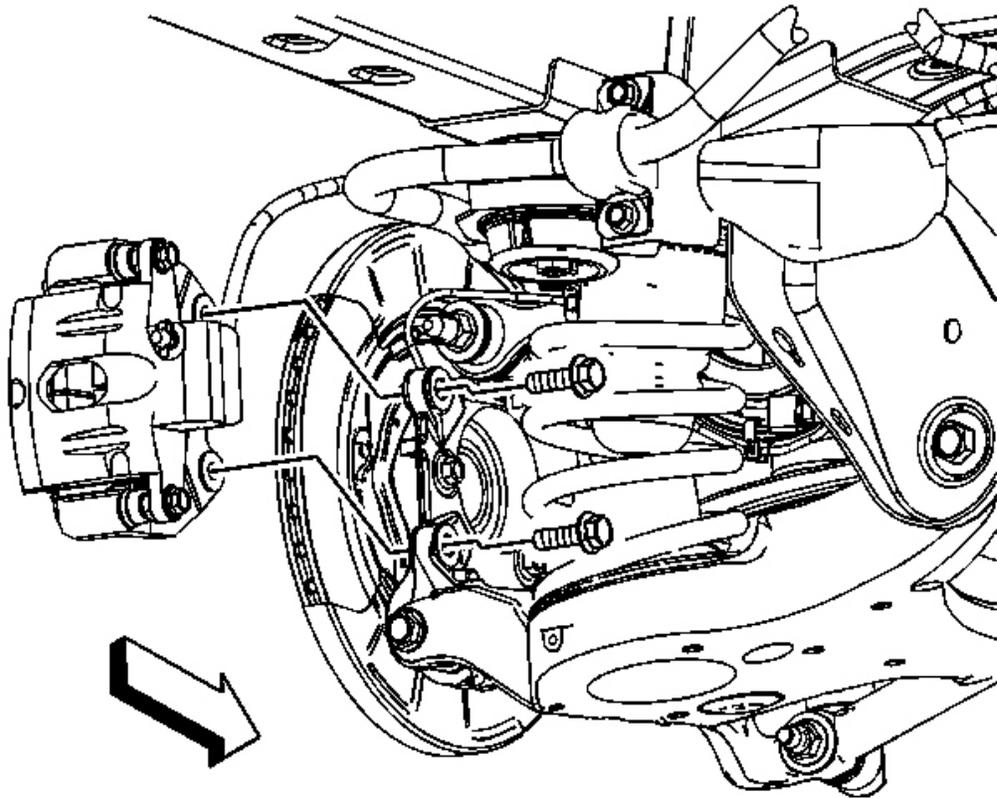


Fig. 109: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear brake caliper bracket bolts.

IMPORTANT: Support the rear brake calipers from the vehicle body not the suspension to prevent stressing of the brake hoses.

5. Support the rear brake caliper.
6. Support the exhaust system on a suitable stand and disconnect the rubber insulator hangers from the exhaust system.
7. Lower the exhaust only enough to allow lowering of the suspension crossmember 38 mm (1.5 in).
8. Install jackstands under the front and rear of the suspension crossmember.

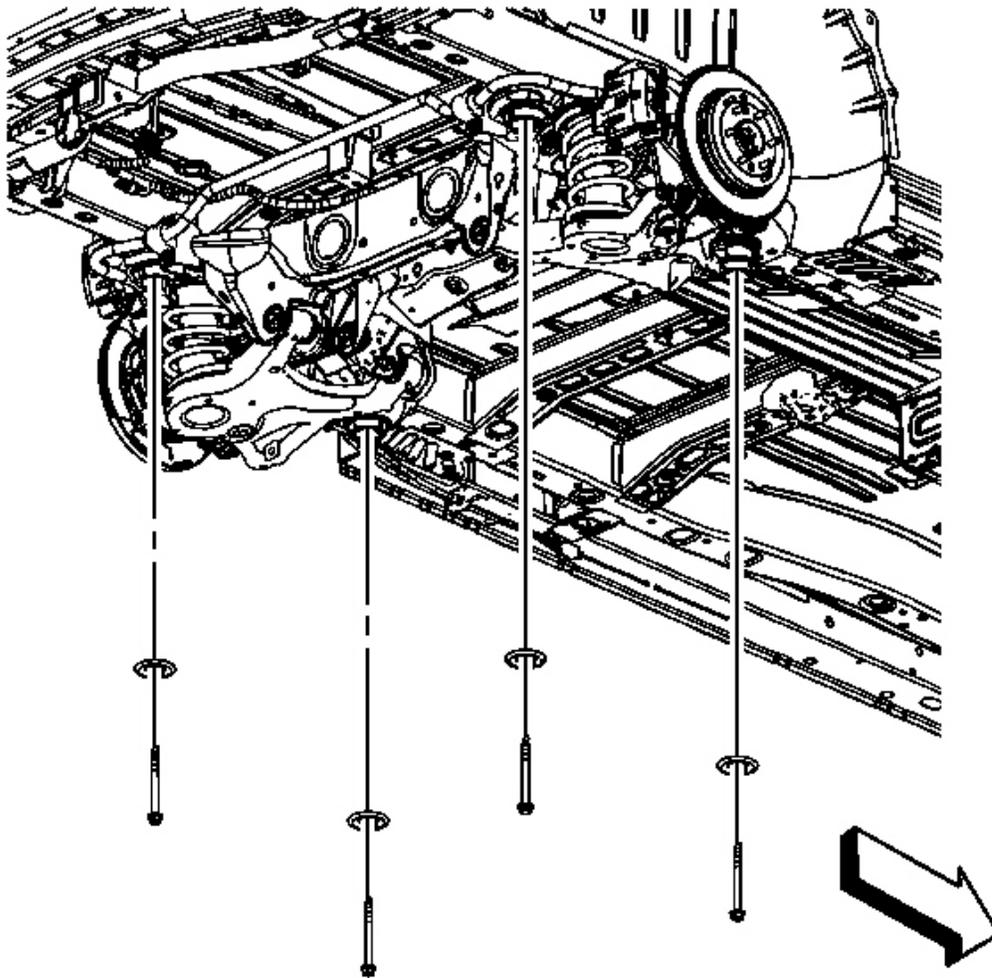


Fig. 110: Identifying Suspension Crossmember To Body Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Both the front and rear of the suspension crossmember must be lowered equally to prevent over stressing the mounts.

9. Remove the suspension crossmember to body bolts.

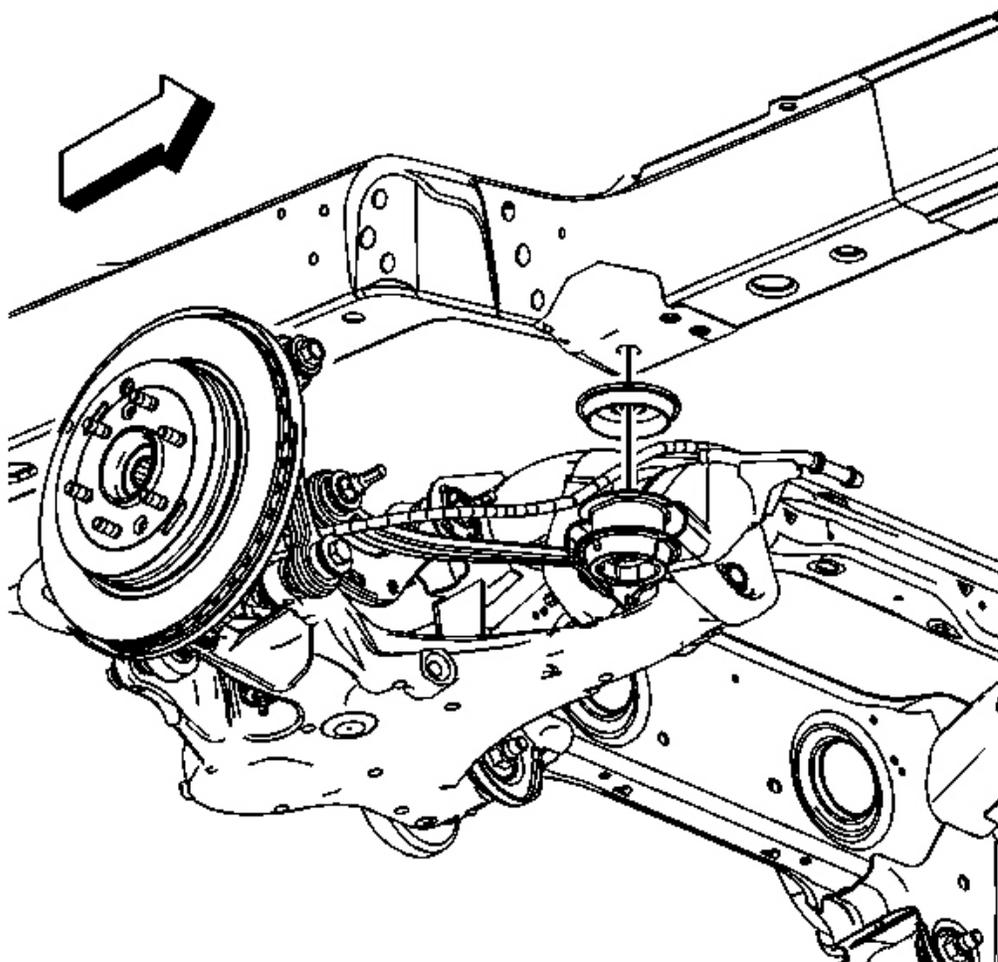


Fig. 111: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

10. Lower the suspension crossmember only enough to service the mount, approximately 38 mm (1.5 in).
11. Remove the upper mount.

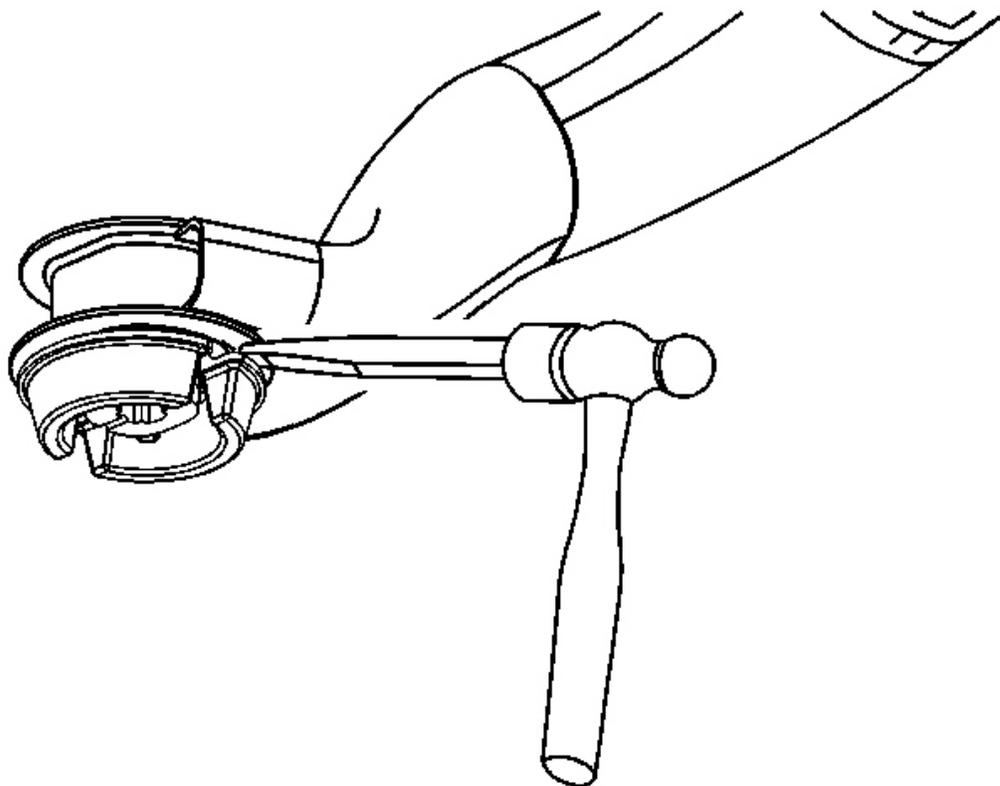


Fig. 112: Identifying Lower Mount & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

12. Remove the lower mount using a flat chisel. Begin extracting the mount by guiding the wedge of the chisel tip between the mount flange lip and the suspension crossmember.

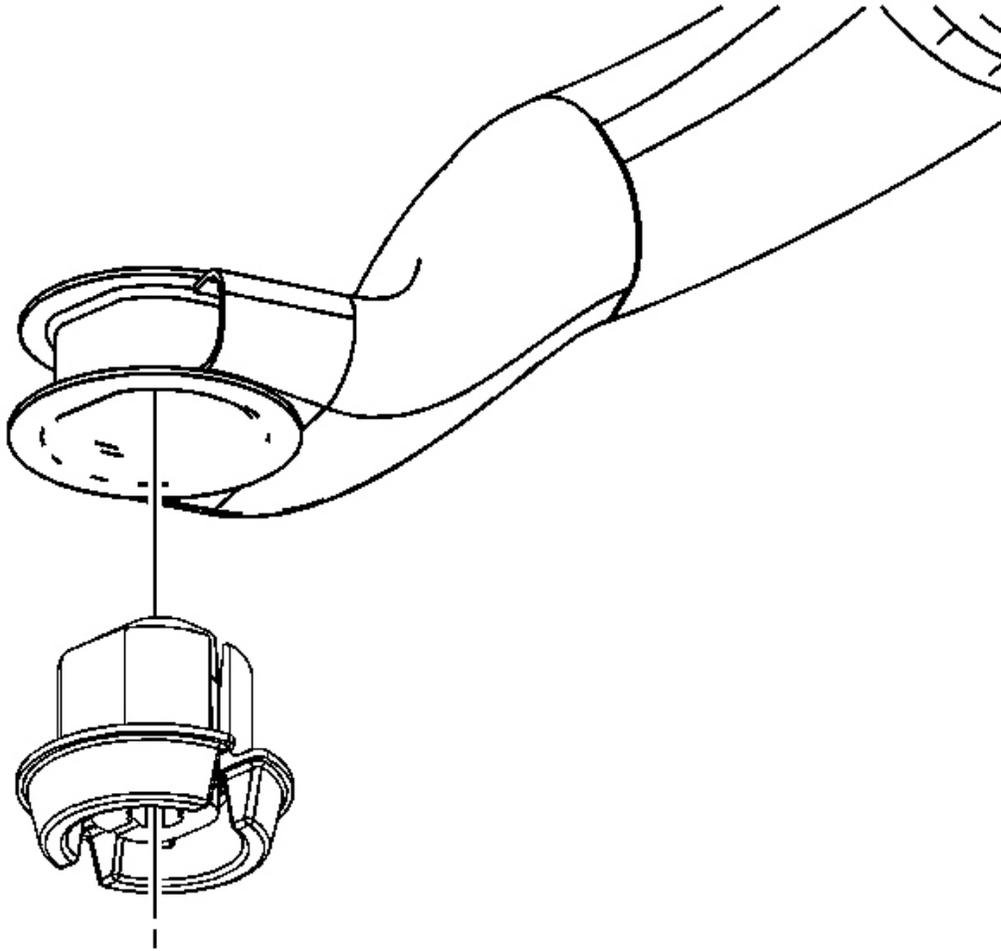


Fig. 113: View Of Lower Mount
Courtesy of GENERAL MOTORS CORP.

13. Continue extracting the mount until it is fully removed from the suspension crossmember.

Installation Procedure

1. Clean the frame mount opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the suspension crossmember mount opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the suspension crossmember mount.

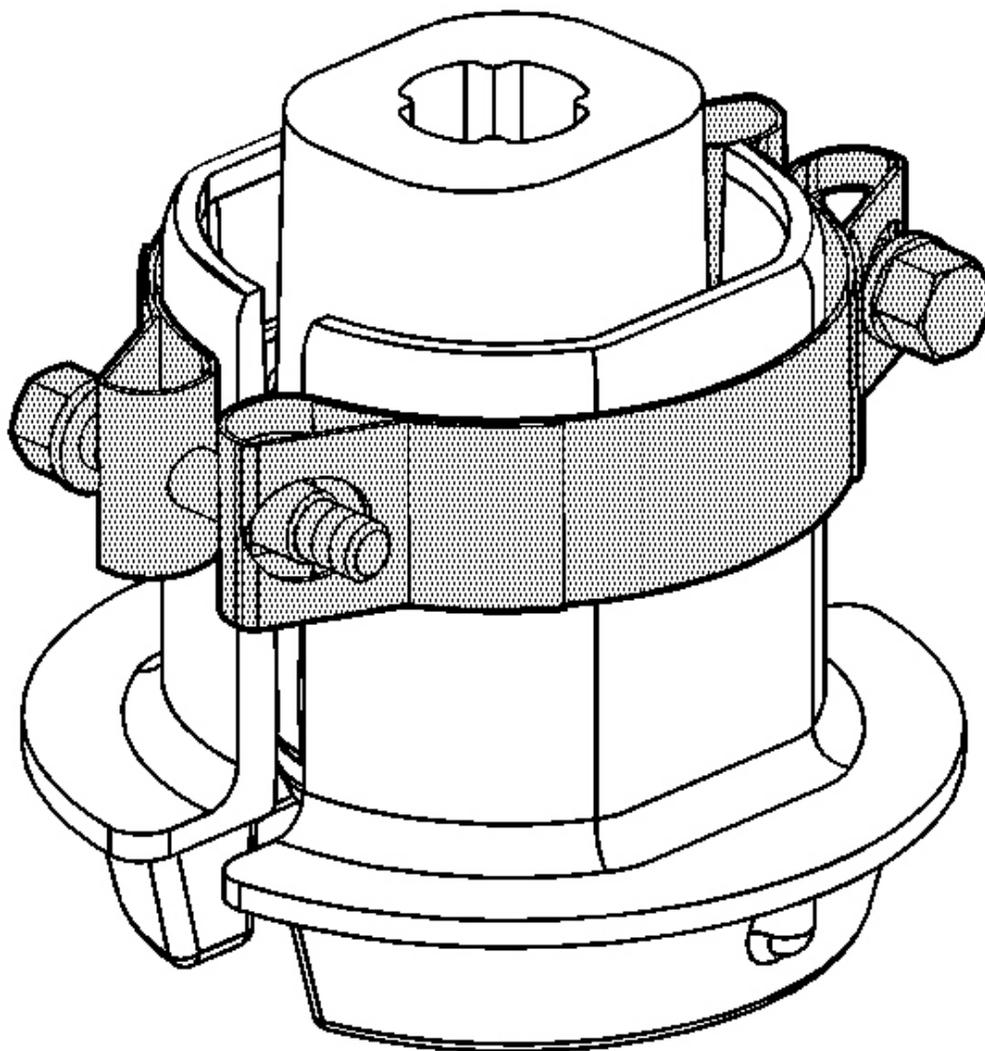


Fig. 114: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the mount about 1/8 inch from the top of the mount. See **Special Tools**.

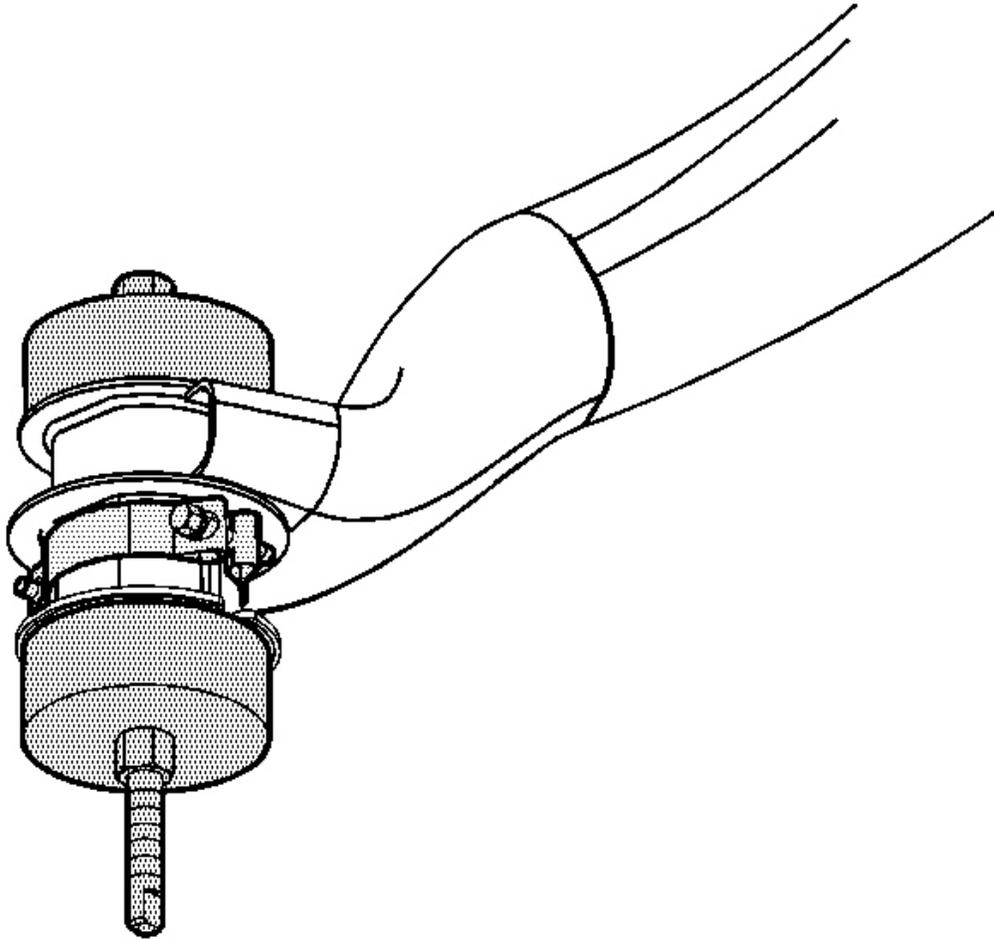


Fig. 115: View Of J-45725, Mount & Suspension Crossmember
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the mount to the front of the suspension crossmember.
6. Install **J-45725** to the mount and the suspension crossmember. See **Special Tools**.

