

2006 SUSPENSION**Rear Suspension - HHR****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS****Fastener Tightening Specifications**

Application	Specification	
	Metric	English
Bracket to Body Bolts	90 N.m + 45°	66 lb ft + 45°
Brake Hose Fittings	19 N.m	14 lb ft
Bushing Through Bolts	90 N.m + 60°	66 lb ft + 60°
Shock Bolt Lower	125 N.m	92 lb ft
Shock Bolt Upper	90 N.m	66 lb ft
Wheel Bearing/Hub Assembly Mounting Nuts	45 N.m + 30°	33 lb ft + 30°

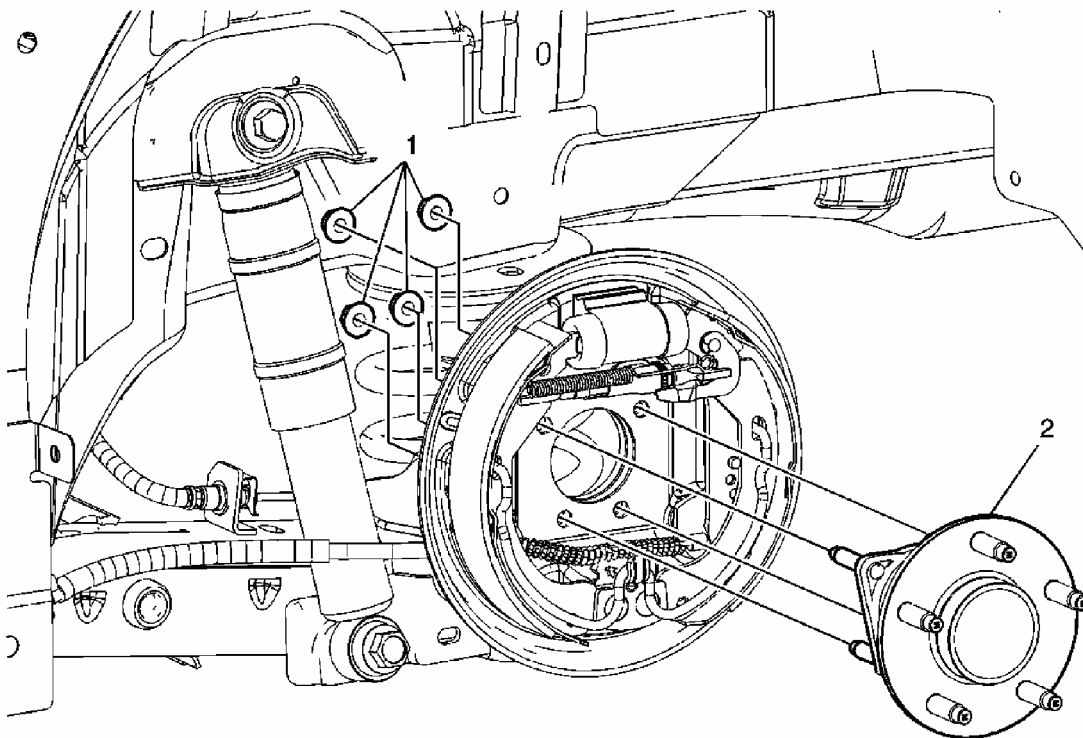
REPAIR INSTRUCTIONS**WHEEL BEARING/HUB REPLACEMENT - REAR**

Fig. 1: Wheel Bearing/Hub Replacement - Rear
Courtesy of GENERAL MOTORS CORP.

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Wheel Bearing/Hub Replacement - Rear

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the rear brake drum. Refer to <u>Brake Drum Replacement</u> .	
1	Rear Wheel Bearing/Hub Nuts (Qty: 4) Tip: Disconnect the electrical connector from the wheel bearing/hub, if equipped. Tighten: 45 N.m (33 lb in) plus 30° rotation.
2	Rear Wheel Bearing/Hub Tip: Pull the wheel bearing/hub from the axle.

SHOCK ABSORBER REPLACEMENT

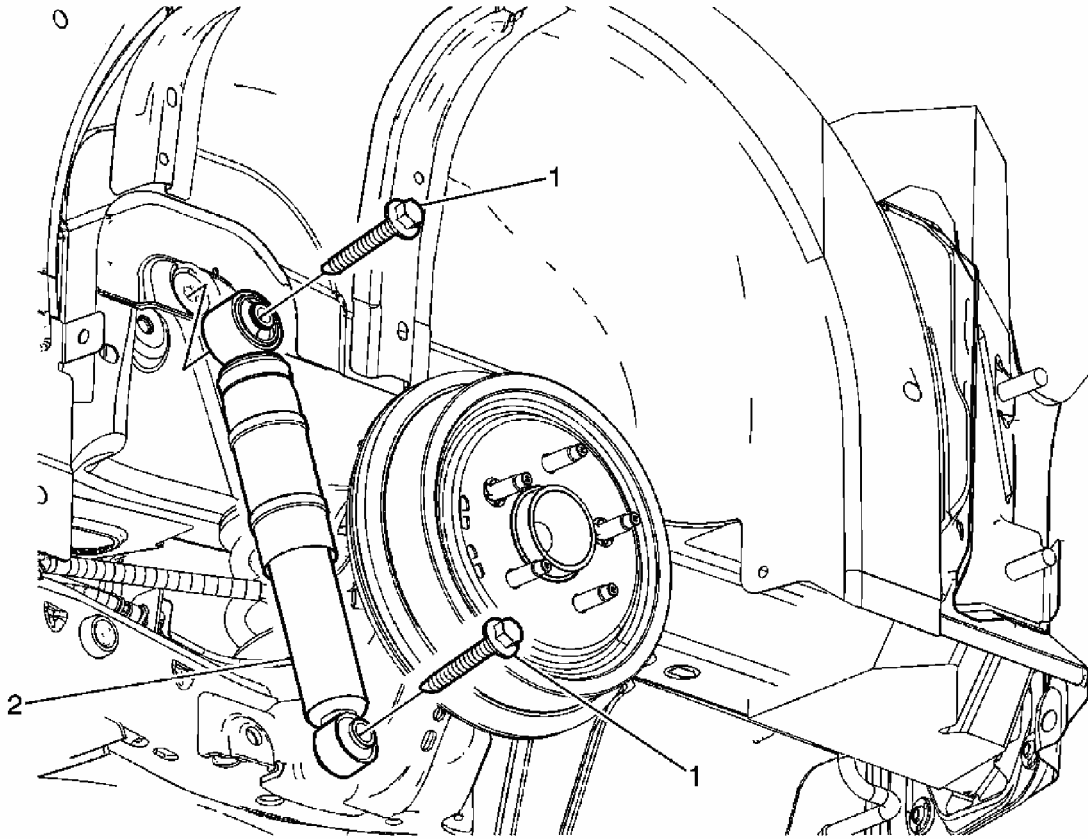


Fig. 2: Shock Absorber Replacement
 Courtesy of GENERAL MOTORS CORP.

Shock Absorber Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Rear Shock Absorber Upper Bolt (Qty: 1) Tighten: 90 N.m (66 lb ft)
	Rear Shock Absorber Lower Bolt (Qty: 1)

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	Tighten: 125 N.m (92 lb ft)
2	Rear Shock Absorber

SHOCK ABSORBER DISPOSAL

CAUTION: Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

CAUTION: To prevent personal injury, wear safety glasses when centerpunching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the centerpunch.