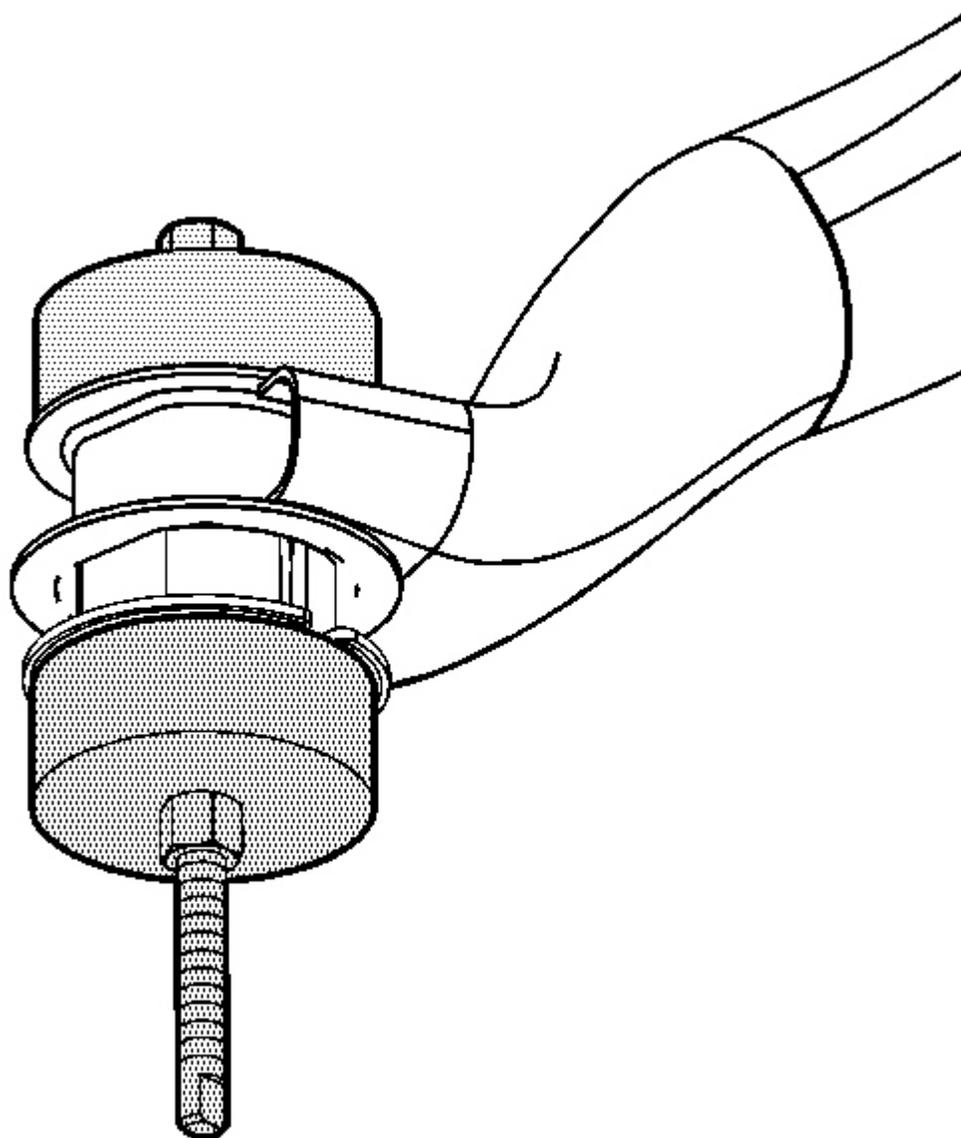


Fig. 116: Identifying Mount Is Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the mount until the mount is halfway recessed in the suspension crossmember. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

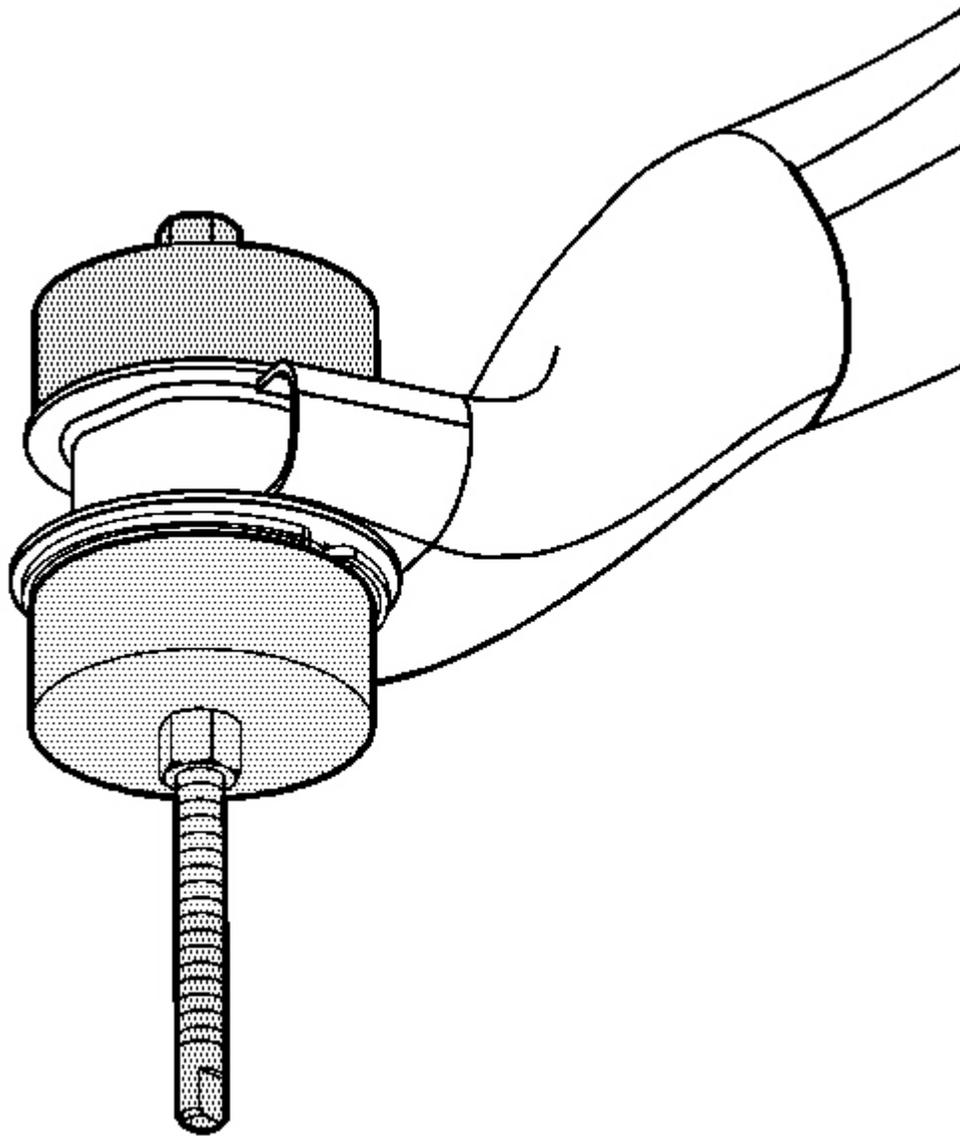


Fig. 117: View Of Mount Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the mount until the flange lip of the mount is fully seated to the bottom of the suspension crossmember. See **Special Tools**.
10. Remove **J-45725** from the mount and the suspension crossmember. See **Special Tools**.

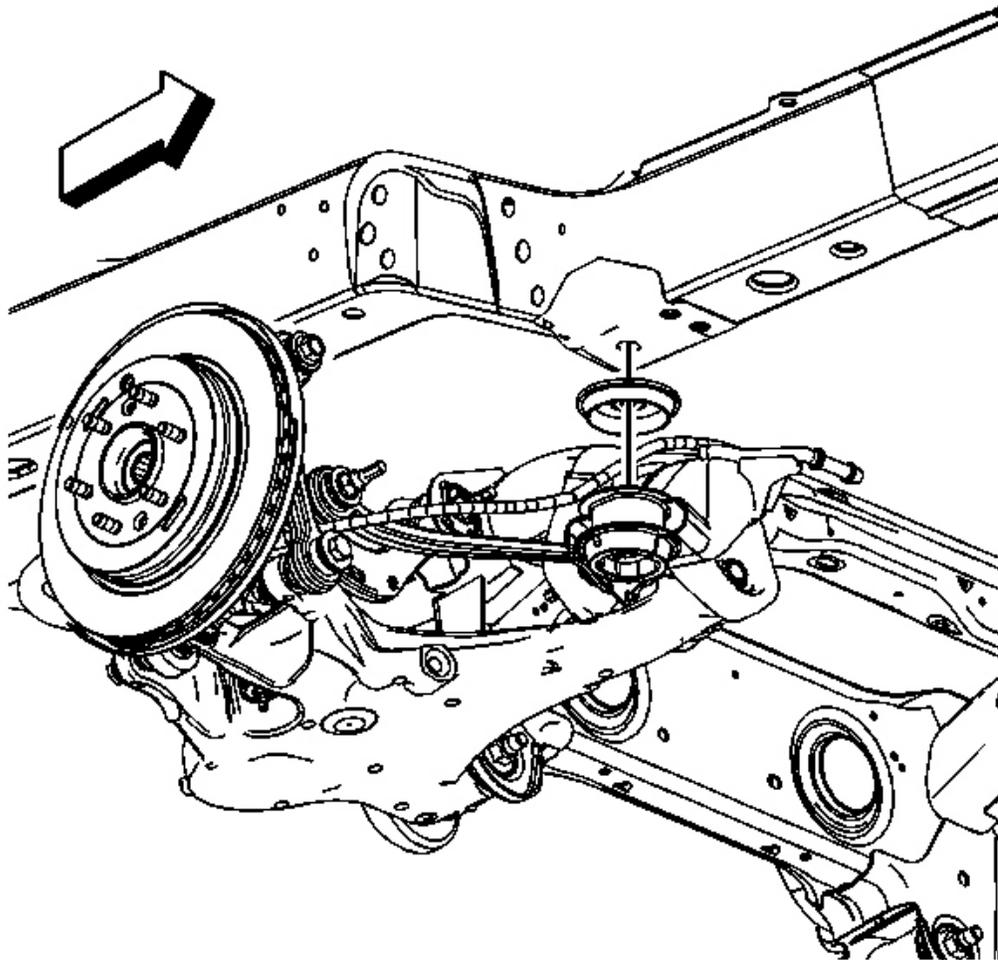


Fig. 118: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

11. Install the upper mount.
12. Raise the suspension crossmember.

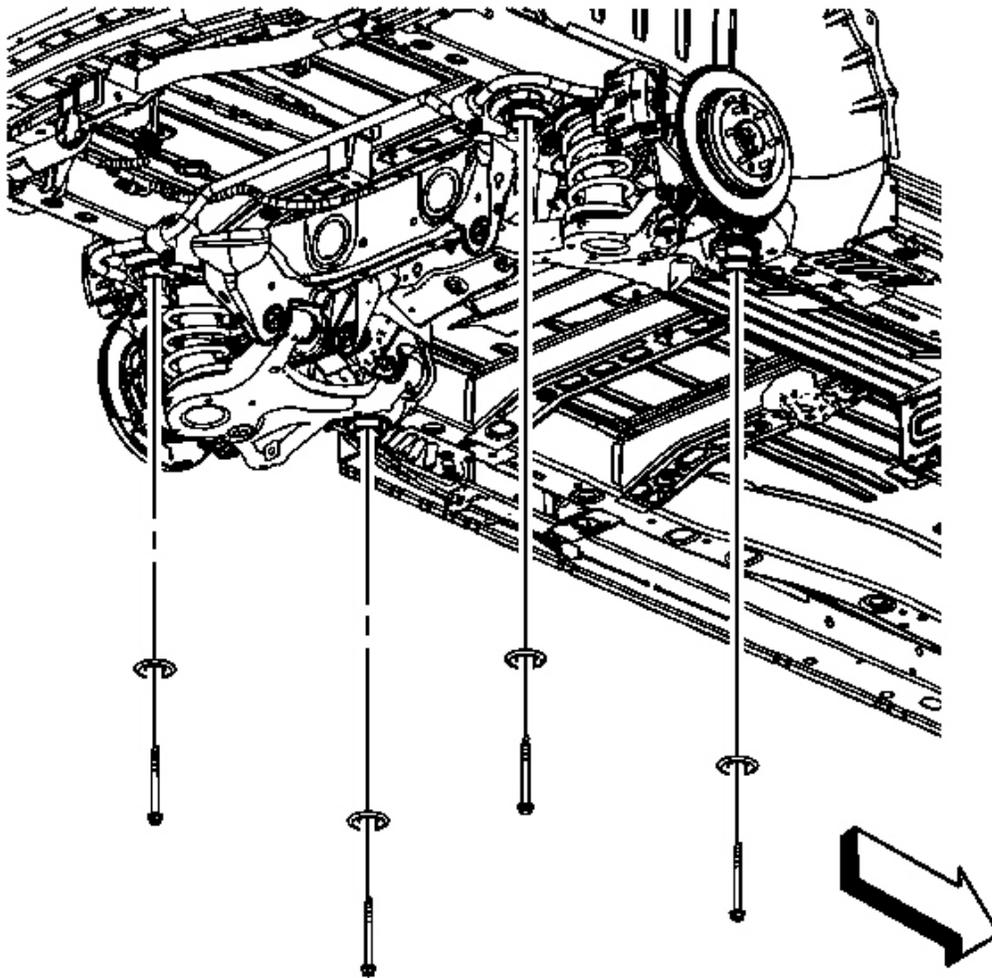


Fig. 119: Identifying Suspension Crossmember To Body Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the suspension crossmember mount bolt does not screw in smoothly, run a tap through the frame crossmember nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody. Do not over tighten the body mount. Over tightening may collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

13. Install the suspension crossmember to body bolts.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

14. Remove the jackstands.

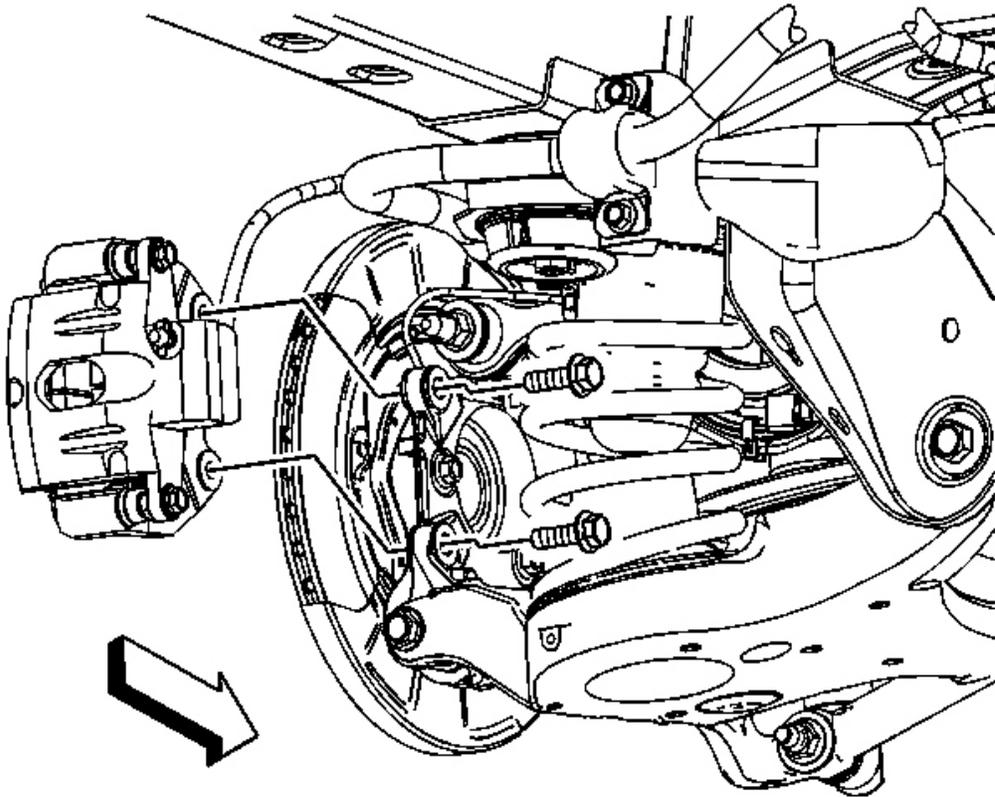


Fig. 120: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

15. Install the rear brake caliper bracket and bolts. Refer to Rear Brake Caliper Bracket Replacement .

16. Install the rear tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .

17. Lower the vehicle.
18. Install the spare tire.

REAR SUSPENSION SUPPORT LOWER MOUNT REPLACEMENT - FRONT (ALL WHEEL DRIVE)

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Remove the spare tire.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .

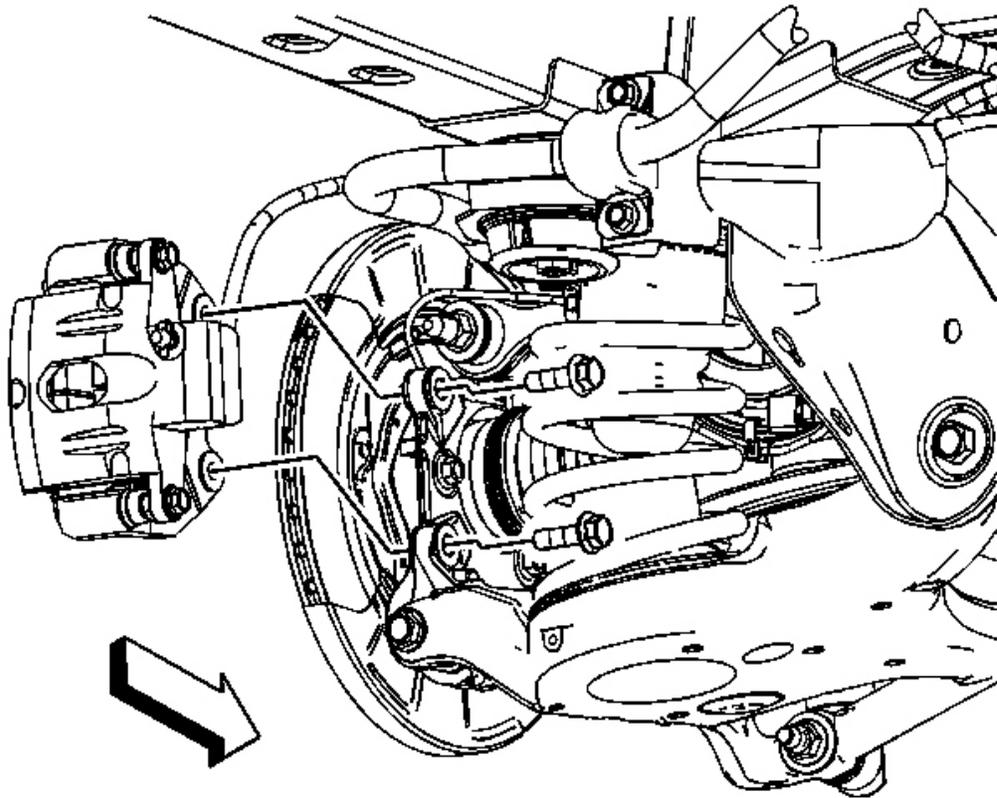


Fig. 121: View Of Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear brake caliper bracket bolts.

IMPORTANT: Support the rear brake calipers from the vehicle body not the suspension to prevent stressing of the brake hoses.

5. Support the rear brake caliper.
6. Support the exhaust system on a suitable stand and disconnect the rubber insulator hangers from the exhaust system.
7. Lower the exhaust only enough to allow lowering of the suspension crossmember 38 mm (1.5 in).
8. Install a jackstand under the front of the rear drive module.