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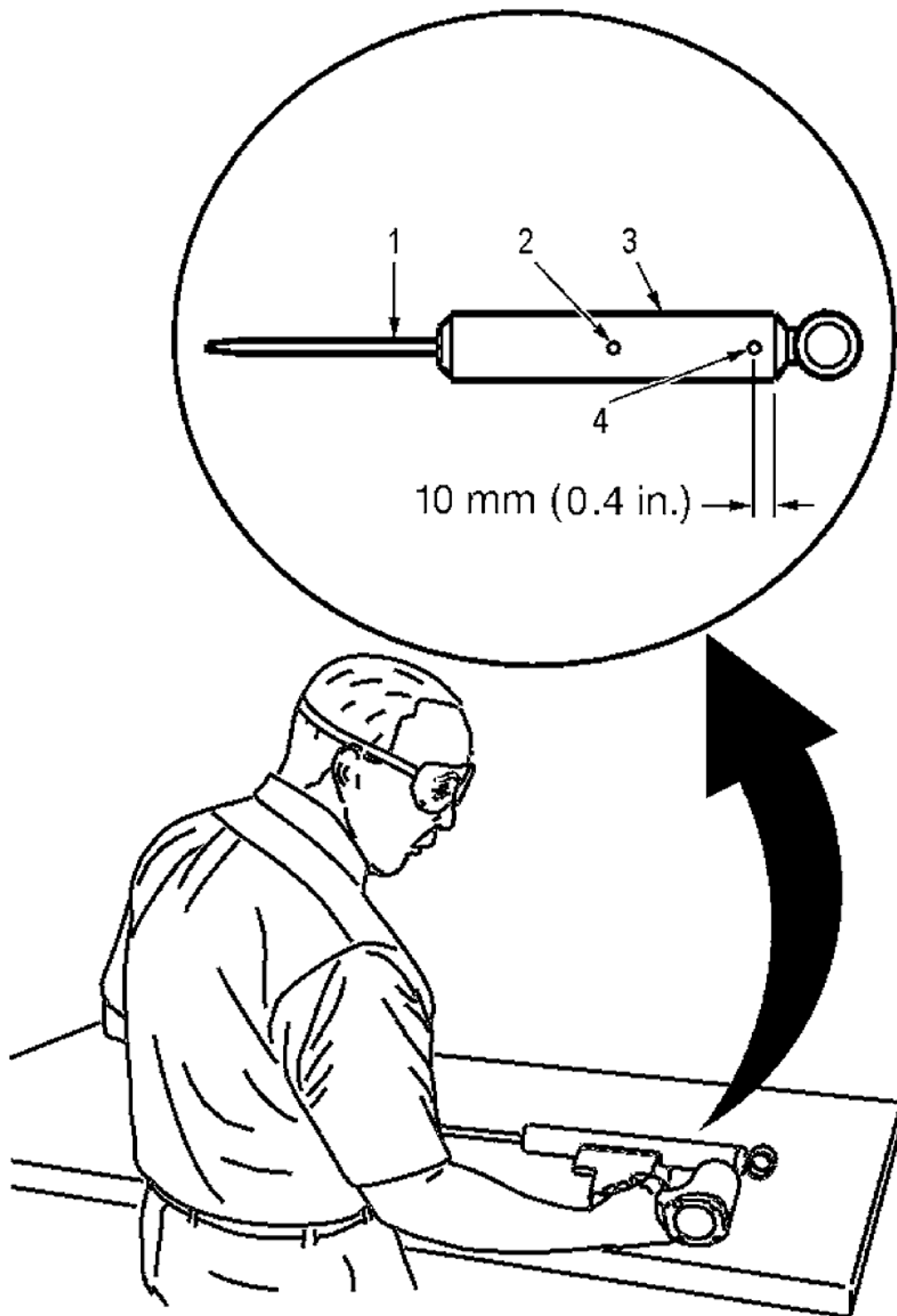


Fig. 3: Drilling Hole In Shock Absorber At Centerpunched Locations
Courtesy of GENERAL MOTORS CORP.

1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a centerpunch.
2. Clamp the shock absorber in a vise horizontally with the shock absorber rod (1) completely extended.
3. Drill a hole in the shock absorber at the centerpunch (4) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
4. Make an indentation in the middle (2) of the tube (3) with a centerpunch.
5. Drill a second hole in the shock absorber at the centerpunch (2) using a 5 mm (3/16 in) drill bit. Oil will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
6. Remove the shock absorber from the vise. Hold the shock absorber over a drain pan horizontally with the holes down. Move the rod (1) in and out of the tube (3) to completely drain the oil from the shock absorber.

COIL SPRING REPLACEMENT

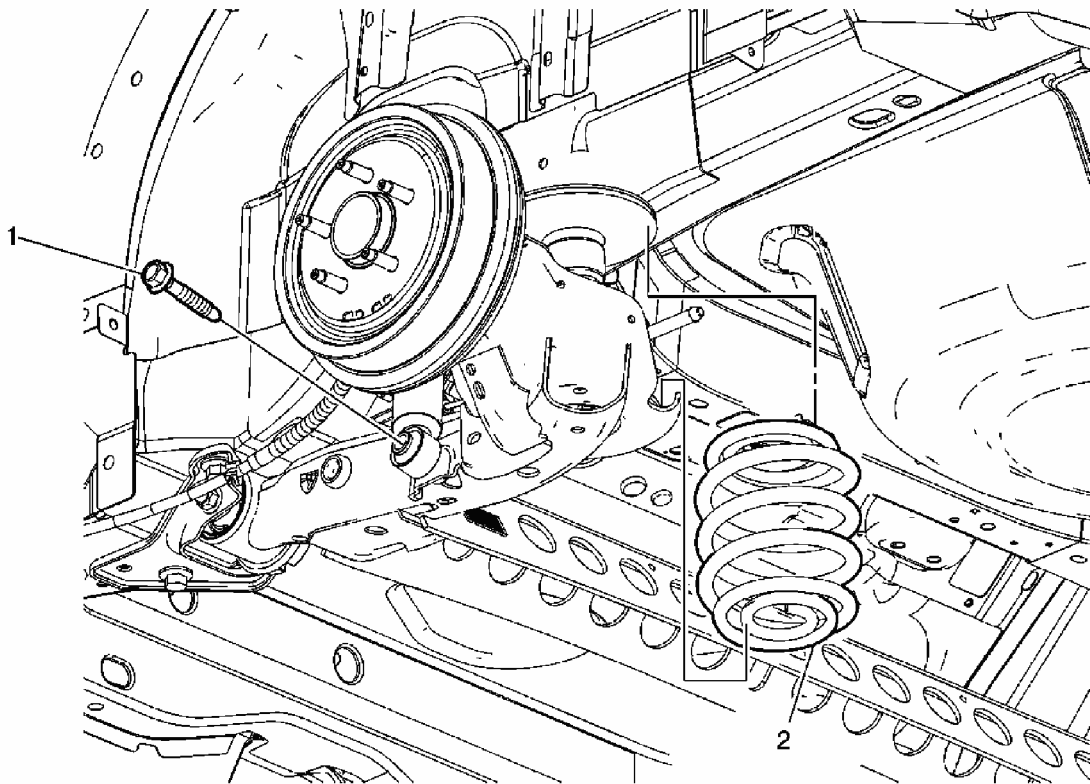


Fig. 4: Coil Spring
Courtesy of GENERAL MOTORS CORP.

Coil Spring Replacement

Callout	Component Name
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NOTE:

Refer to **Fastener Notice** .

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications**.

Preliminary Procedures

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

1	Rear Shock Absorber Bolt Tip: Support the rear axle with a jack stand before removing the shock absorber bolt. Tighten: 90 N.m (66 lb in)
2	Rear Coil Spring Tip: Lower the jack stand to release the tension on the rear spring.

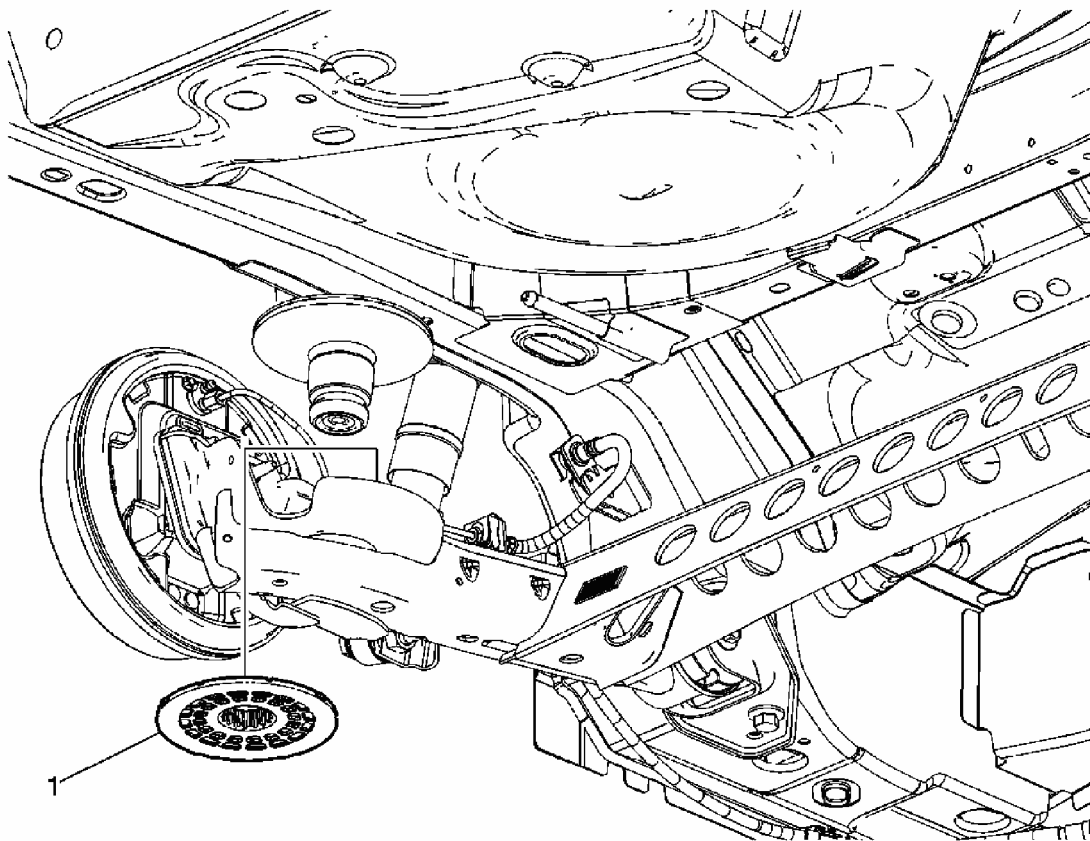
COIL SPRING INSULATORS REPLACEMENT

Fig. 5: Coil Spring Insulators
Courtesy of GENERAL MOTORS CORP.

Coil Spring Insulators Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> . Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>. Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the lower rear shock bolt. Refer to <u>Shock Absorber Replacement</u>. 4. Remove the rear coil spring. Refer to <u>Coil Spring Replacement</u>.	
1	Rear Spring Insulator

SPRING BUMPER REPLACEMENT

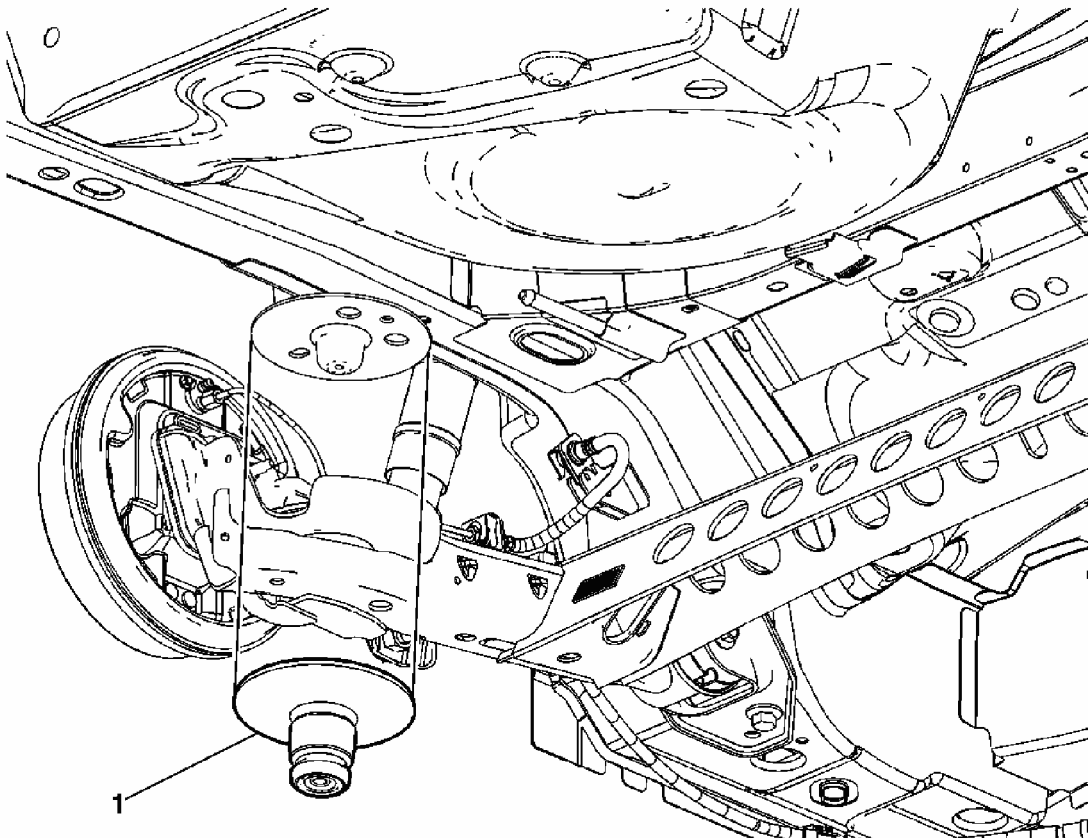


Fig. 6: Spring Bumper
Courtesy of GENERAL MOTORS CORP.

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Spring Bumper Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the lower rear shock bolt. Refer to <u>Shock Absorber Replacement</u>. 4. Remove the rear coil spring. Refer to <u>Coil Spring Replacement</u>.	
1	Upper Rear Spring Bumper

REAR AXLE REPLACEMENT

Removal Procedure

IMPORTANT: If the rear axle is being replaced due to a wheel alignment issue and is not physically damaged, refer to Thrust Angle Description for additional information.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .
3. Disconnect the left and right rear brake pipes from the rear brake hoses at the axle.
4. Disconnect the brake hoses from the axle brake hose bracket.
5. Plug the brake pipes and hoses in order to prevent additional brake fluid loss.
6. Disconnect both rear parking brake cables at the rear brake. Refer to Park Brake Cable Replacement - Rear .
7. If applicable, disconnect the antilock brake system (ABS) harness connectors and disconnect from the axle.
8. Support the rear axle with a hydraulic lift table.

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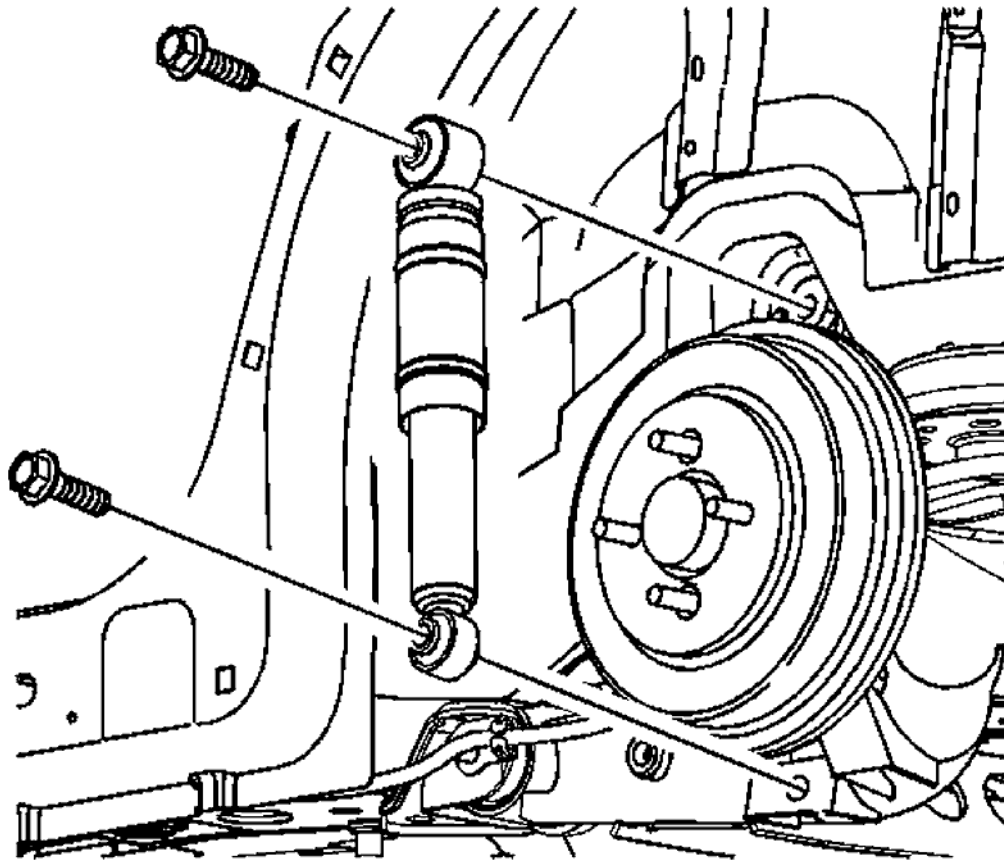


Fig. 7: View Of Shock Absorber
Courtesy of GENERAL MOTORS CORP.