9. Install jackstands under the front and rear of the suspension crossmember.

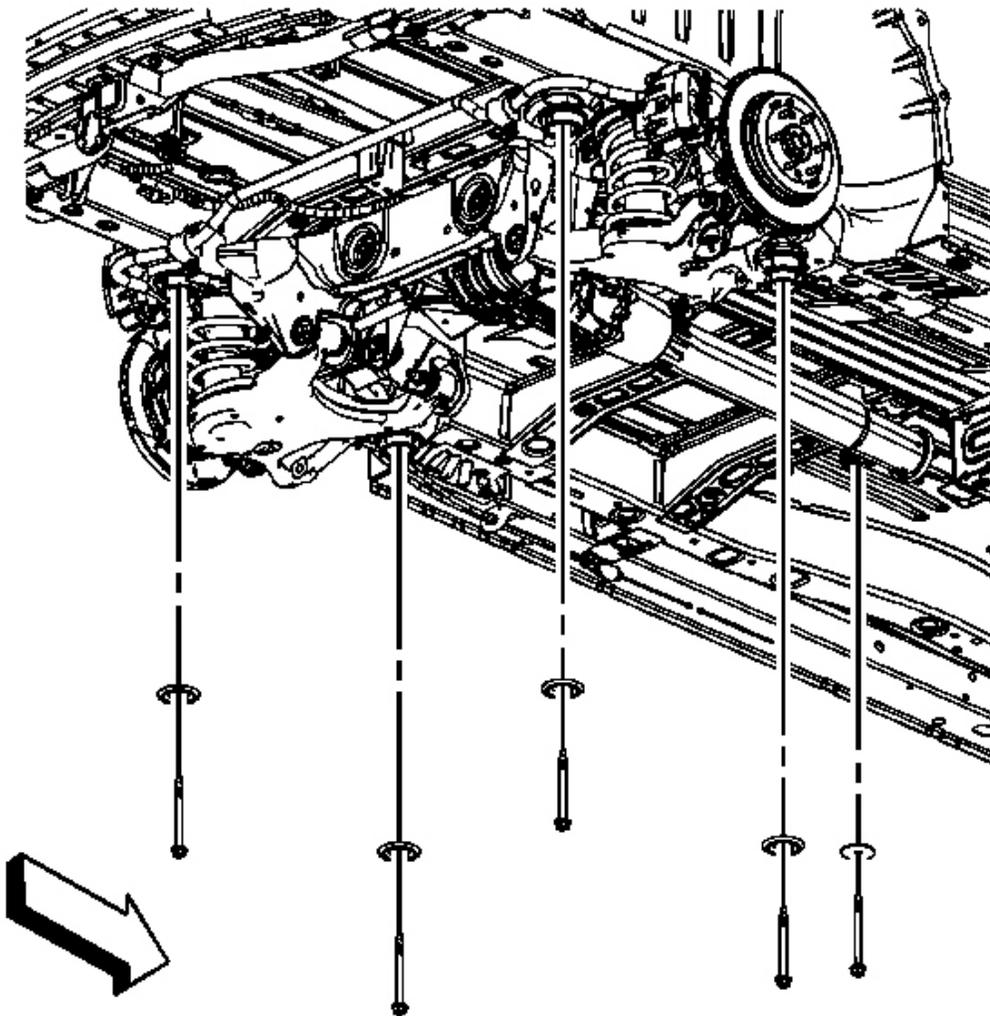


Fig. 122: View Of Suspension Crossmember To Body Bolts & Rear Axle Differential To Body Bolt

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Both the front and rear of the rear drive module must be lowered equally to prevent over stressing the rear drive module bushing and suspension crossmember mounts.

10. Remove the suspension crossmember to body bolts.
11. Remove the rear axle differential to body bolt.

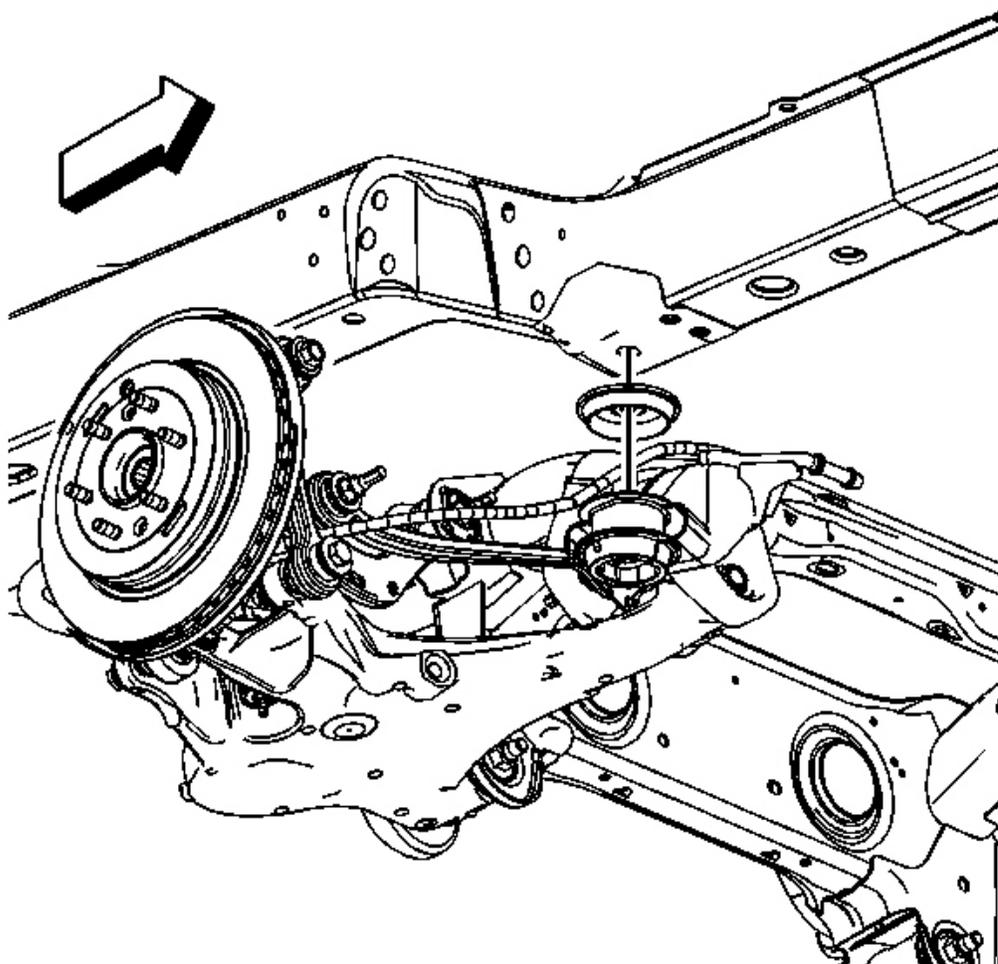


Fig. 123: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

12. Lower the rear drive module and suspension crossmember only enough to service the mount, approximately 38 mm (1.5 in).
13. Remove the upper mount.

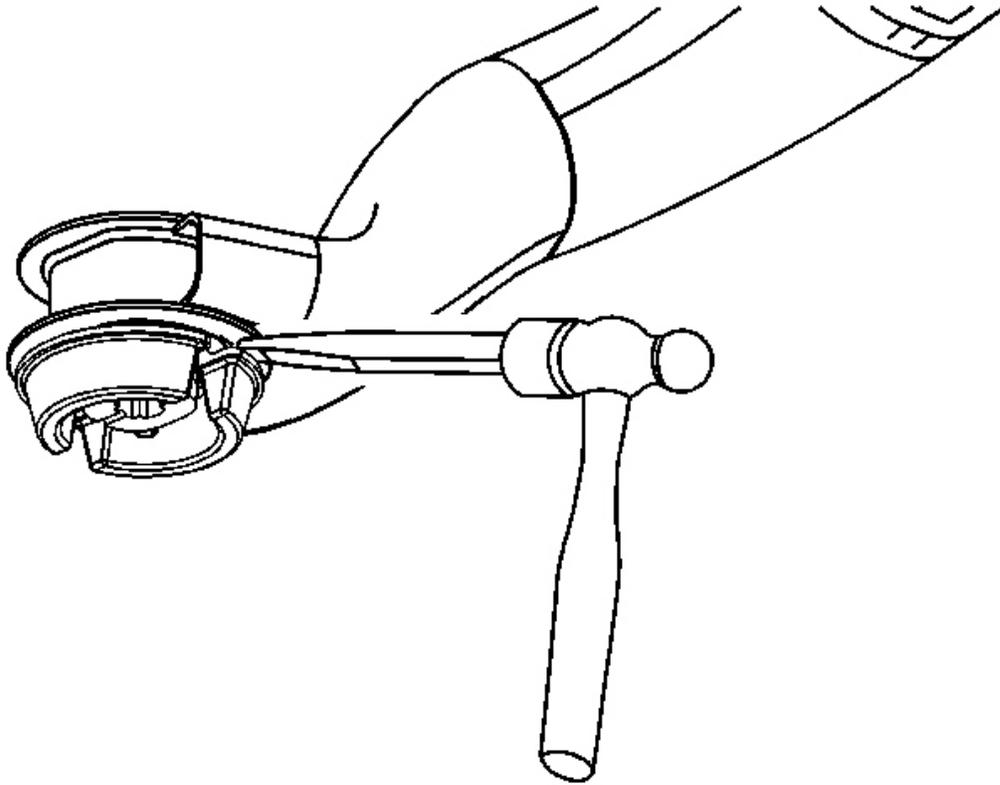


Fig. 124: Identifying Lower Mount & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

14. Remove the lower mount using a flat chisel. Begin extracting the mount by guiding the wedge of the chisel tip between the mount flange lip and the suspension crossmember.

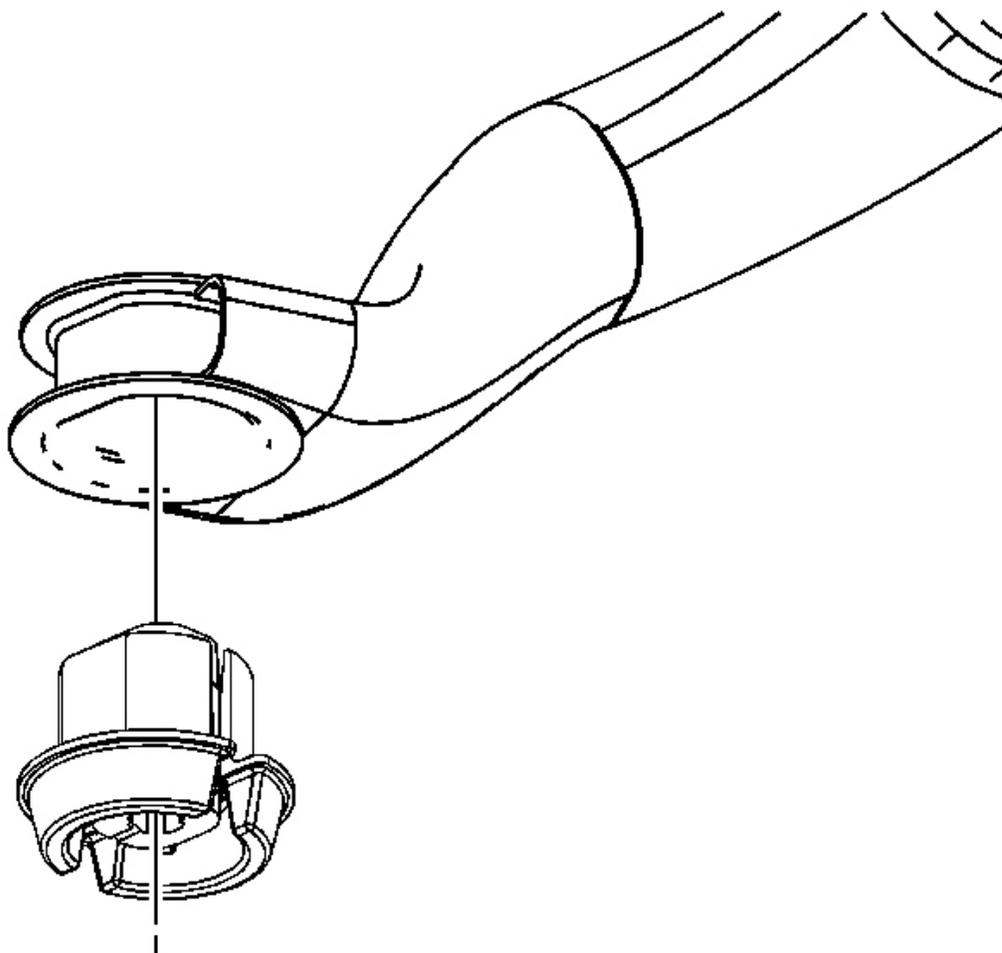


Fig. 125: View Of Lower Mount
Courtesy of GENERAL MOTORS CORP.

15. Continue extracting the mount until it is fully removed from the suspension crossmember.

Installation Procedure

1. Clean the suspension crossmember mount opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the suspension crossmember mount opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the suspension crossmember mount.

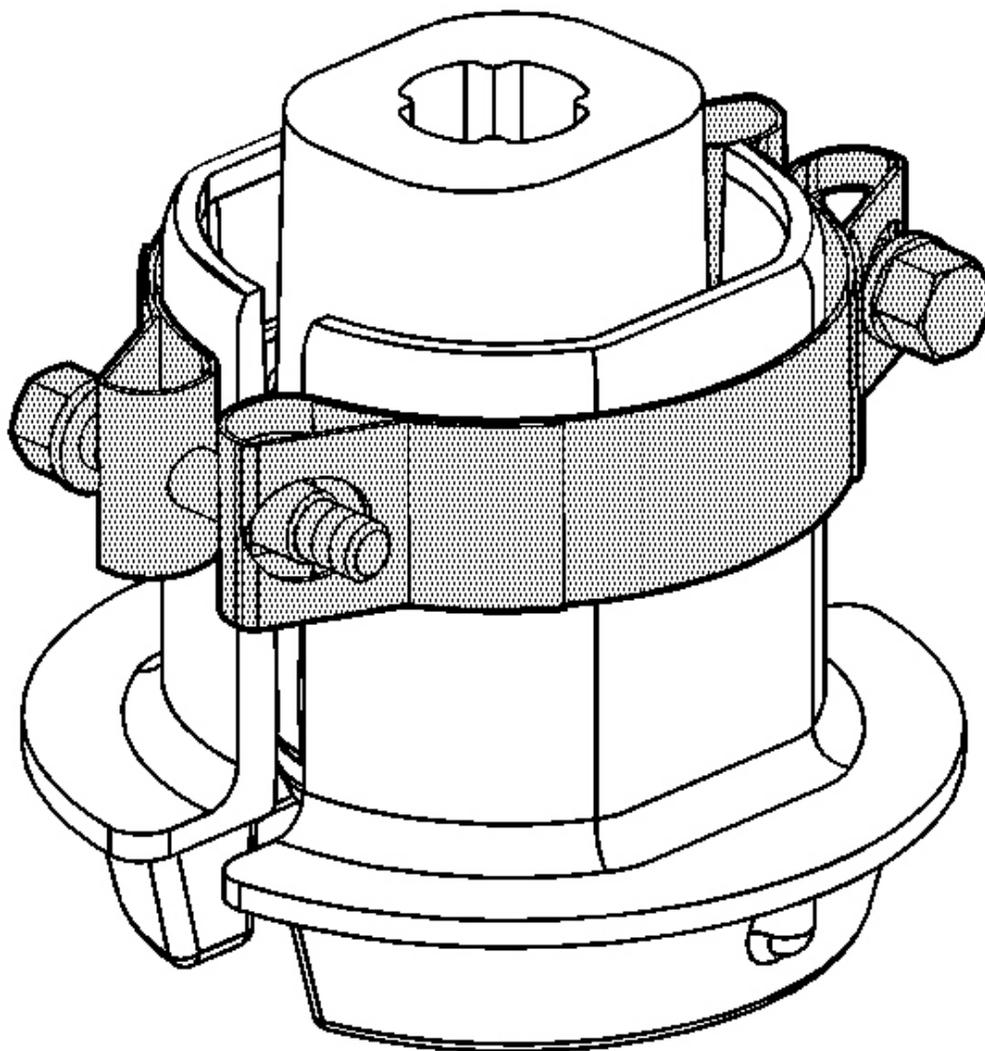


Fig. 126: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the mount about 1/8 inch from the top of the mount. See **Special Tools**.

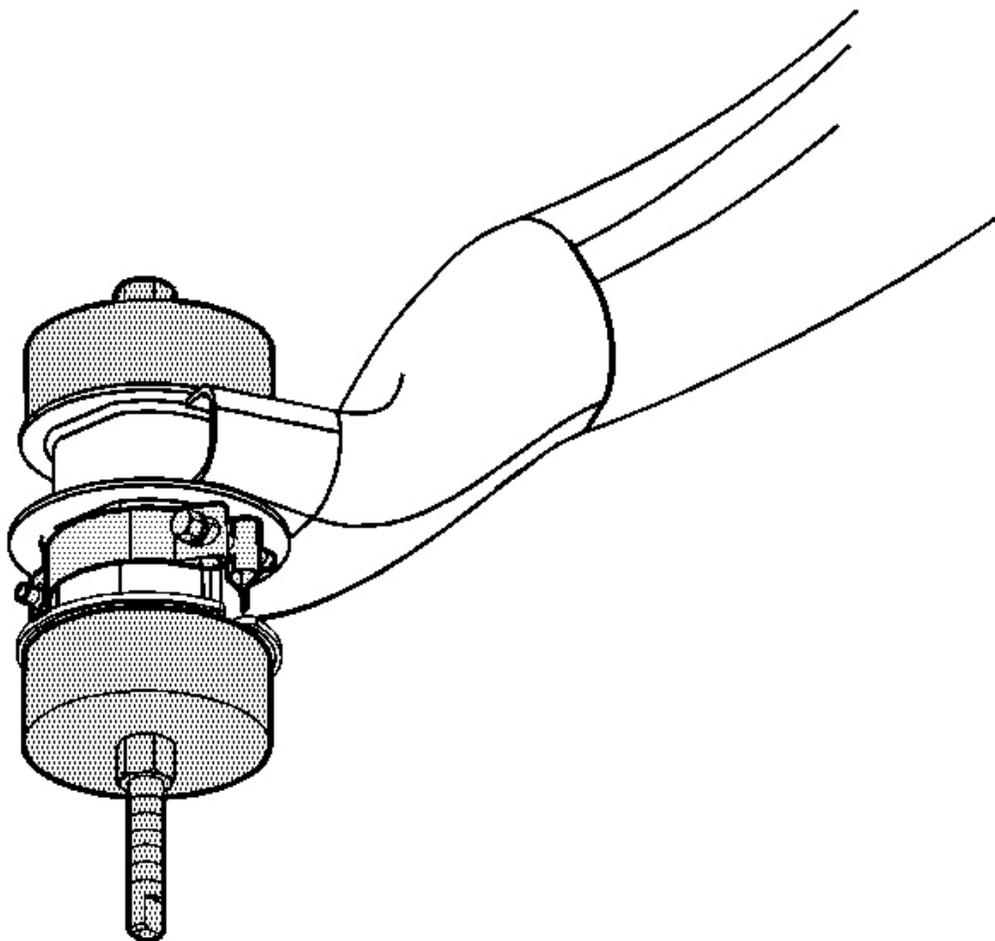


Fig. 127: View Of J-45725, Mount & Suspension Crossmember
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the mount to the front of the suspension crossmember.
6. Install **J-45725** to the mount and the suspension crossmember. See **Special Tools**.