9. Remove the lower shock bolts. Refer to **Shock Absorber Replacement**.

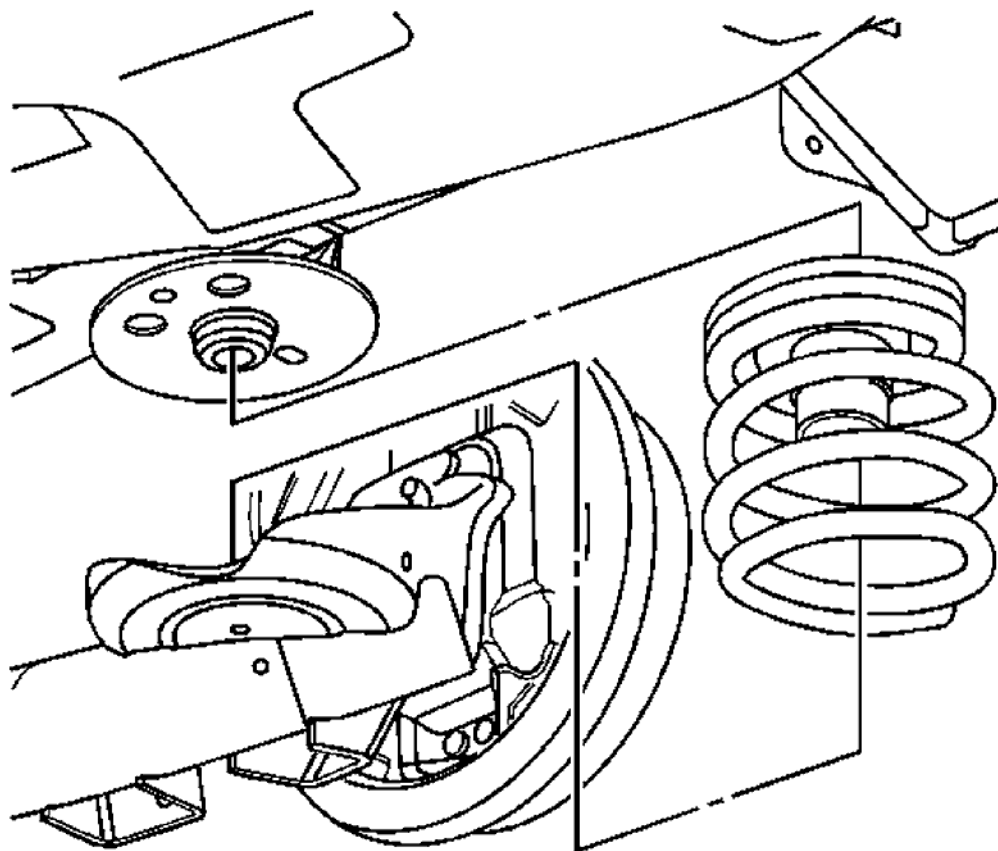


Fig. 8: View Of Coil Spring
Courtesy of GENERAL MOTORS CORP.

10. Lower the hydraulic lift table and remove the rear coil springs. Refer to **Coil Spring Replacement**.
11. Disconnect the park brake cables from the cable brackets.

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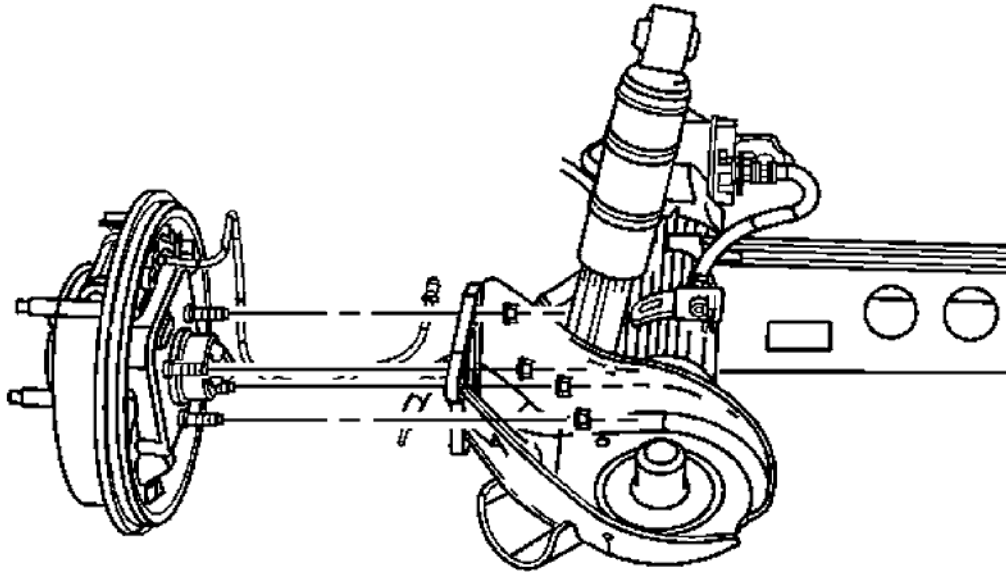
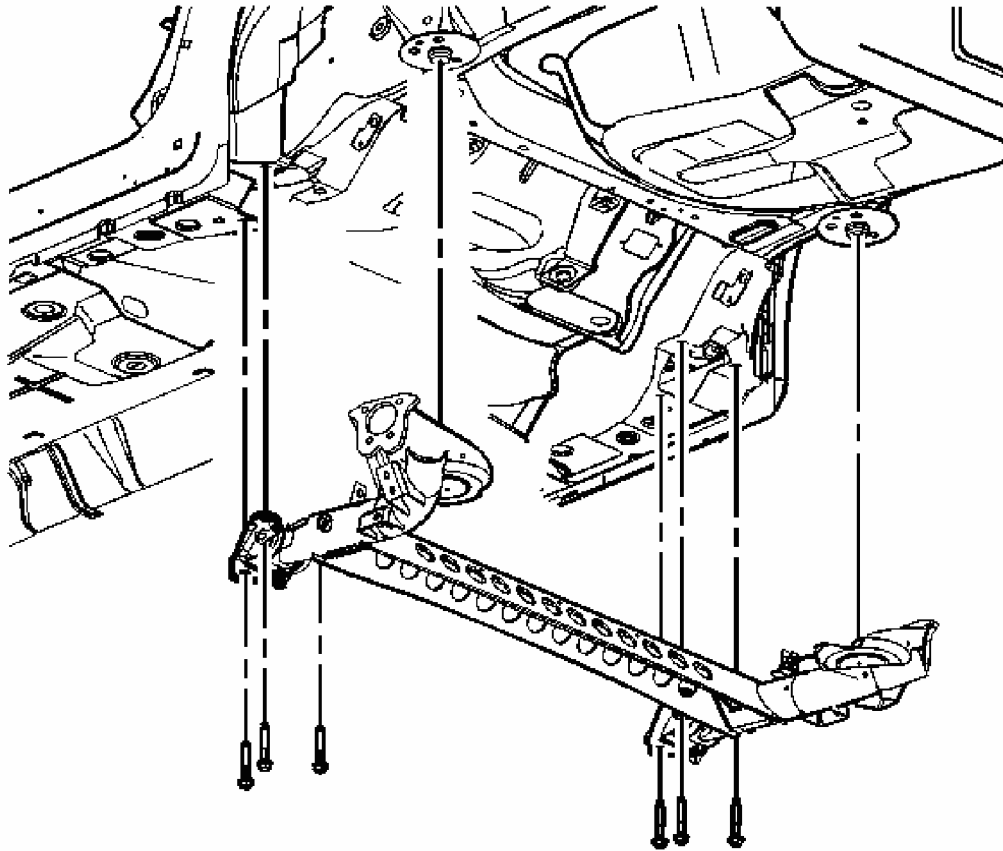


Fig. 9: Identifying Wheel Bearing/Hubs
Courtesy of GENERAL MOTORS CORP.

12. Remove the wheel bearing/hub retaining nuts from both sides.
13. Remove the wheel bearing/hubs, with the brakes and backing plate as an assembly.



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- ## Installation Procedure

- IMPORTANT:** The axle bushing through bolts must be installed with the bolt head facing inboard.

3. Loosely install the bushing bolts and nuts.
4. Place the axle on the hydraulic lift table.
5. Raise the axle into position.

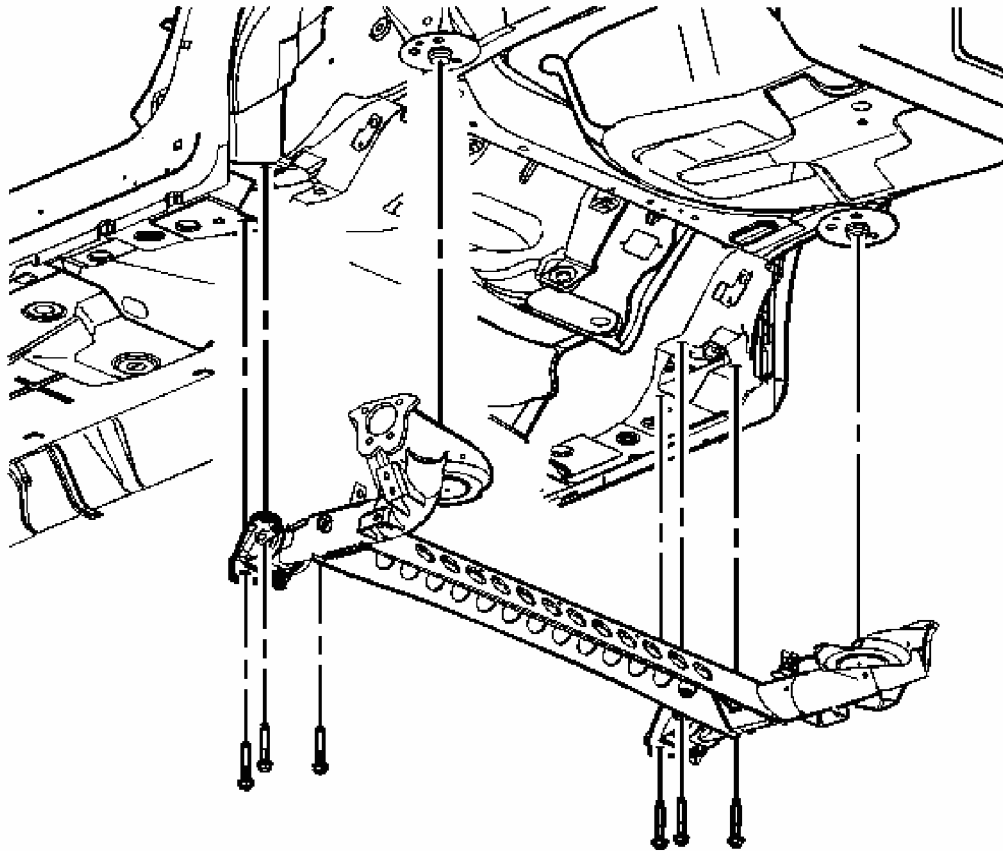


Fig. 11: View Of Rear Axle Bushing Bracket
Courtesy of GENERAL MOTORS CORP.

6. Hand tighten the axle bracket to body bolts just enough to hold the brackets flush to the body.

IMPORTANT: The axle through bolts must be tightened with the axle at the correct trim height and prior to torquing the axle bracket to body bolts.

7. Using the lift table, raise the axle to the proper trim height specification by measuring the vertical distance between the bottom edge of the upper spring seat and the bottom of the notch in the lower spring seat. Refer to **Trim Height Inspection Procedure** for

D height measurement.

NOTE: Refer to Fastener Notice .

8. Tighten the axle bushing through bolts.

Tighten: Tighten the bolts to 90 N.m (66 lb ft) +60 degrees.

9. Insert two 12 mm diameter pins through the axle brackets into the underbody.

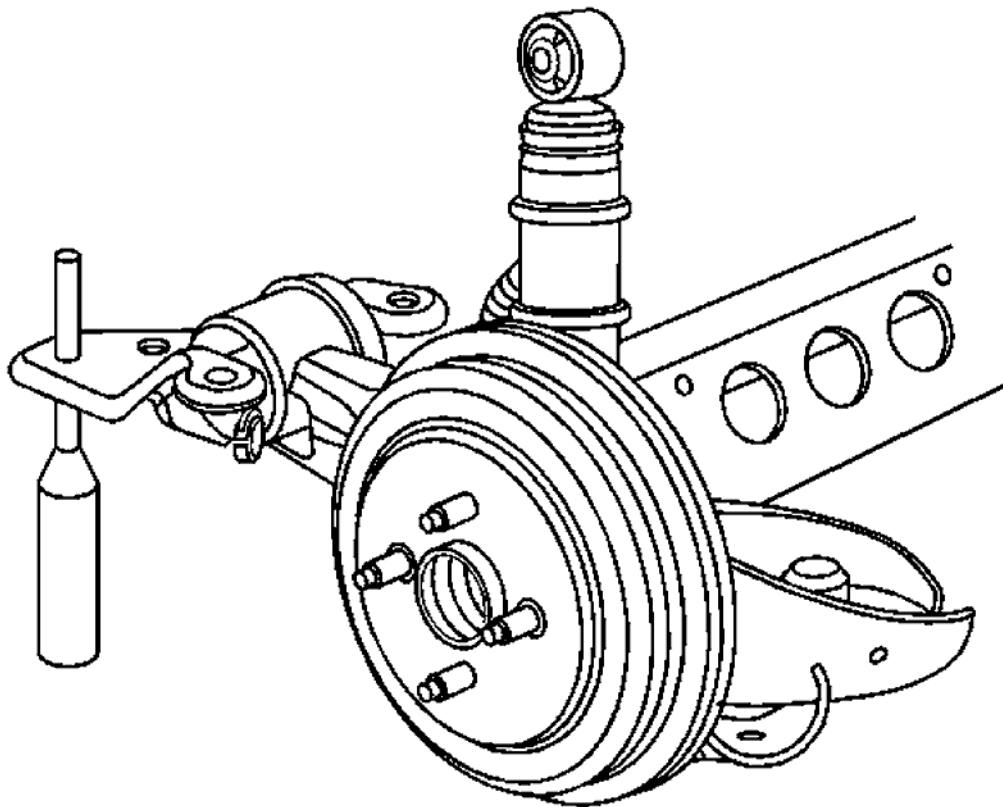


Fig. 12: View Of Left Side Of Axle Bracket
Courtesy of GENERAL MOTORS CORP.

10. Align the left side axle bracket and snug down the bolts.

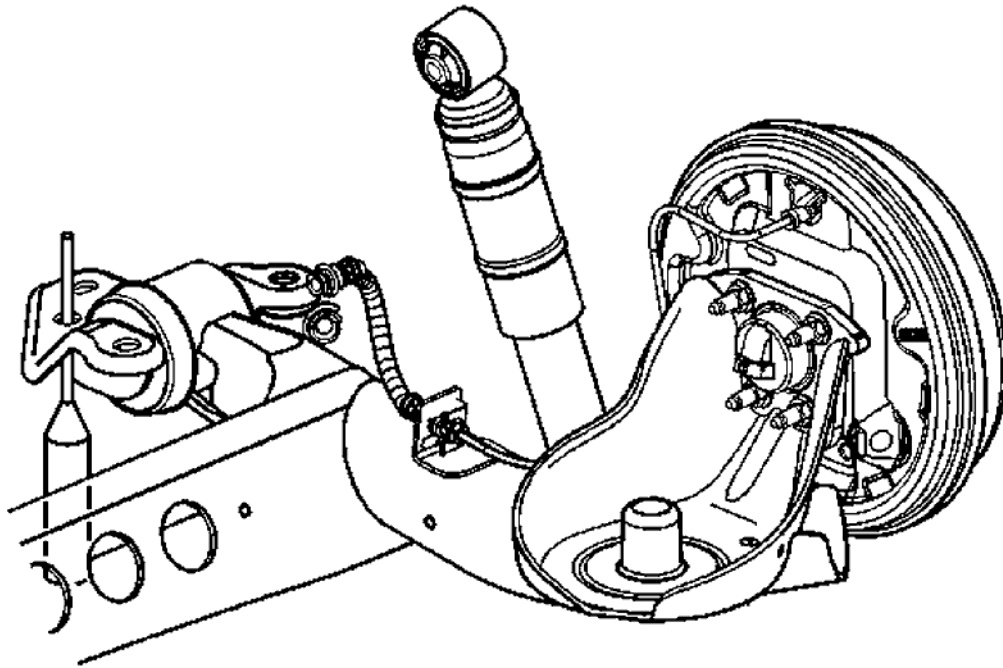


Fig. 13: View Of Right Side Of Axle Bracket

Courtesy of GENERAL MOTORS CORP.

11. Align the right side axle bracket and snug down the bolts.
12. Tighten all the bracket to body bolts.

Tighten: Tighten the bolts to 90 N.m (66 lb ft) + 45 degrees.