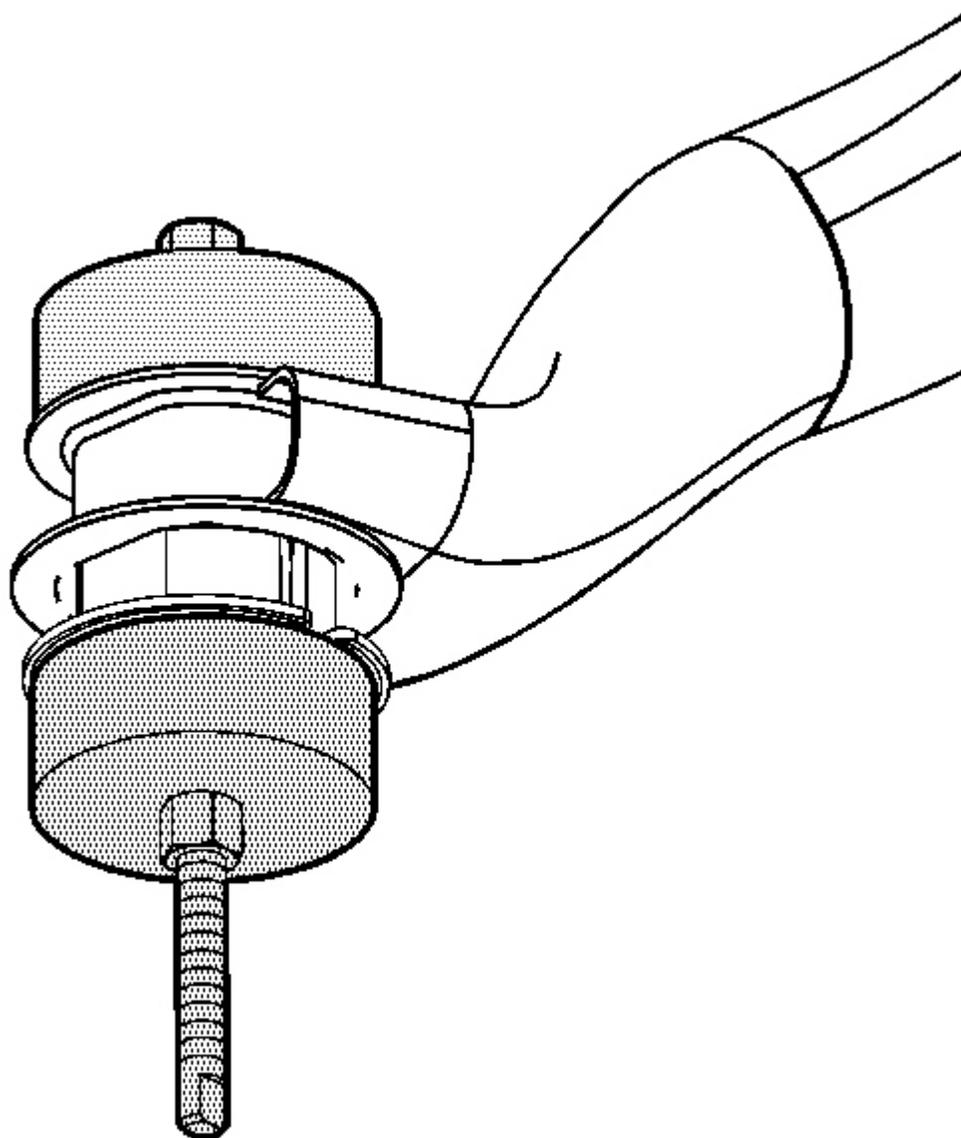


Fig. 128: Identifying Mount Is Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the mount until the mount is halfway recessed in the suspension crossmember. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

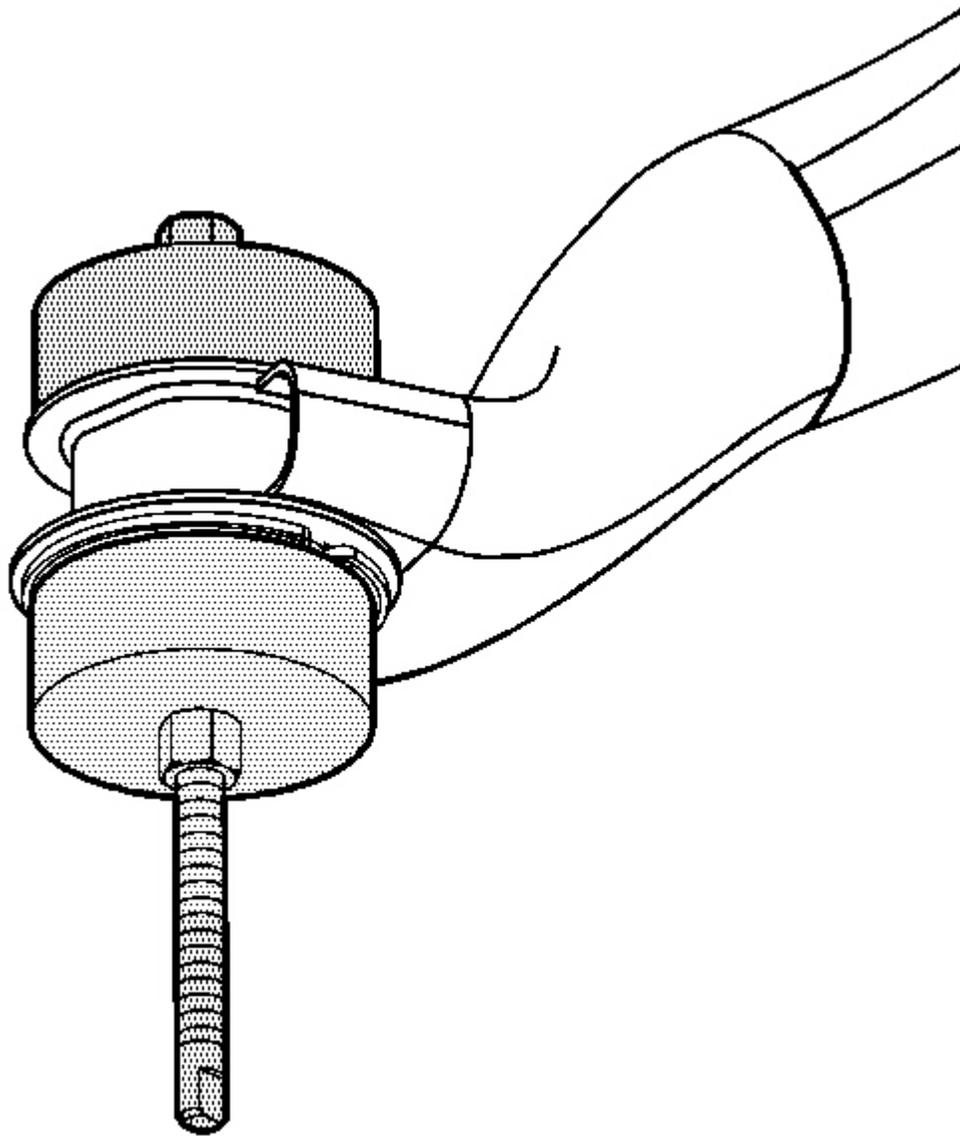


Fig. 129: View Of Mount Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the mount until the flange lip of the mount is fully seated to the bottom of the suspension crossmember. See **Special Tools**.
10. Remove **J-45725** from the mount and the suspension crossmember. See **Special Tools**.

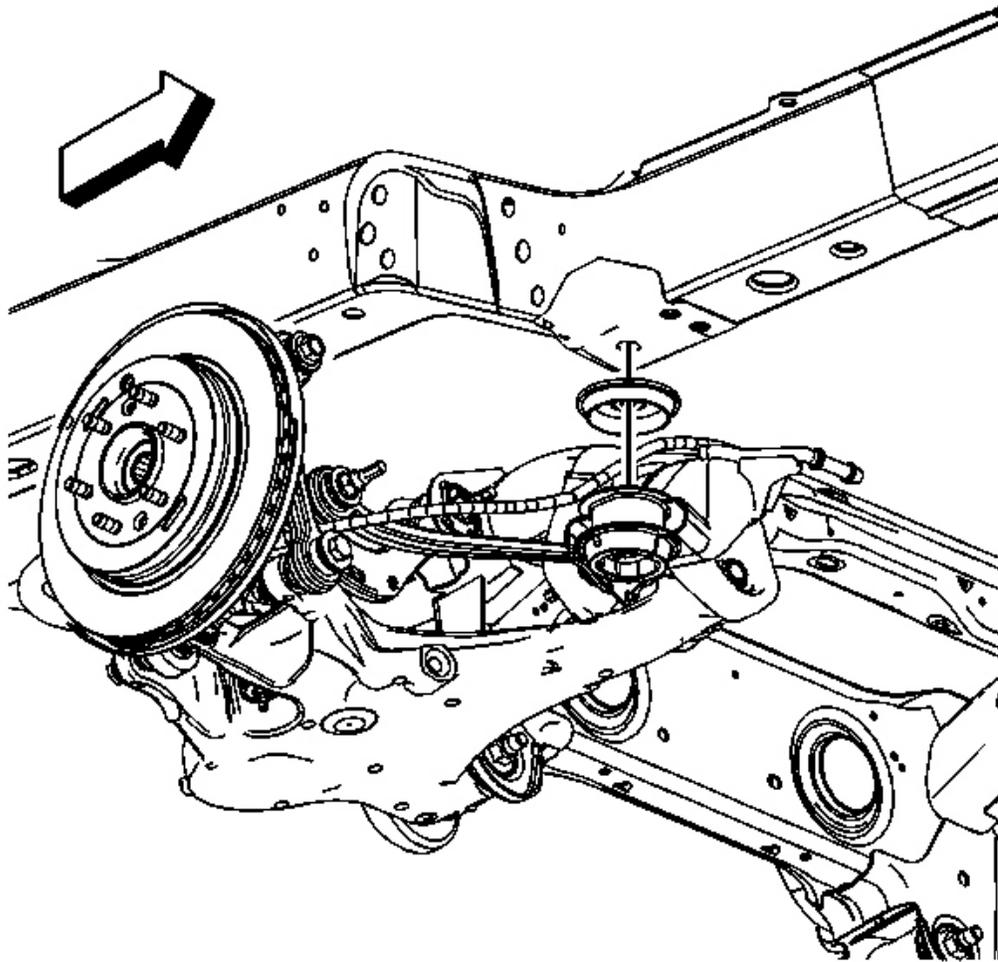


Fig. 130: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

11. Install the upper mount.
12. Raise the suspension crossmember and rear drive module.

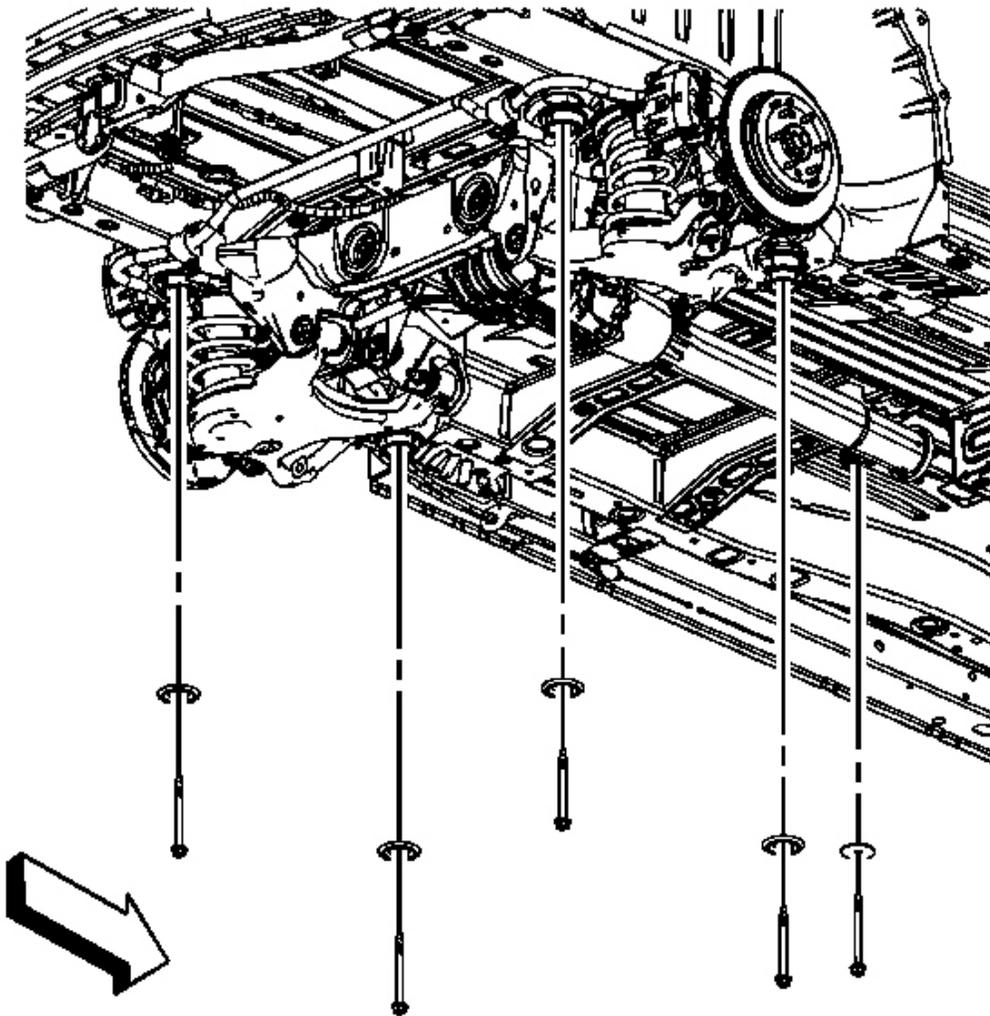


Fig. 131: View Of Suspension Crossmember To Body Bolts & Rear Axle Differential To Body Bolt

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the suspension crossmember mount bolt does not screw in smoothly, run a tap through the suspension crossmember nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody. Do not over tighten the body mount. Over tightening may

collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

13. Install the suspension crossmember to body bolts.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

14. Install the rear axle differential to body bolt.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

15. Remove the jackstands.

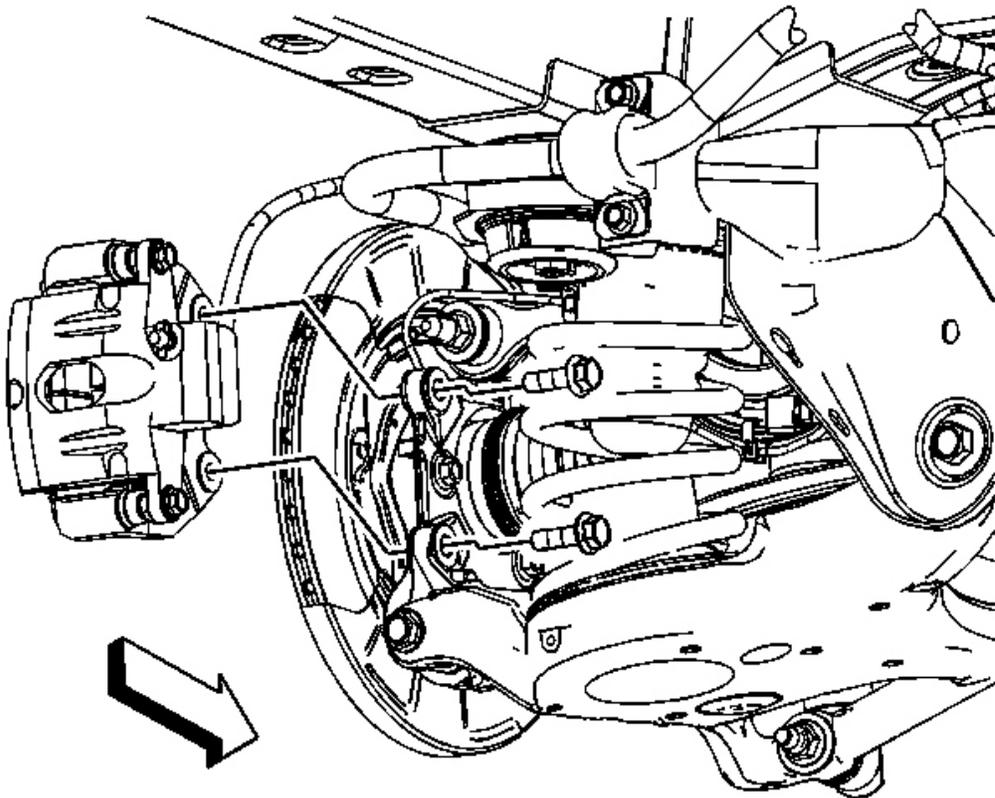


Fig. 132: View Of Rear Brake Caliper & Bracket Assemblies

Courtesy of GENERAL MOTORS CORP.

16. Install the rear brake caliper bracket and bolts. Refer to **Rear Brake Caliper Bracket Replacement** .
17. Install the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
18. Lower the vehicle.
19. Install the spare tire.

REAR SUSPENSION SUPPORT LOWER MOUNT REPLACEMENT - REAR (FRONT WHEEL DRIVE)

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Remove the spare tire.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .

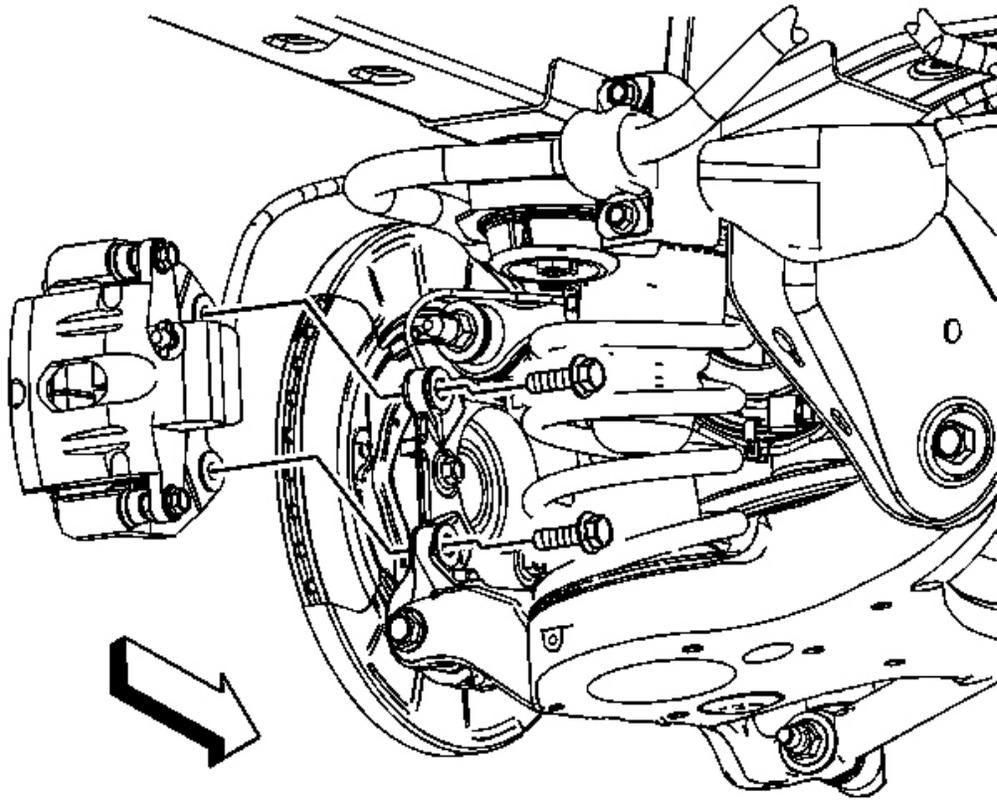


Fig. 133: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear brake caliper bracket bolts.

IMPORTANT: Support the rear brake calipers from the vehicle body not the suspension to prevent stressing of the brake hoses.

5. Support the rear brake caliper.
6. Support the exhaust system on a suitable stand and disconnect the rubber insulator hangers from the exhaust system.
7. Lower the exhaust only enough to allow lowering of the suspension crossmember 38 mm (1.5 in).
8. Install jackstands under the front and rear of the suspension crossmember.

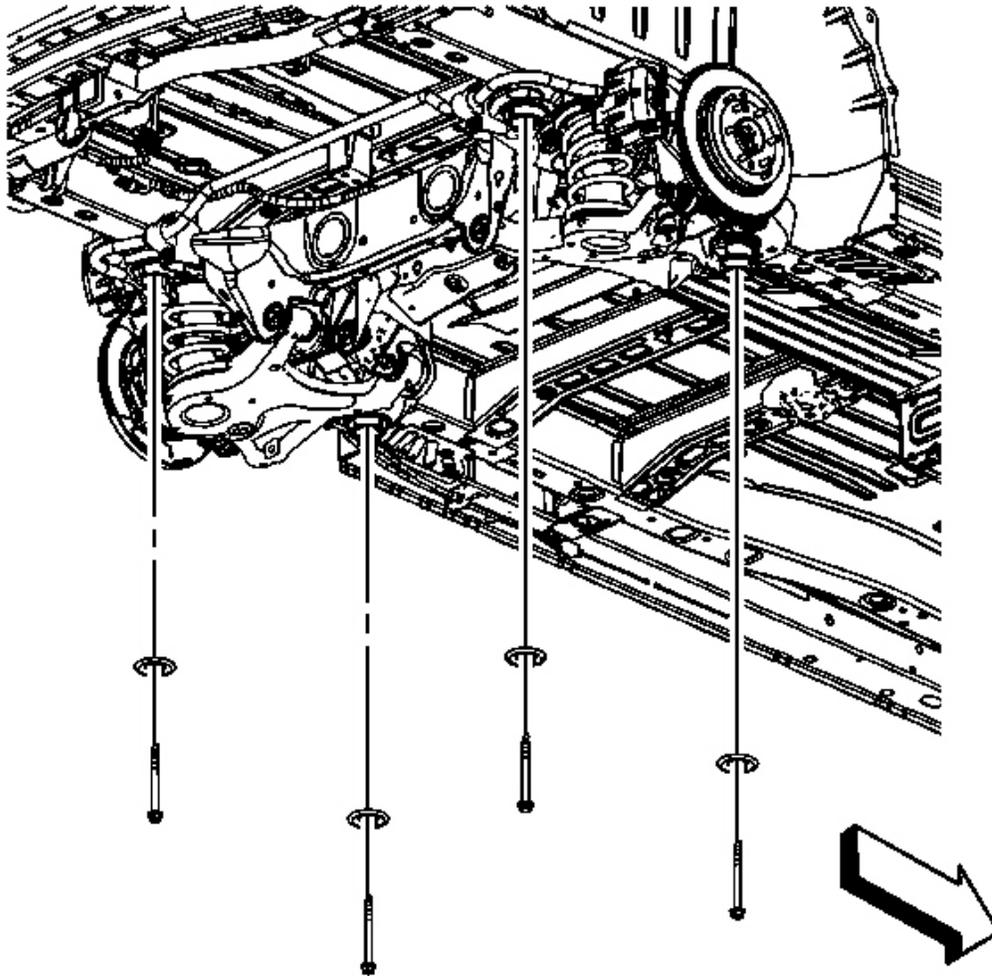


Fig. 134: Identifying Suspension Crossmember To Body Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Both the front and rear of the suspension crossmember must be lowered equally to prevent over stressing the mounts.

9. Remove the suspension crossmember to body bolts.

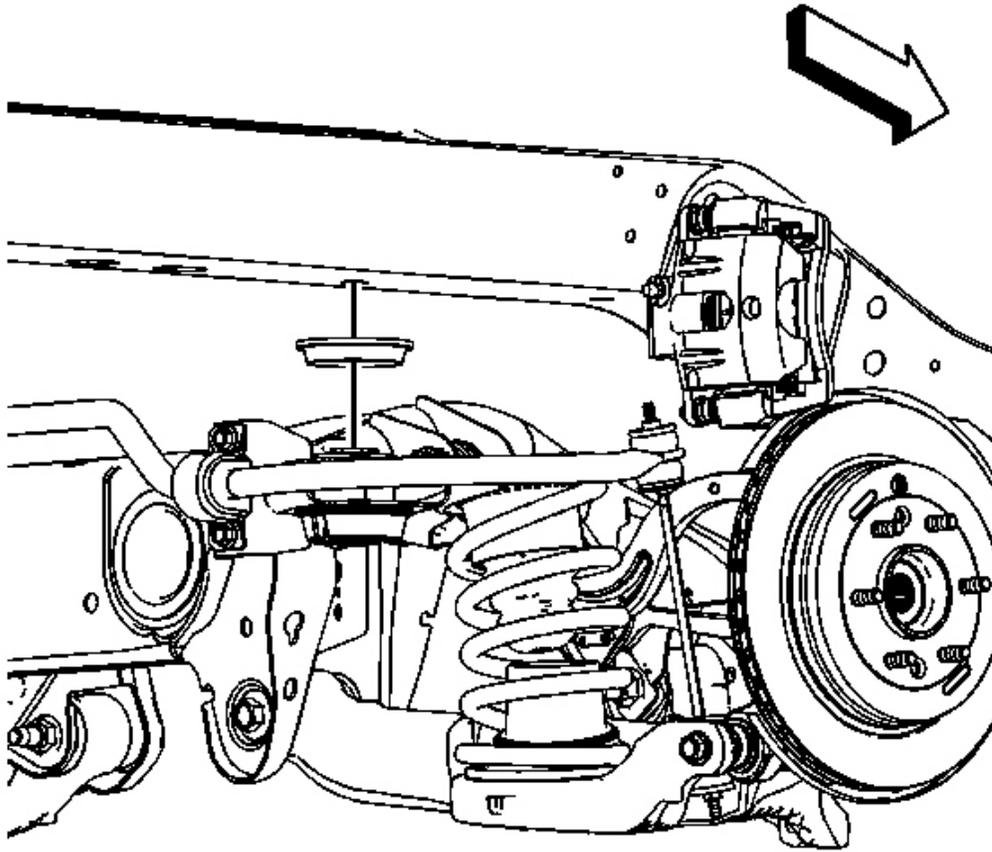


Fig. 135: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

10. Lower the suspension crossmember only enough to service the mount, approximately 38 mm (1.5 in).
11. Remove the upper mount.

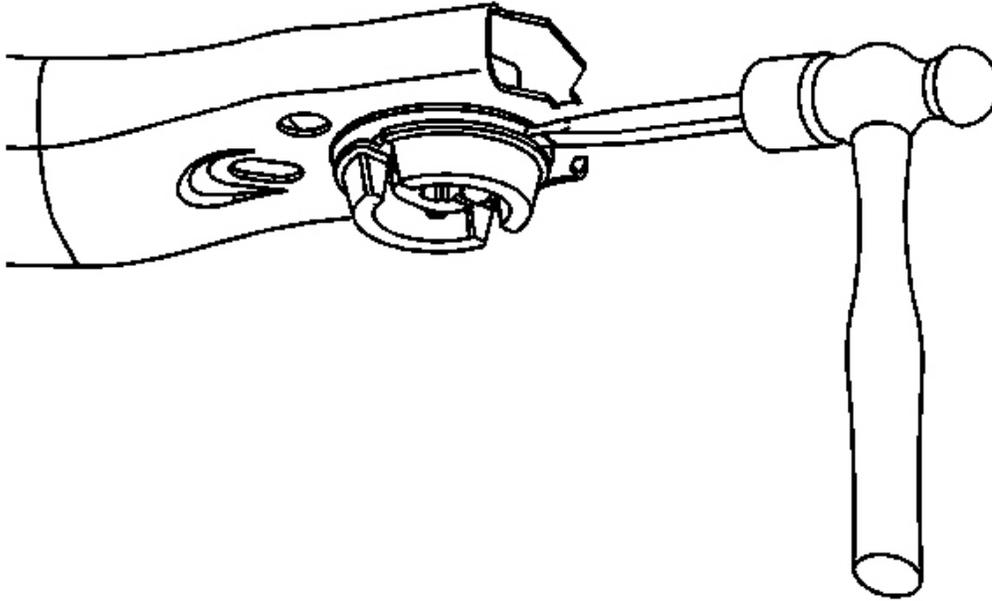


Fig. 136: Identifying Lower Mount & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

12. Remove the lower mount using a flat chisel. Begin extracting the mount by guiding the wedge of the chisel tip between the mount flange lip and the suspension crossmember.

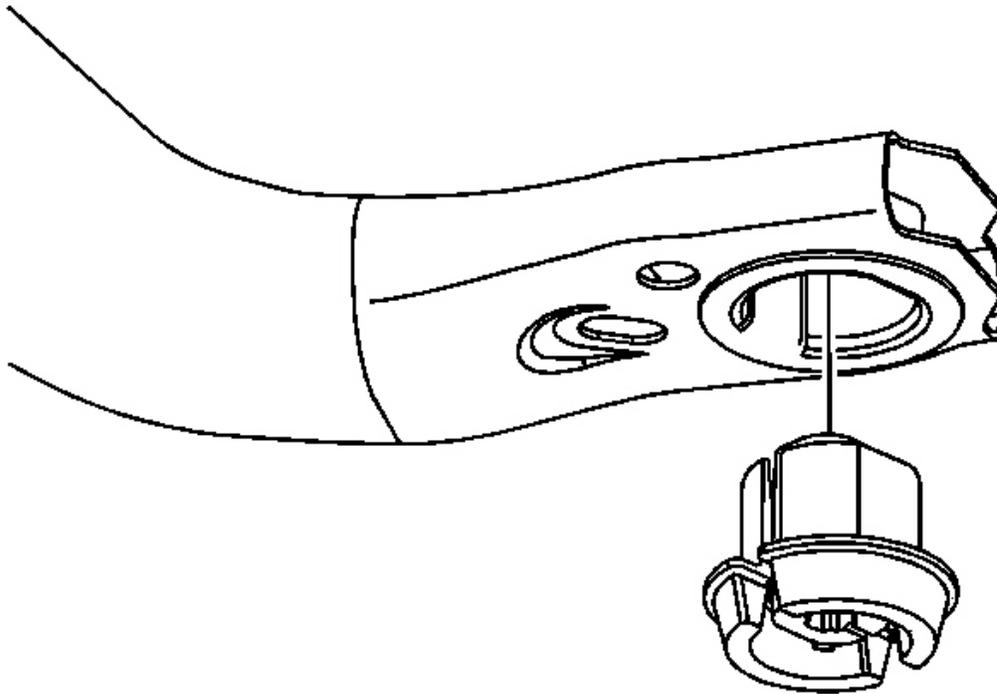


Fig. 137: Identifying Lower Mount
Courtesy of GENERAL MOTORS CORP.

13. Continue extracting the mount until it is fully removed from the suspension crossmember.

Installation Procedure

1. Clean the frame mount opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the suspension crossmember mount opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the suspension crossmember mount.

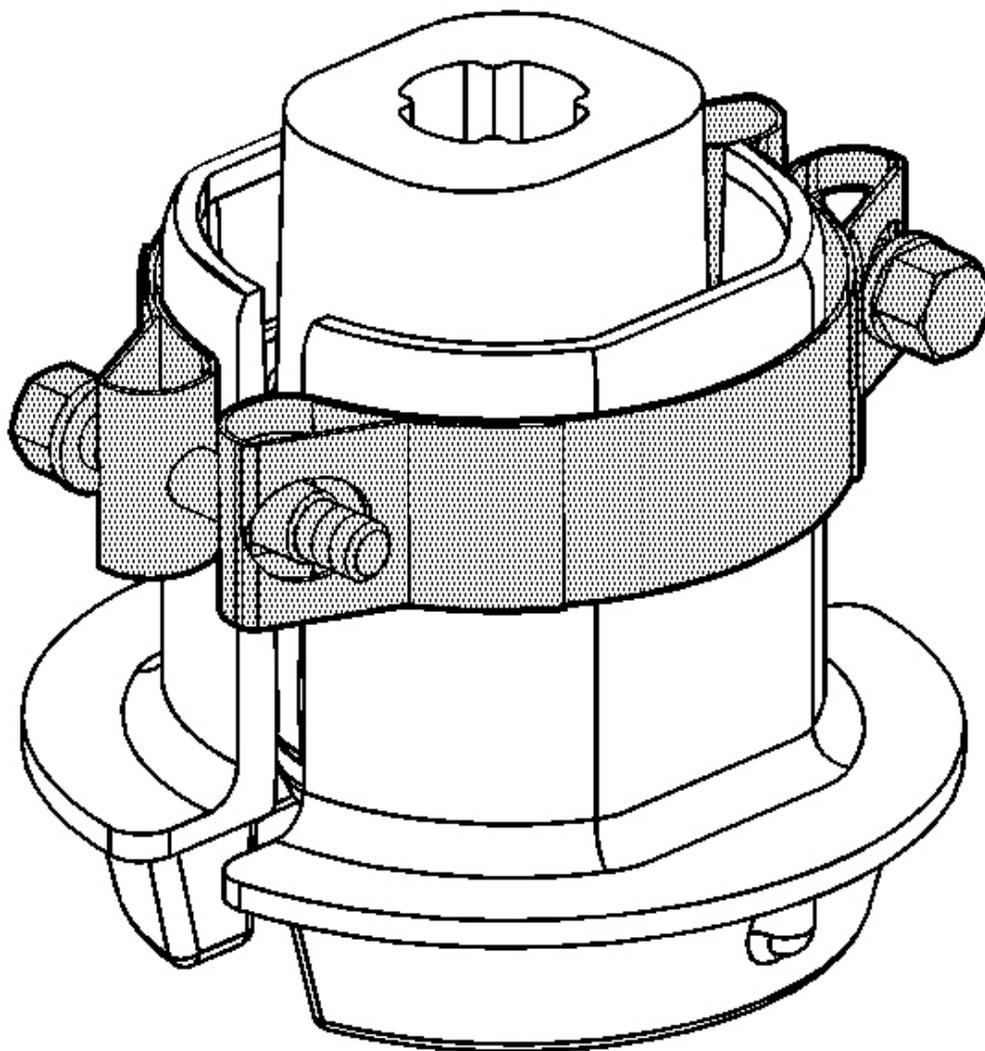


Fig. 138: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the mount about 1/8 inch from the top of the mount. See **Special Tools**.

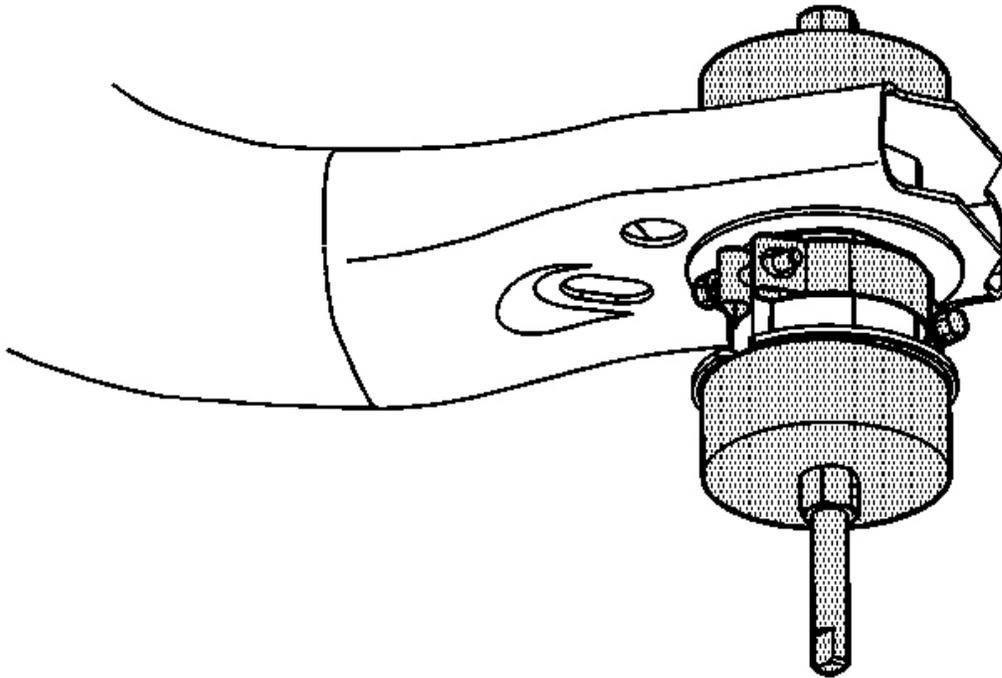


Fig. 139: View Of J-45725, Mount & Suspension Crossmember
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the mount to the front of the suspension crossmember.
6. Install **J-45725** to the mount and the suspension crossmember. See **Special Tools**.

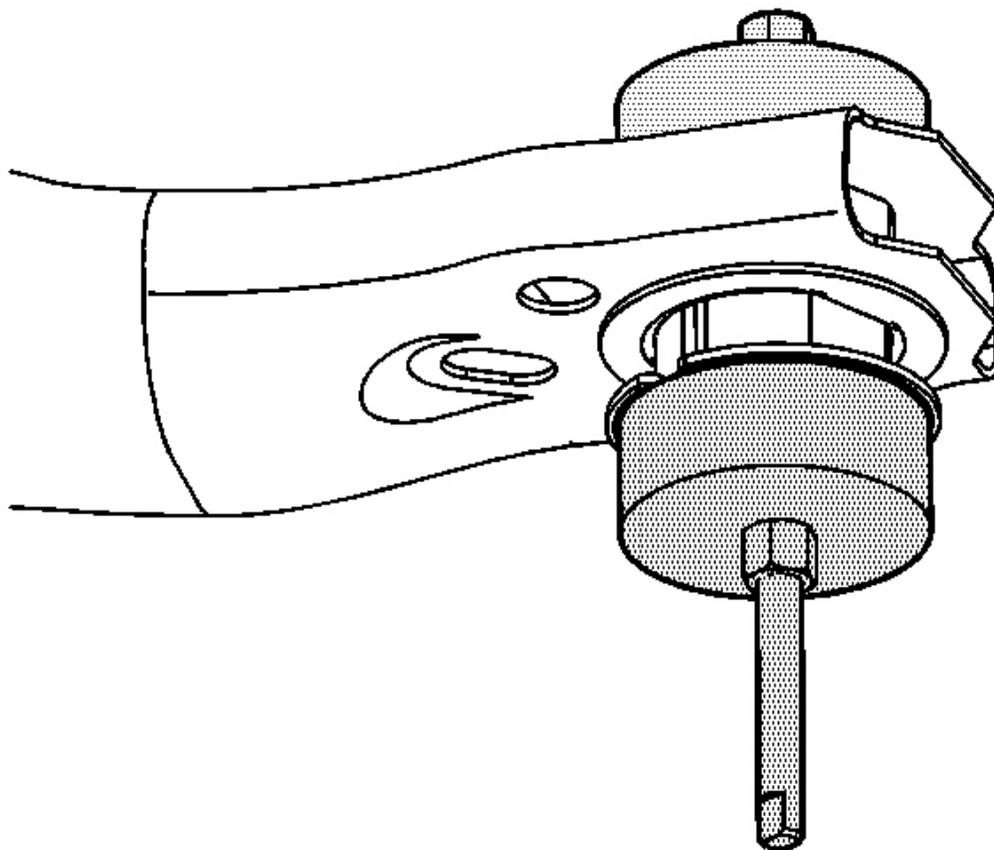


Fig. 140: Identifying Mount Is Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the mount until the mount is halfway recessed in the suspension crossmember. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

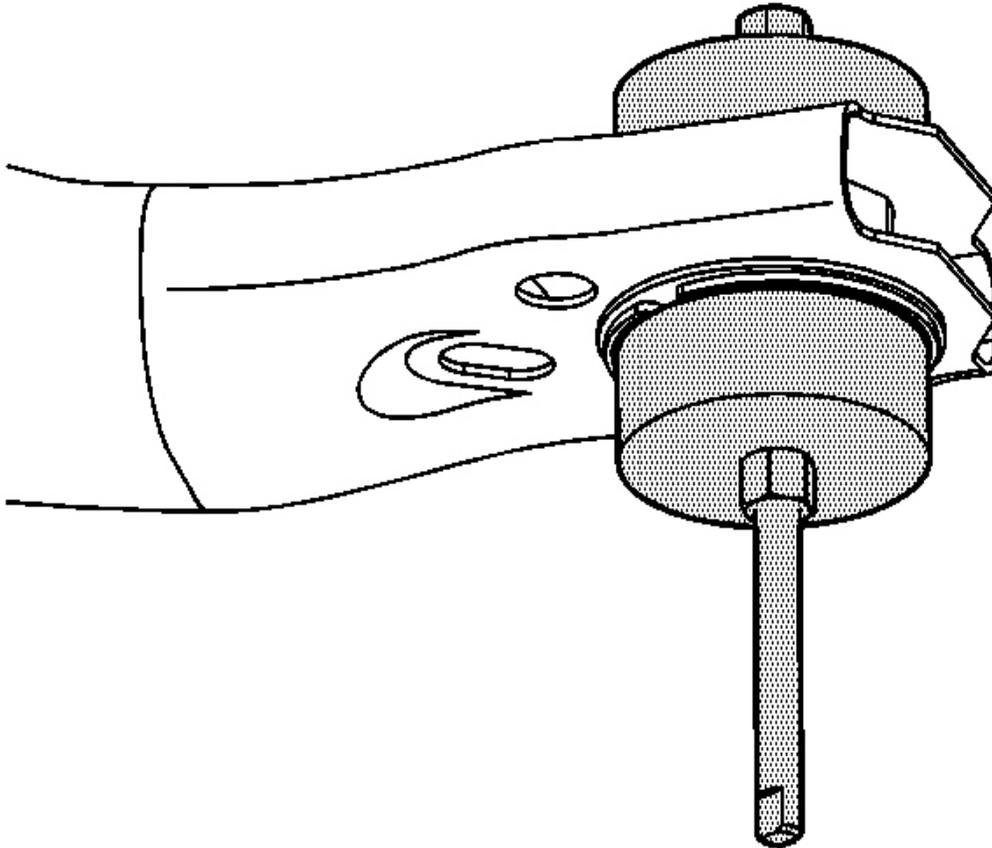


Fig. 141: Identifying Mount Is Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the mount until the flange lip of the mount is fully seated to the bottom of the suspension crossmember. See **Special Tools**.
10. Remove **J-45725** from the mount and the suspension crossmember. See **Special Tools**.