13. Install the wheel bearing/hubs, with the brakes and backing plate assemblies.

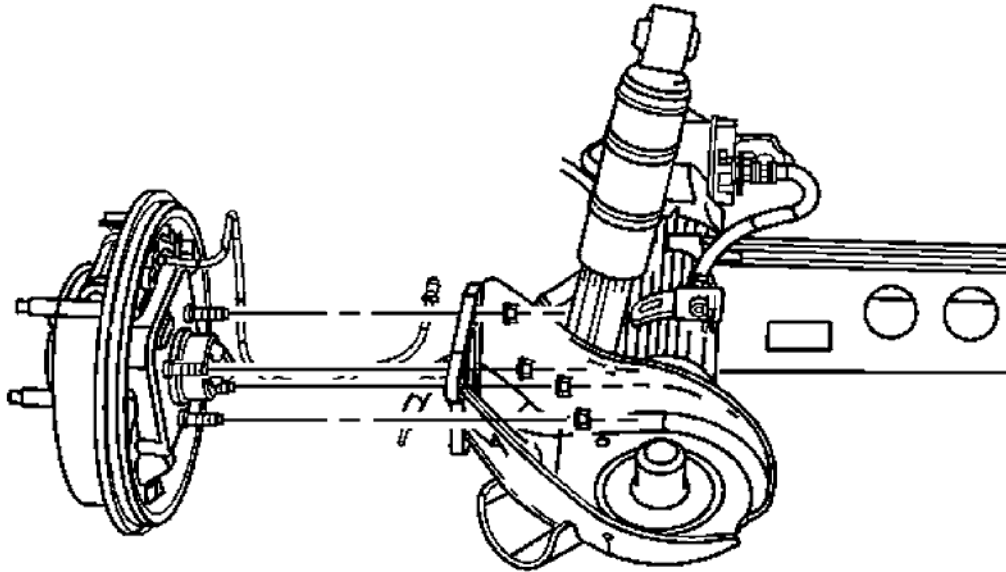


Fig. 14: Identifying Wheel Bearing/Hubs
Courtesy of GENERAL MOTORS CORP.

14. Install the bearing/hub nuts.

Tighten: Tighten the nuts to 45 N.m + 30 degrees (33 lb ft + 30 degrees).

15. Connect the brake hoses to the rear axle brackets.
16. Connect the brake pipes to the brake hoses at the axle.

Tighten: Tighten the brake pipe fittings to 19 N.m (14 lb ft).

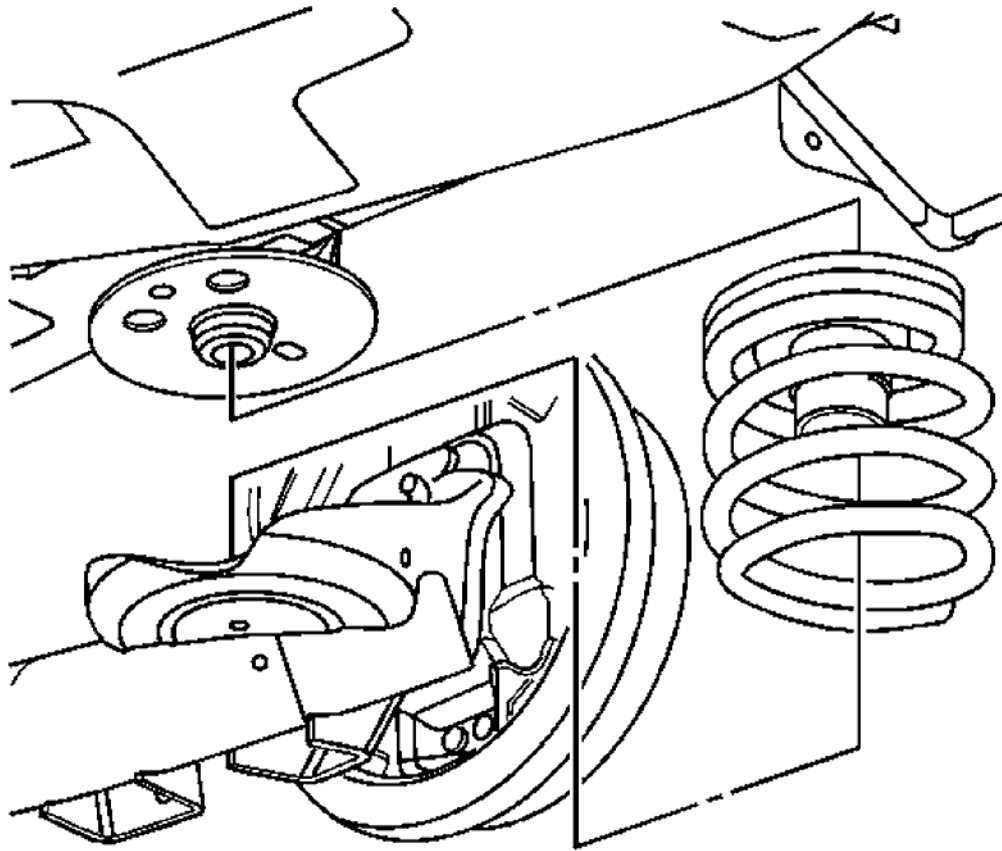


Fig. 15: View Of Coil Spring
Courtesy of GENERAL MOTORS CORP.

17. Install the rear coil springs. Refer to **Coil Spring Replacement**.

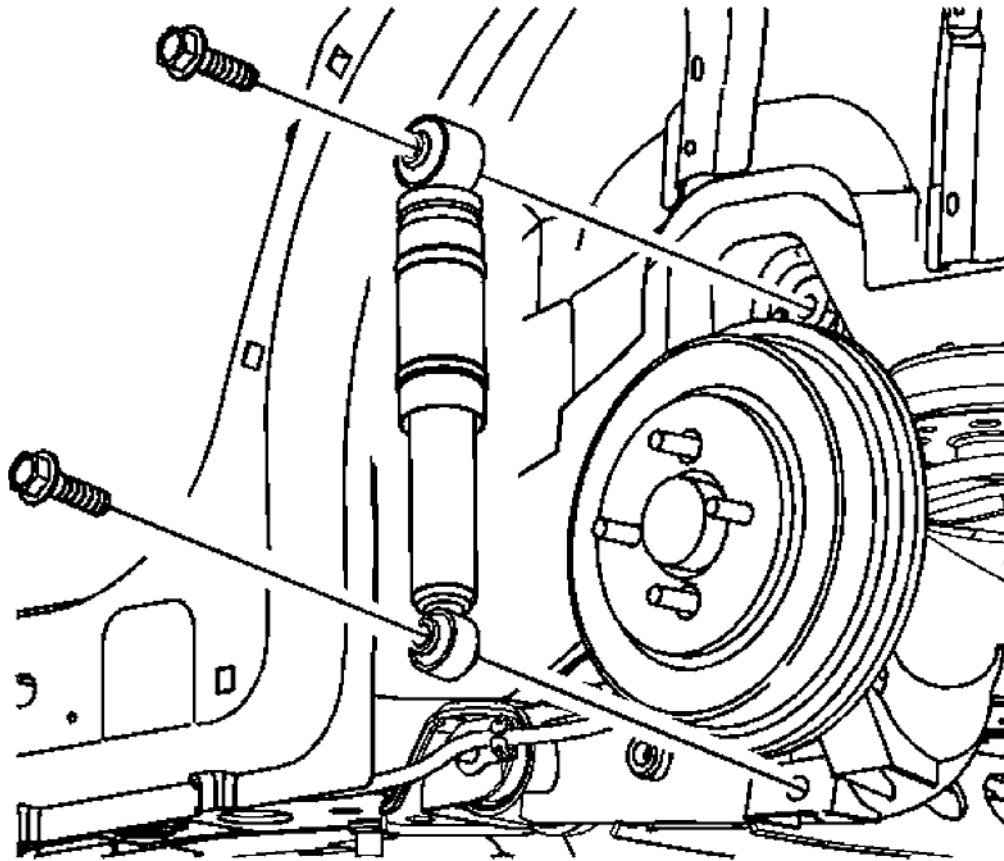


Fig. 16: View Of Shock Absorber
Courtesy of GENERAL MOTORS CORP.

18. Install the lower shock bolts. Refer to **Shock Absorber Replacement**.
19. Lower and remove the hydraulic lift table.
20. If applicable, connect the ABS sensor harness connector and harness to axle retainer.
21. Connect the park brake cables to the axle brackets and rear brakes. Refer to **Park Brake Cable Replacement - Rear**.
22. Bleed the brake system. Refer to **Hydraulic Brake System Bleeding (Pressure)** or **Hydraulic Brake System Bleeding (Manual)**.
23. Install the rear wheels. Refer to **Tire and Wheel Removal and Installation**.
24. Lower the vehicle.

CONTROL ARM BUSHING REPLACEMENT

Tools Required

J 44570 Bushing Remover/Installer Kit. See Special Tools.

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .