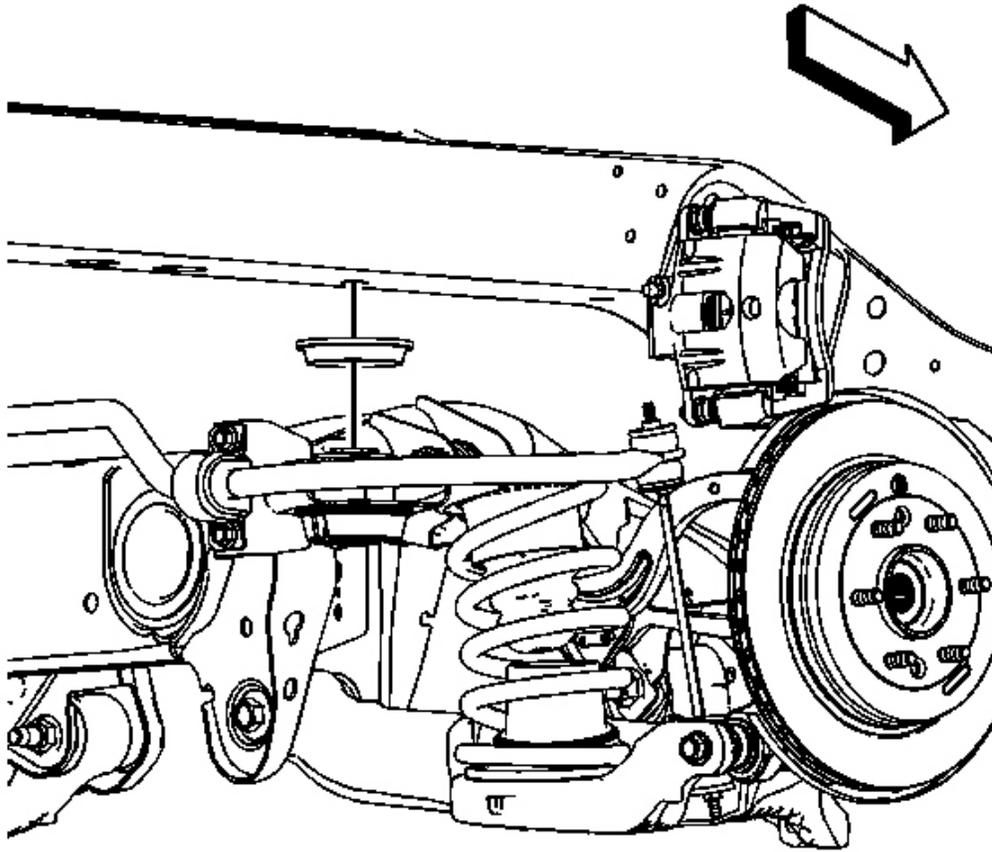


Fig. 142: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

11. Install the upper mount.
12. Raise the suspension crossmember.

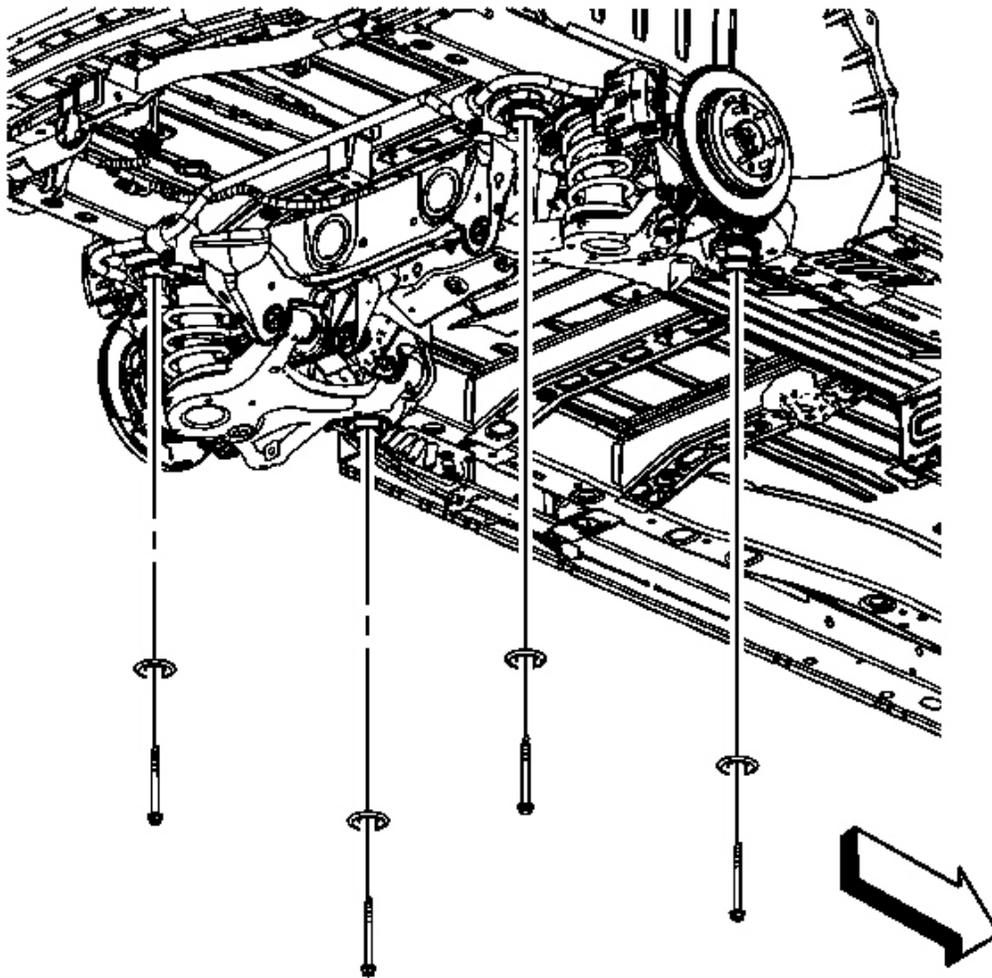


Fig. 143: Identifying Suspension Crossmember To Body Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the suspension crossmember mount bolt does not screw in smoothly, run a tap through the frame crossmember nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody. Do not over tighten the body mount. Over tightening may collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

13. Install the suspension crossmember to body bolts.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

14. Remove the jackstands.

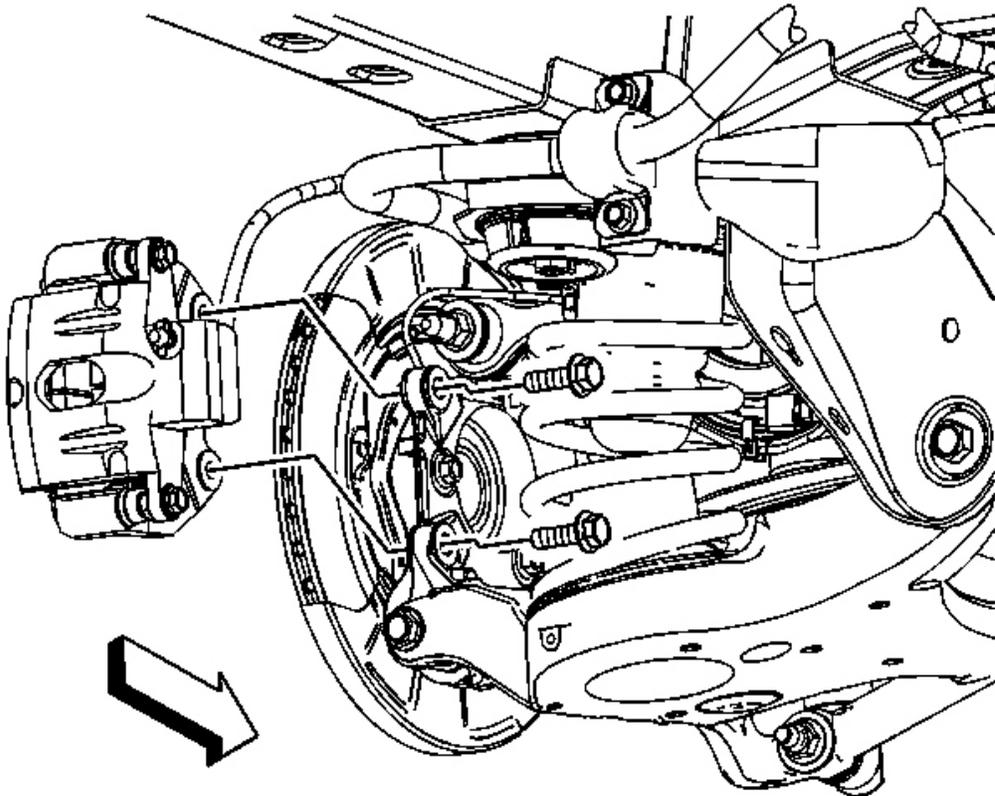


Fig. 144: Identifying Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

15. Install the rear brake caliper bracket and bolts. Refer to Rear Brake Caliper Bracket Replacement .
16. Install the rear tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .

17. Lower the vehicle.
18. Install the spare tire.

REAR SUSPENSION SUPPORT LOWER MOUNT REPLACEMENT - REAR (ALL WHEEL DRIVE DRIVE)

Tools Required

J-45725 Frame Bushing Installer. See **Special Tools**.

Removal Procedure

1. Remove the spare tire.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .

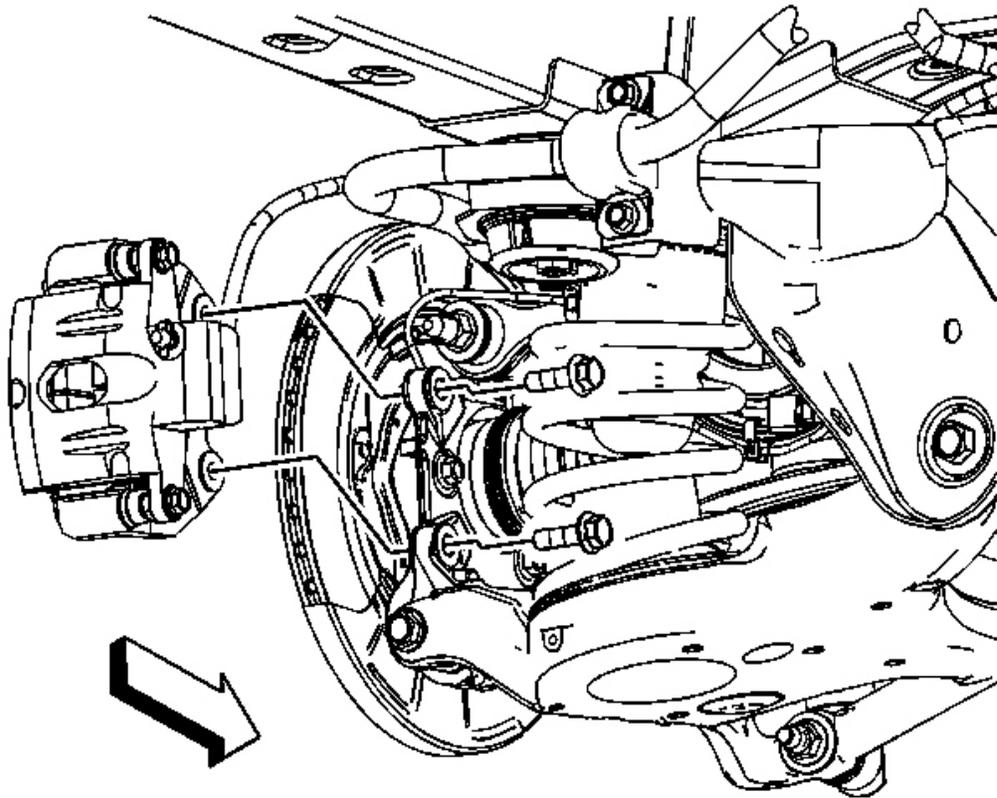


Fig. 145: View Of Rear Brake Caliper & Bracket Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear brake caliper bracket bolts.

IMPORTANT: Support the rear brake calipers from the vehicle body not the suspension to prevent stressing of the brake hoses.

5. Support the rear brake caliper.
6. Support the exhaust system on a suitable stand and disconnect the rubber insulator hangers from the exhaust system.
7. Lower the exhaust only enough to allow lowering of the suspension crossmember 38 mm (1.5 in).
8. Install a jackstand under the front of the rear drive module.

9. Install jackstands under the front and rear of the suspension crossmember.

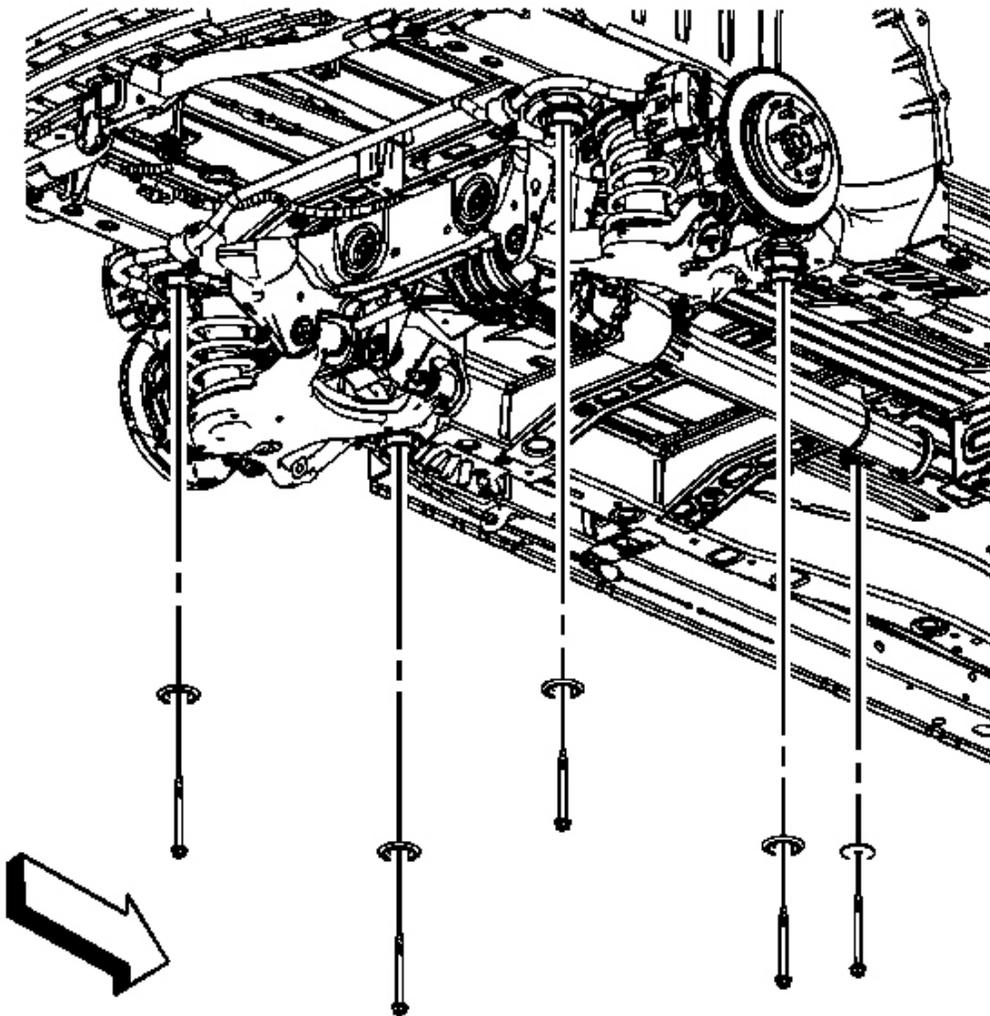


Fig. 146: View Of Suspension Crossmember To Body Bolts & Rear Axle Differential To Body Bolt

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Both the front and rear of the rear drive module must be lowered equally to prevent over stressing the rear drive module bushing and suspension crossmember mounts.

10. Remove the suspension crossmember to body bolts.
11. Remove the rear axle differential to body bolt.

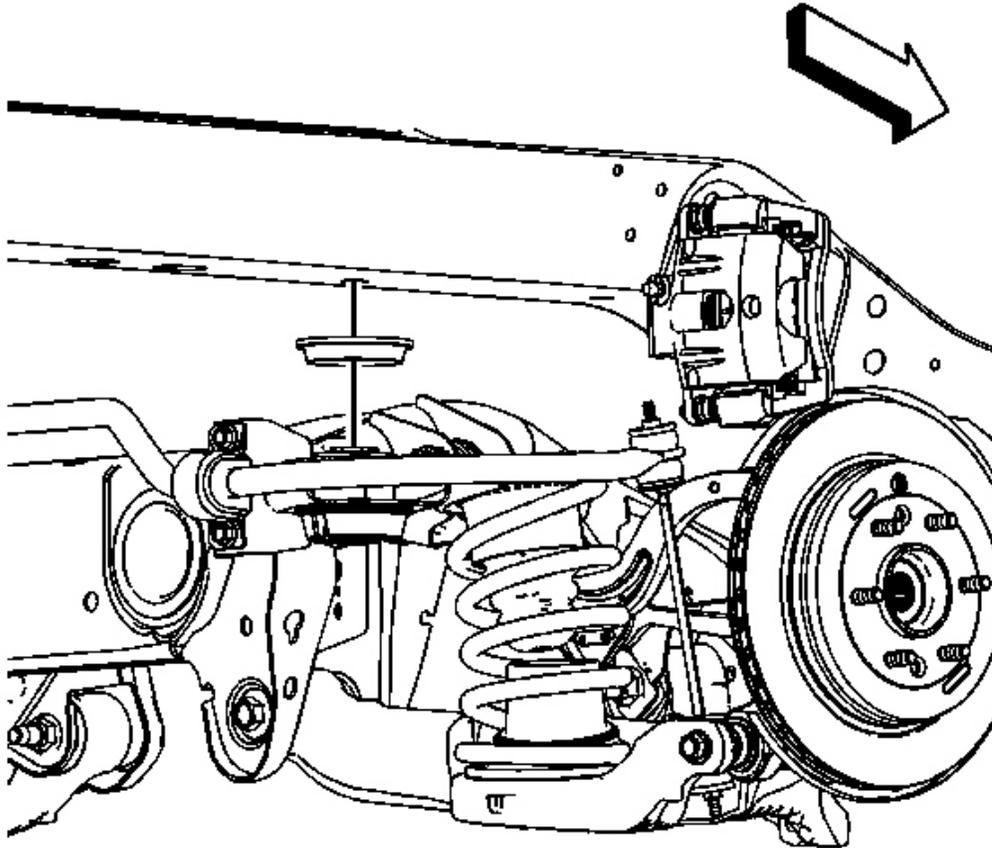


Fig. 147: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

12. Lower the rear drive module and suspension crossmember only enough to service the mount, approximately 38 mm (1.5 in).
13. Remove the upper mount.

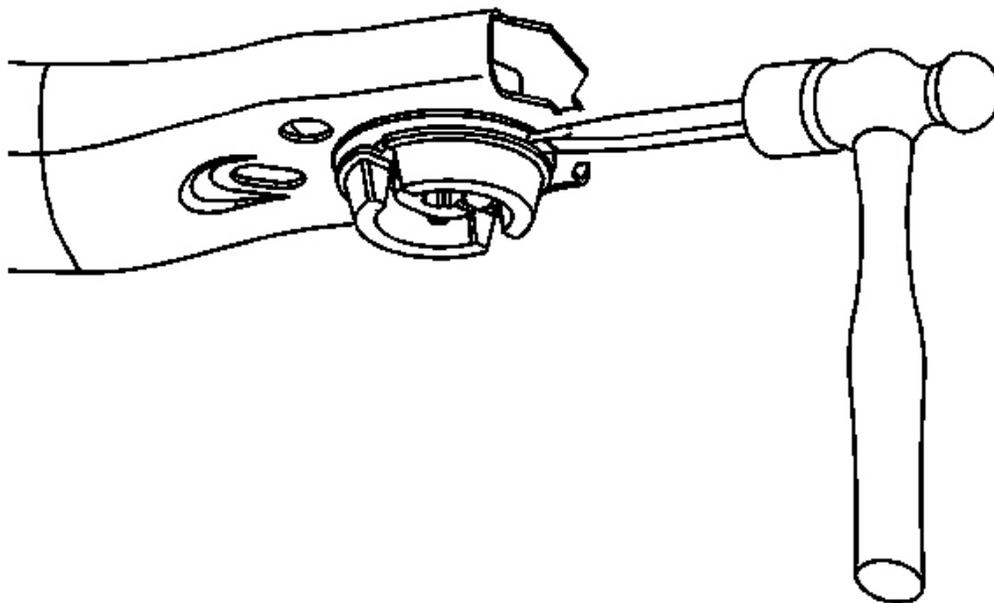


Fig. 148: Identifying Lower Mount & Flat Chisel
Courtesy of GENERAL MOTORS CORP.

14. Remove the lower mount using a flat chisel. Begin extracting the mount by guiding the wedge of the chisel tip between the mount flange lip and the suspension crossmember.

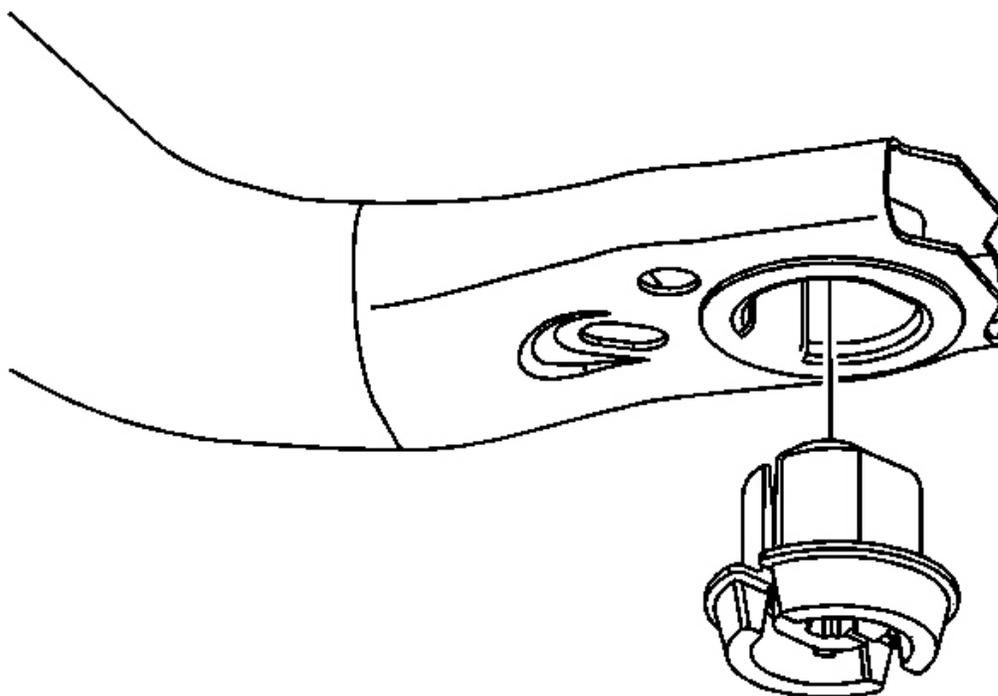


Fig. 149: Identifying Lower Mount
Courtesy of GENERAL MOTORS CORP.