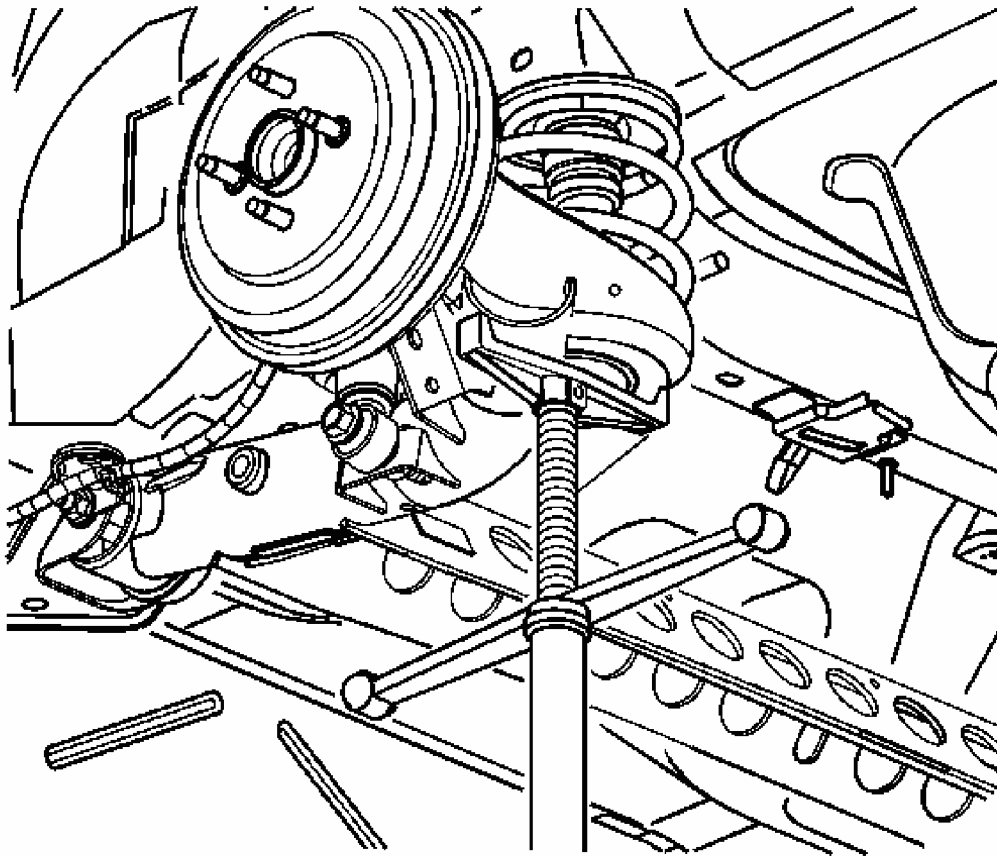


Fig. 17: Supporting Rear Axle With Tall Jack Stand
Courtesy of GENERAL MOTORS CORP.

3. Place 2 screw type jack stands under both ends of the rear axle.
4. Remove the rear brake hose bracket attaching nuts from the body.
5. Detach the rear brake hose brackets from the body allowing the lines to hang free.
6. Remove the lower shock bolts.

IMPORTANT: Do not kink the brake pipes while lowering the

axle.

7. Lower the jacks in order to remove the coil springs.
8. Temporarily re-install the lower shock bolts to support the axle.

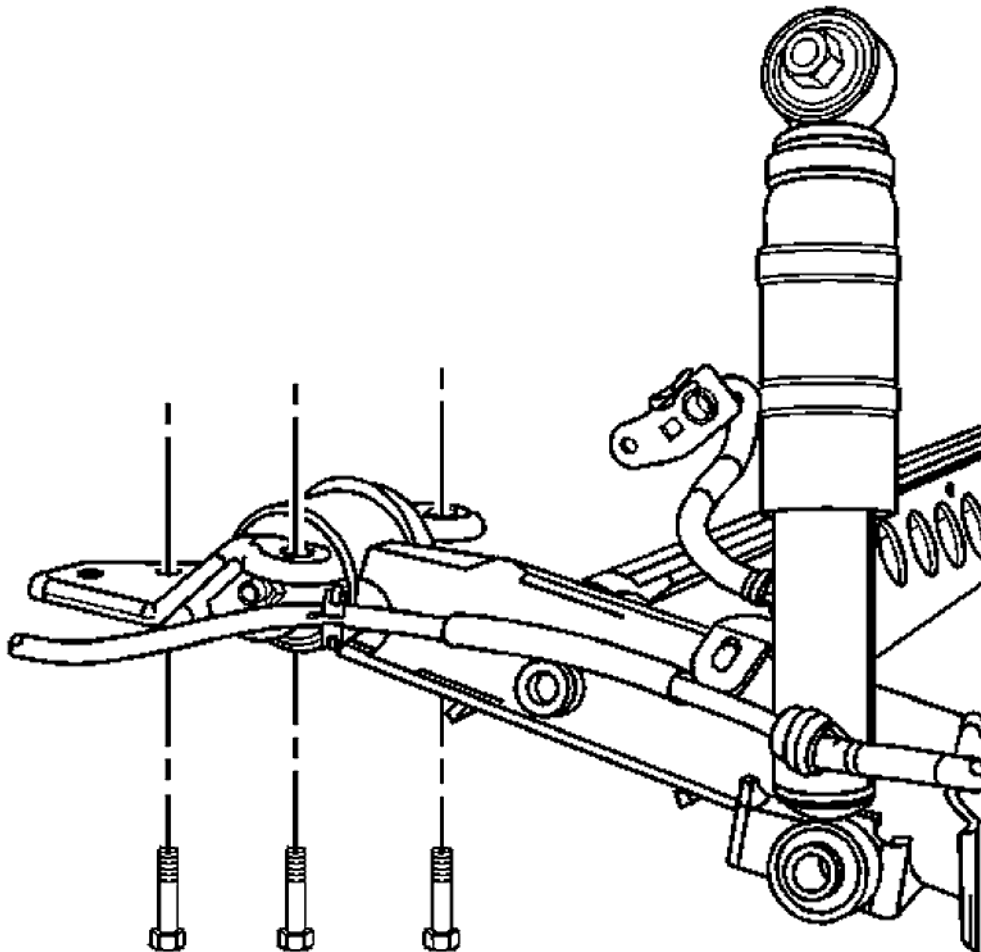


Fig. 18: View Of Bushing Bracket-To-Body Bolts
Courtesy of GENERAL MOTORS CORP.

9. Remove the bushing bracket to body bolts from both ends of the rear axle.
10. Using the jack stands, raise the rear of the axle until the bushing brackets pivot away from the body.
11. Remove the axle bushing through bolts and remove the bushing brackets.

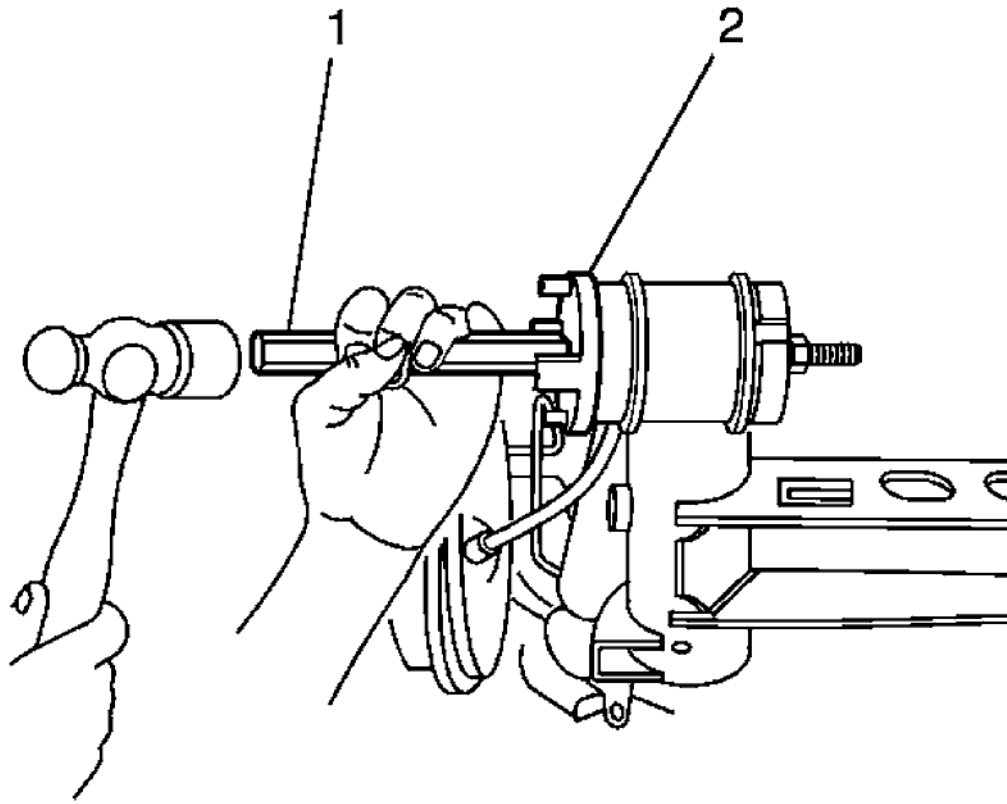


Fig. 19: Identifying J 44570-3 & J 44570-1
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Note the depth and orientation of the old bushing before removal.