15. Continue extracting the mount until it is fully removed from the suspension crossmember.

Installation Procedure

1. Clean the suspension crossmember mount opening.
2. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the inside of the suspension crossmember mount opening.
3. Apply a thin coat of rubber lubricant GM P/N 1051717 (Canadian P/N 5728223) or equivalent to the suspension crossmember mount.

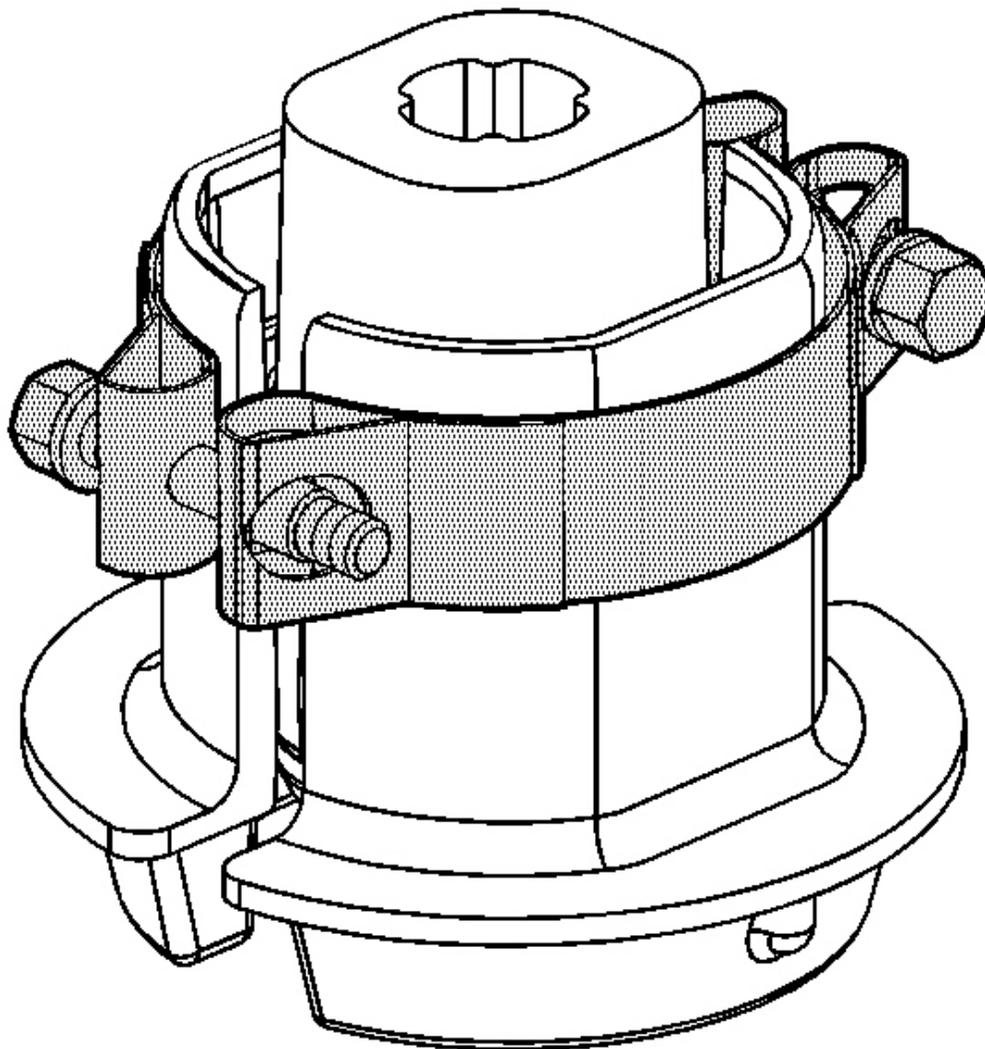


Fig. 150: Identifying Special Tool - J-45725
Courtesy of GENERAL MOTORS CORP.

4. Install clamp **J-45725** onto the mount about 1/8 inch from the top of the mount. See **Special Tools**.

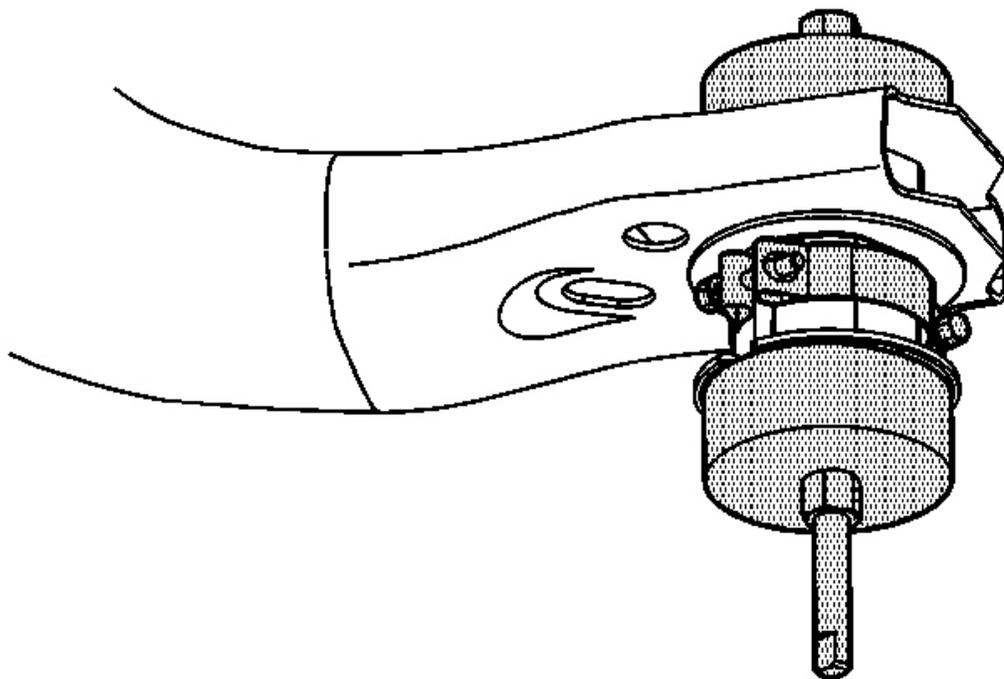


Fig. 151: View Of J-45725, Mount & Suspension Crossmember
Courtesy of GENERAL MOTORS CORP.

5. Align the split of the mount to the front of the suspension crossmember.
6. Install **J-45725** to the mount and the suspension crossmember. See **Special Tools**.

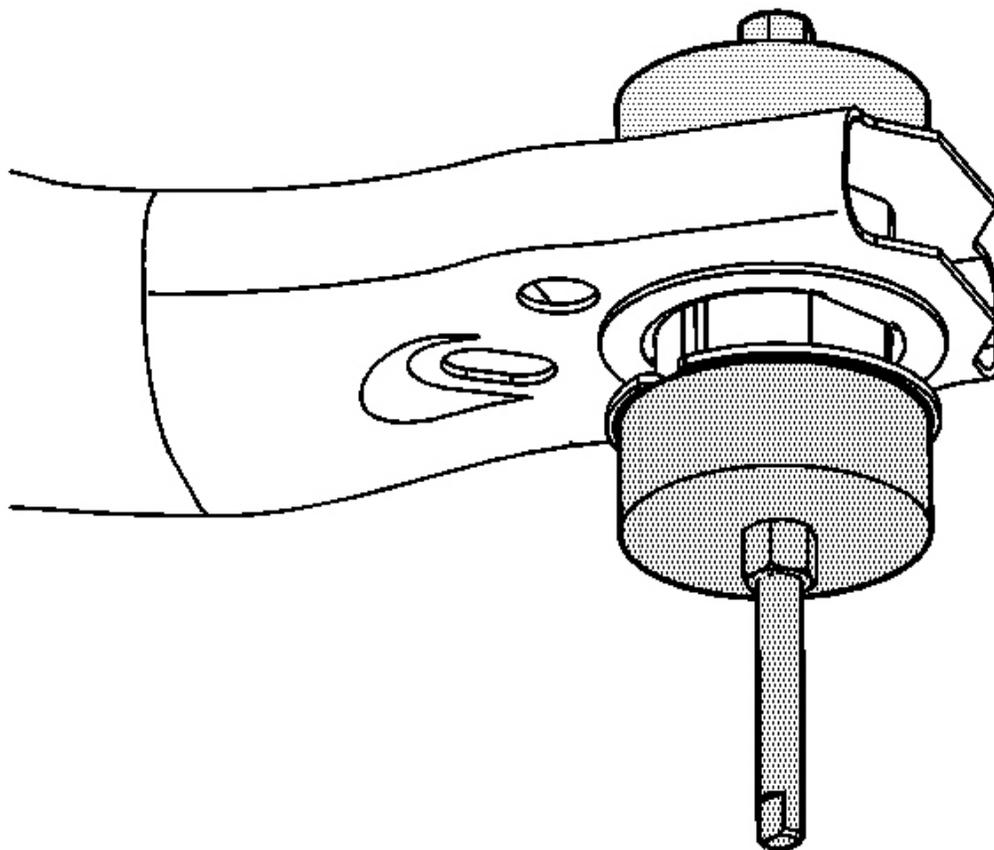


Fig. 152: Identifying Mount Is Halfway Recessed
Courtesy of GENERAL MOTORS CORP.

7. Using **J-45725** install the mount until the mount is halfway recessed in the suspension crossmember. See **Special Tools**.
8. Remove only the clamp **J-45725** . See **Special Tools**.

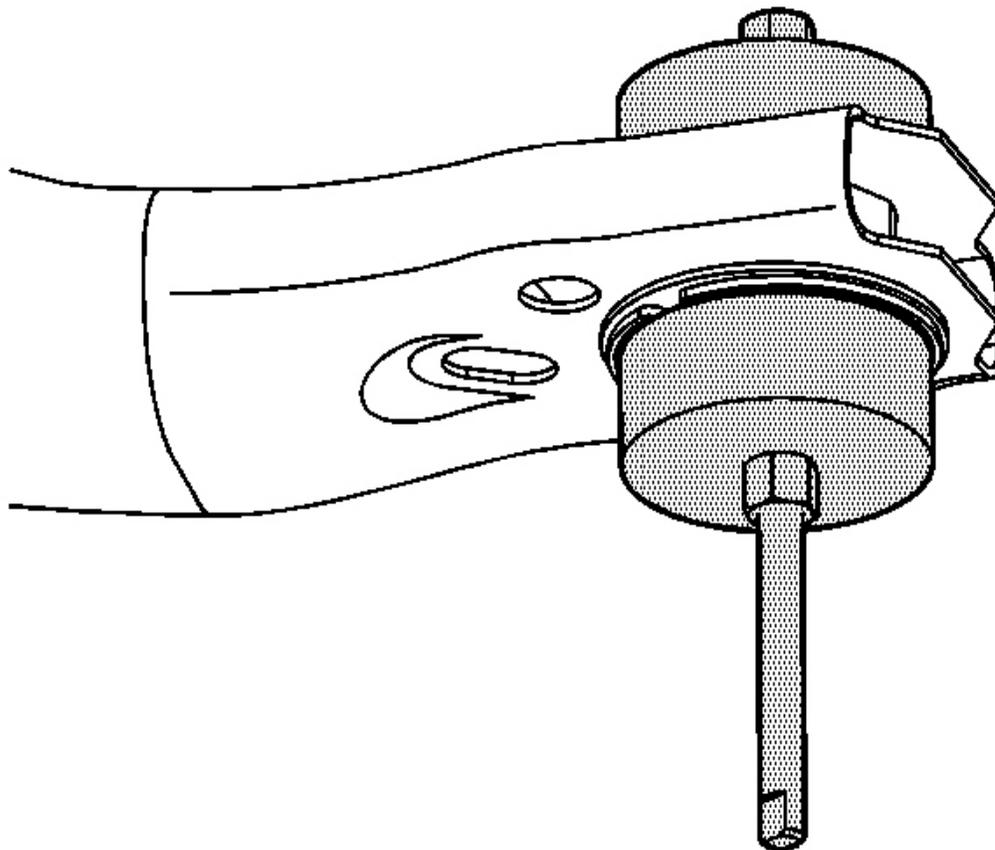


Fig. 153: Identifying Mount Is Fully Seated
Courtesy of GENERAL MOTORS CORP.

9. Using **J-45725** continue installing the mount until the flange lip of the mount is fully seated to the bottom of the suspension crossmember. See **Special Tools**.
10. Remove **J-45725** from the mount and the suspension crossmember. See **Special Tools**.

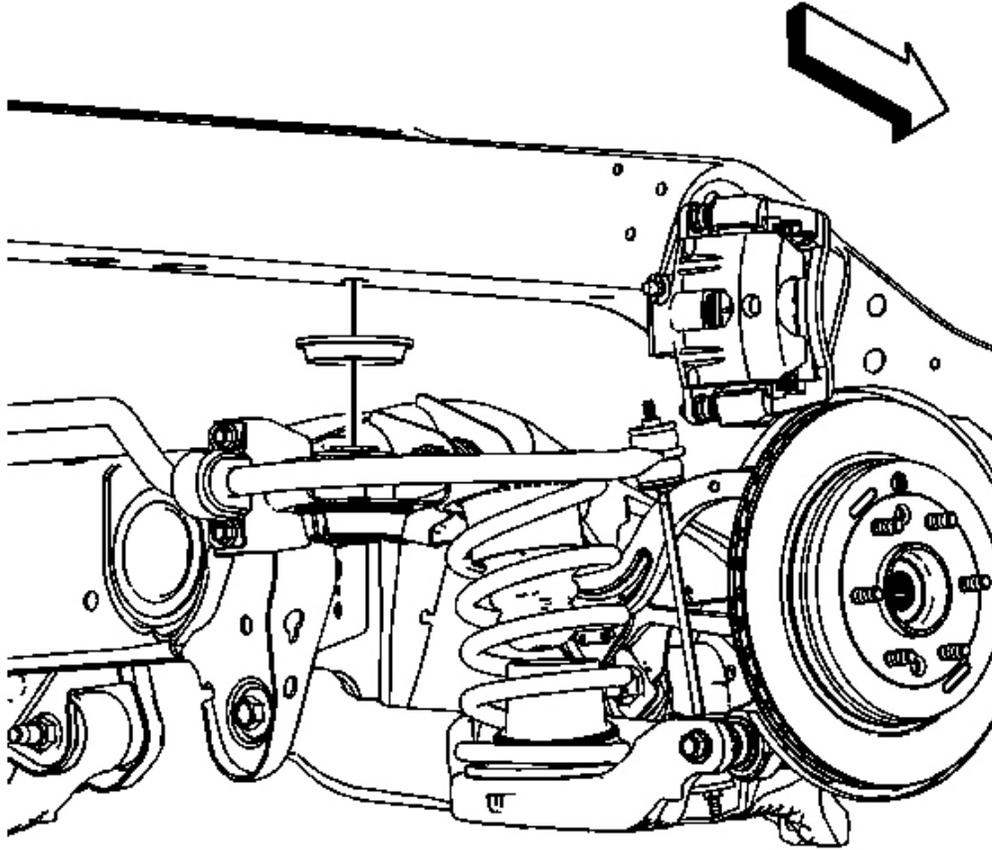


Fig. 154: View Of Upper Mount
Courtesy of GENERAL MOTORS CORP.

11. Install the upper mount.
12. Raise the suspension crossmember and rear drive module.

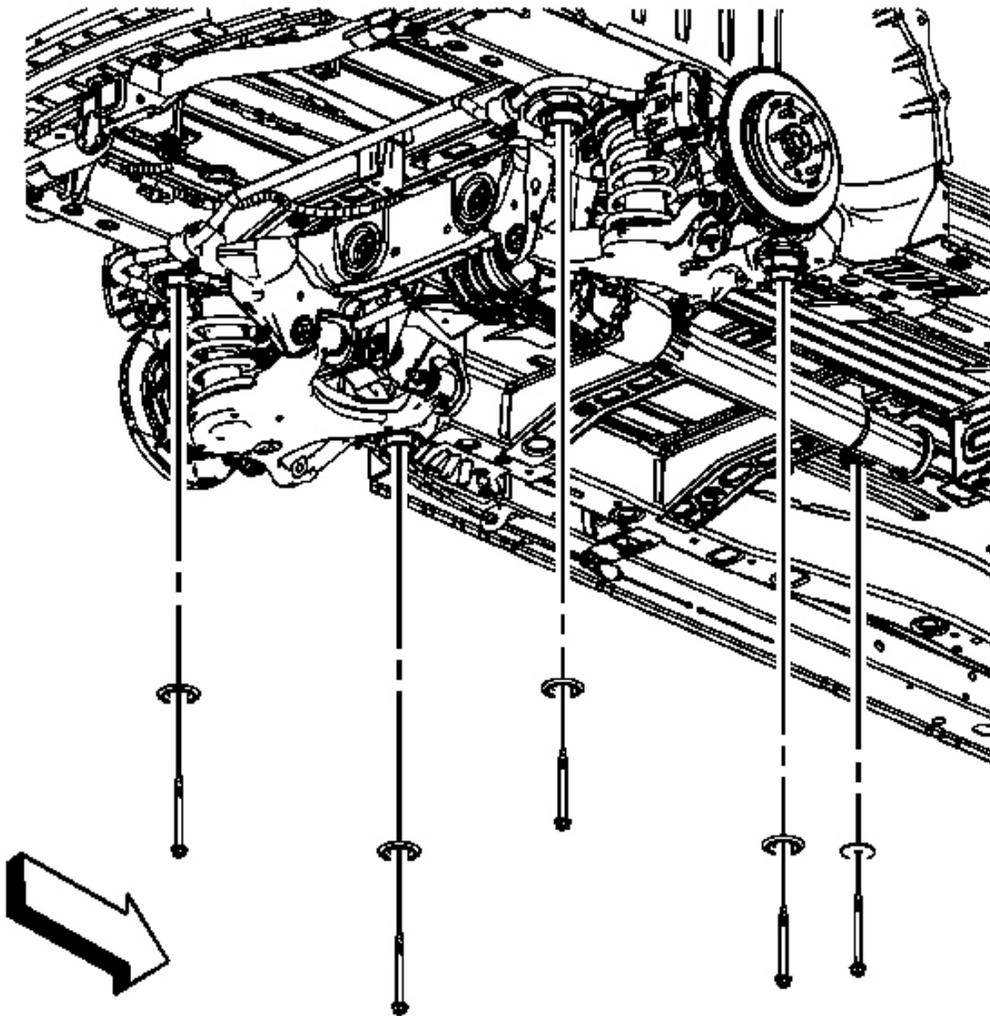


Fig. 155: View Of Suspension Crossmember To Body Bolts & Rear Axle Differential To Body Bolt

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the suspension crossmember mount bolt does not screw in smoothly, run a tap through the suspension crossmember nut in the body in order to remove foreign material. Ensure the tap does not punch through the underbody. Do not over tighten the body mount. Over tightening may

collapse a spacer or strip a bolt.

NOTE: Refer to Fastener Notice .

13. Install the suspension crossmember to body bolts.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

14. Install the rear axle differential to body bolt.

Tighten: Tighten the bolts to 160 N.m (118 lb ft).

15. Remove the jackstands.

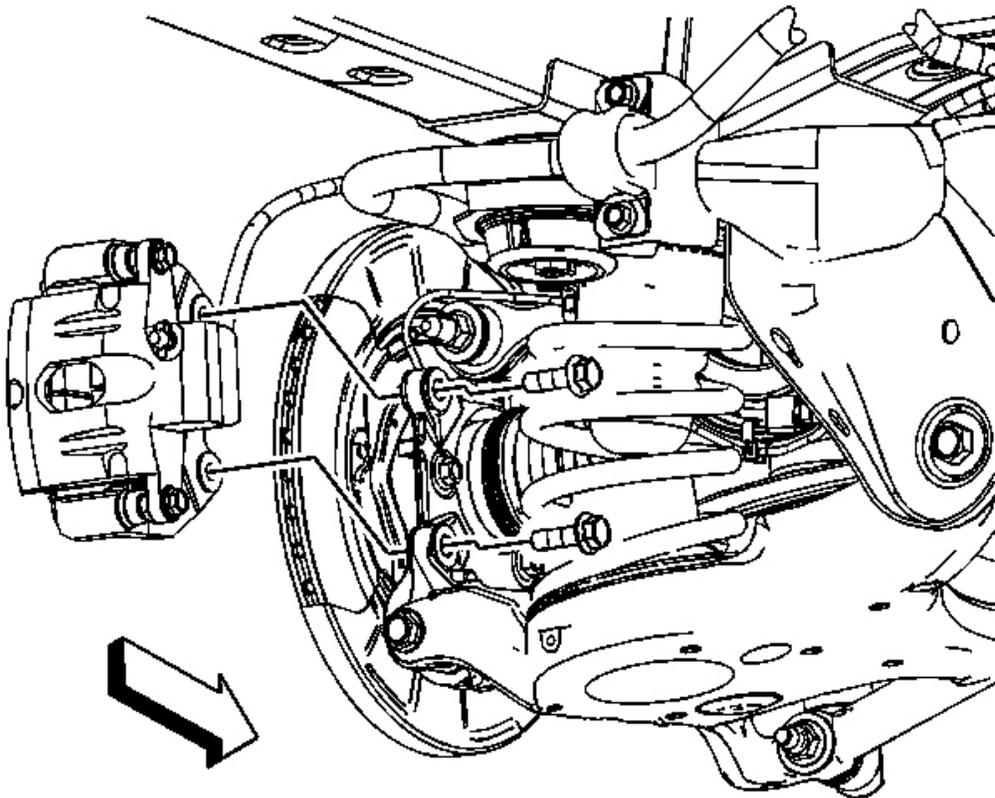


Fig. 156: View Of Rear Brake Caliper & Bracket Assemblies

Courtesy of GENERAL MOTORS CORP.

16. Install the rear brake caliper bracket and bolts. Refer to **Rear Brake Caliper Bracket Replacement** .
17. Install the rear tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
18. Lower the vehicle.
19. Install the spare tire.

TRAILER HITCH REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

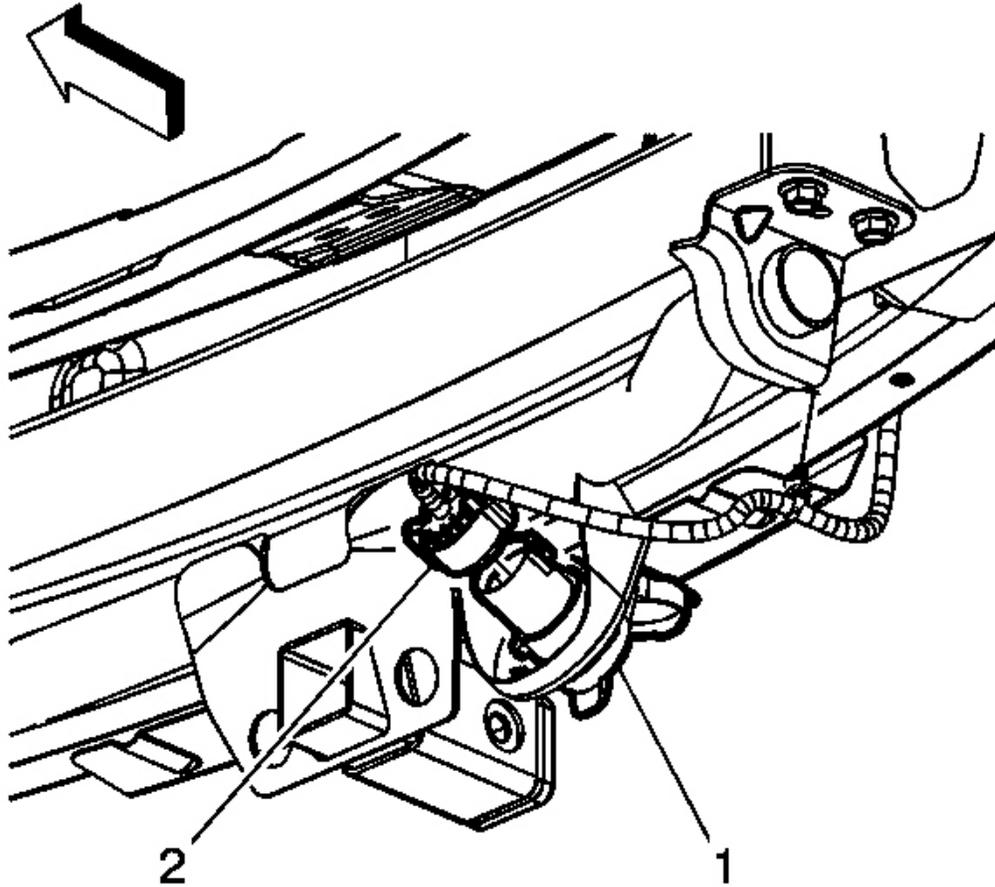


Fig. 157: Identifying Body Wire Harness & Trailer Wire Harness Connector
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the body wire harness (2) from the trailer wire harness connector (1).

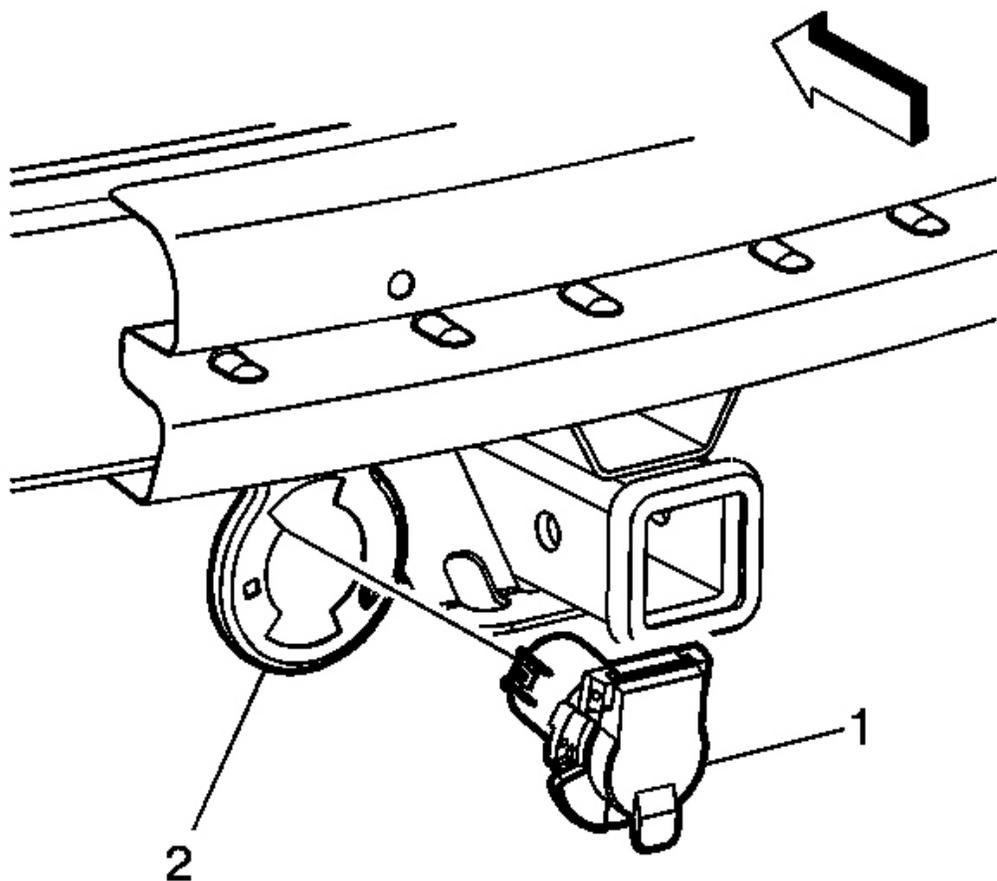


Fig. 158: View Of Trailer Wire Harness Connector & Trailer Hitch
Courtesy of GENERAL MOTORS CORP.

3. If replacing the trailer hitch, remove the trailer wire harness connector (1) from the trailer hitch (2).

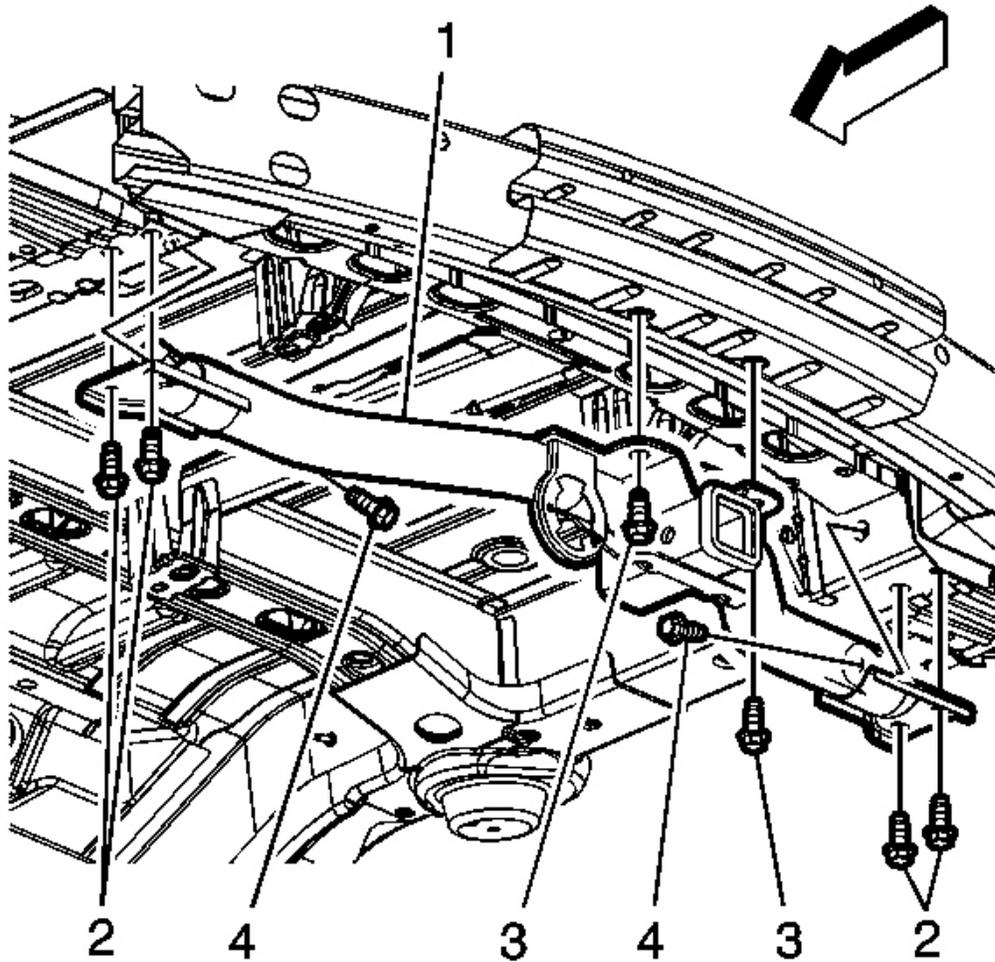


Fig. 159: View Of Trailer Hitch Bolts & Trailer Hitch
Courtesy of GENERAL MOTORS CORP.

4. Remove the trailer hitch bolts (2-4).
5. Remove the trailer hitch (1).

Installation Procedure

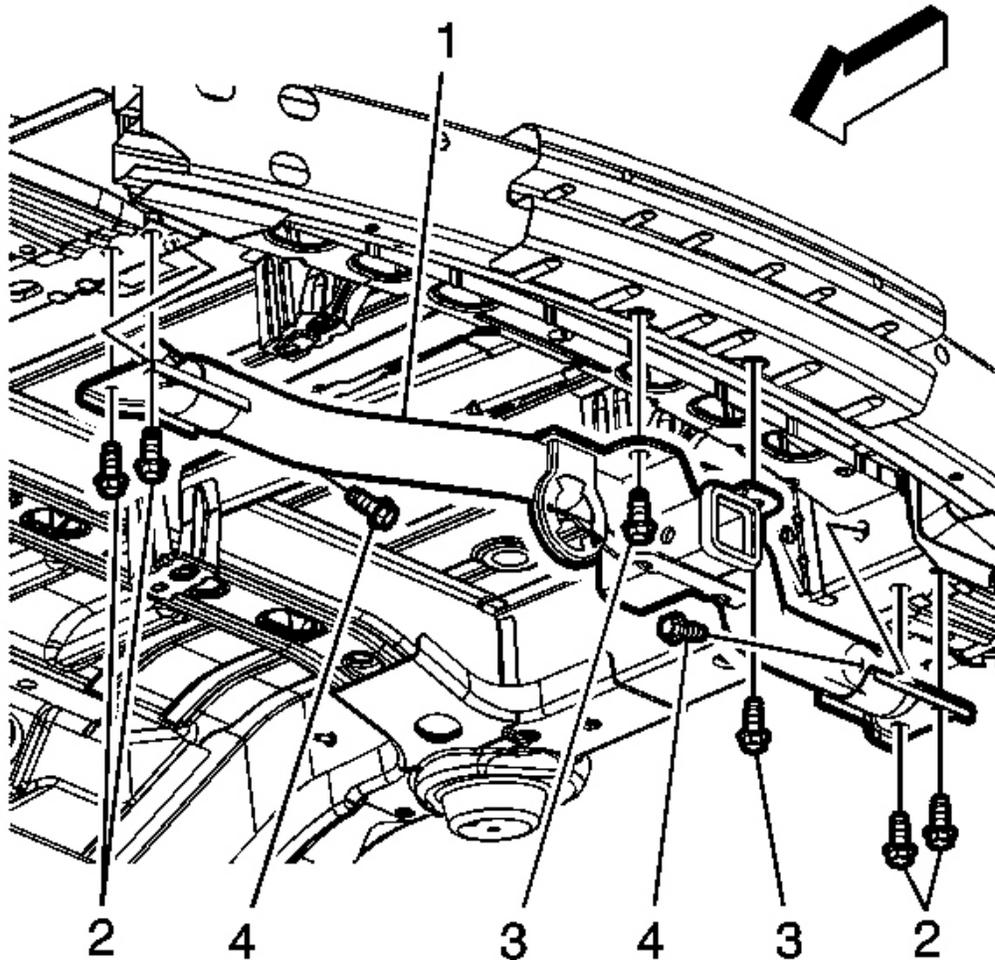


Fig. 160: View Of Trailer Hitch Bolts & Trailer Hitch
Courtesy of GENERAL MOTORS CORP.

1. Install the trailer hitch (1).

NOTE: Refer to Fastener Notice .

2. Install the trailer hitch bolts (2-4).

Tighten: Tighten the bolts to 100 N.m (74 lb ft).

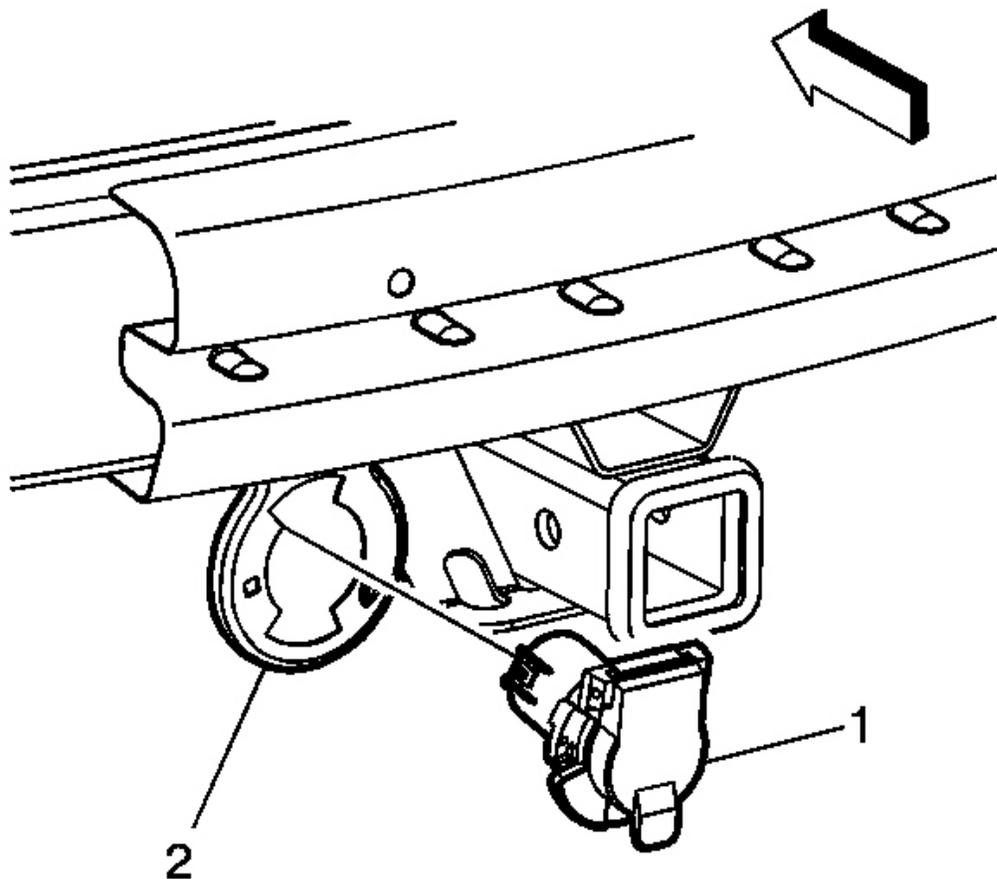


Fig. 161: View Of Trailer Wire Harness Connector & Trailer Hitch
Courtesy of GENERAL MOTORS CORP.

3. If previously removed, install the trailer wire harness connector (1) to the trailer hitch (2).

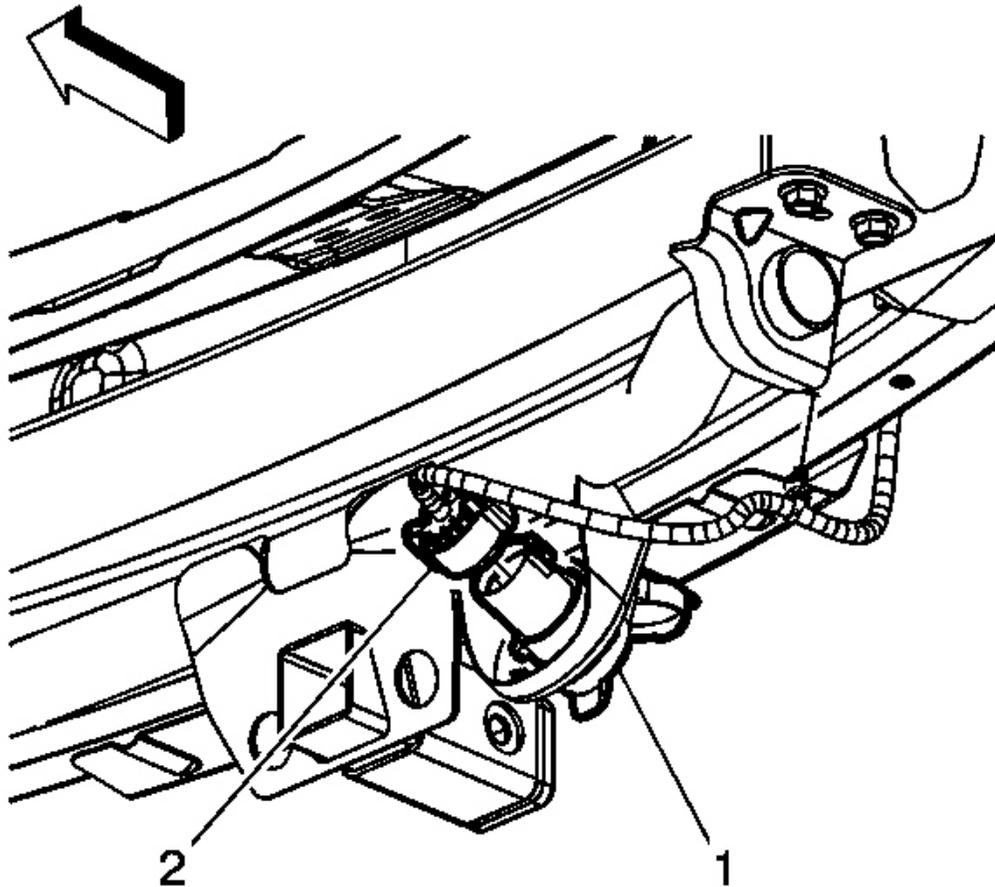


Fig. 162: Identifying Body Wire Harness & Trailer Wire Harness Connector
 Courtesy of GENERAL MOTORS CORP.

4. Connect the body wire harness (2) to the trailer wire harness connector (1).
5. lower the vehicle.

SPECIAL TOOLS AND EQUIPMENT

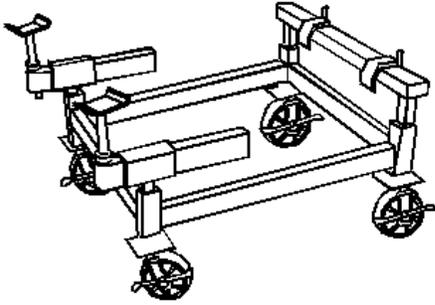
SPECIAL TOOLS

Special Tools

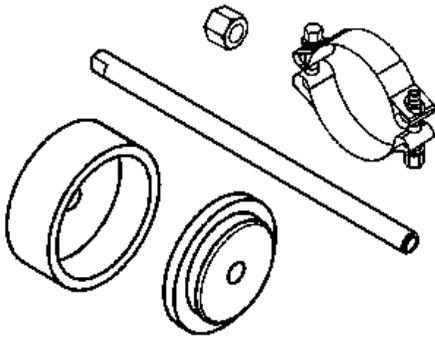
Illustration	Tool Number/Description

2007 Saturn Outlook XE

2007 ACCESSORIES & EQUIPMENT Frame and Underbody - Outlook



J 39580
Engine Support Table



J 45725
Frame Bushing Installer