12. Using the **J 44570** , install the J 44570-1 (2) with the lip between the axle sleeve and bushing flange. See **Special Tools**. It may require tapping with a hammer to fully seat the tool.
13. Insert J 44570-3 (1) through the J 44570-1 (2) and the axle bushing.
14. Install the washer and nut by hand, tightening until the tool is snug.
15. Using a hammer, drive the bushing from the axle sleeve.
16. Disassemble the tool and remove the bushing.

Installation Procedure

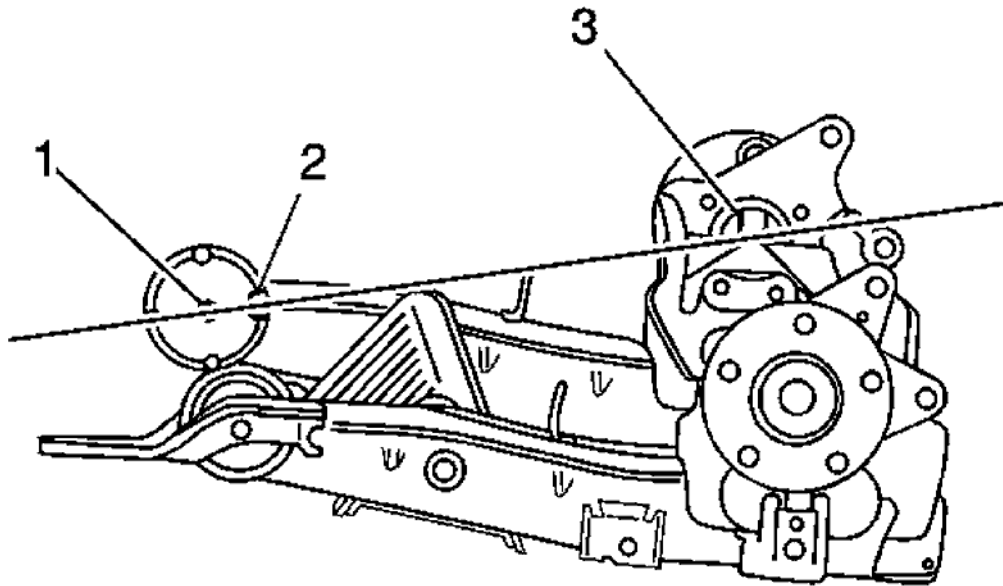


Fig. 20: View Of Correct Axle Bushing Installation
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The axle bushings must be installed in the correct orientation as shown.

1. Slide the new bushings into the axle sleeve in the same orientation noted during removal. Make sure the rubber end (1) is facing inboard and the largest void (2) is in line with the wheel hub center (3).
2. Place the J 44570-1 (2) onto the bushing. Make sure the bushing is still oriented correctly.

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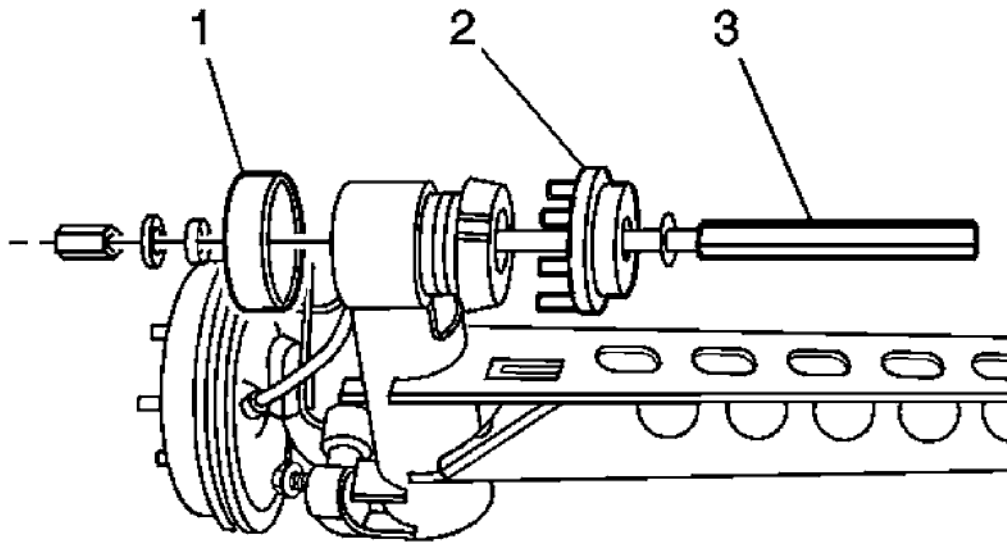


Fig. 21: Replacing Bushing Using J 44570-2, J 44570-1 & J 44570-3
Courtesy of GENERAL MOTORS CORP.

3. Insert the J 44570-3 (3) through the J 44570-1 (2) and the axle bushing.
4. Install the J 44570-2 (1) bearing, washer, and nut.
5. Pull the bushing into the axle sleeve by holding the hex end of the threaded shaft while turning the nut.
6. Disassemble and remove the bushing installation tool from the axle.
7. Install the axle brackets to the axle bushings with the alignment slot on the outboard side.

IMPORTANT: The axle bushing through bolts must be installed with the bolt head facing inboard.

8. Loosely install the bushing bolts, park brake cable brackets and nuts.
9. Using the jack stands, lower the rear of the axle until the bushing brackets contact the body.

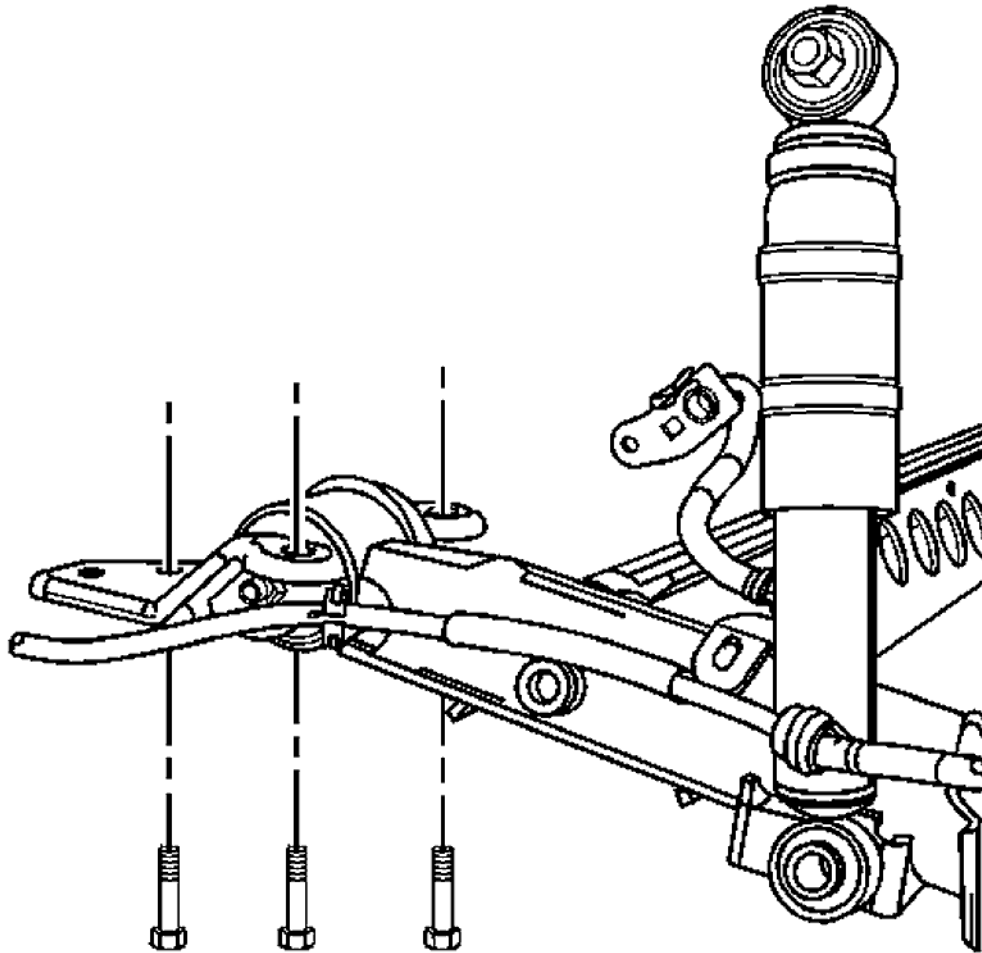


Fig. 22: View Of Bushing Bracket-To-Body Bolts
Courtesy of GENERAL MOTORS CORP.

10. Hand tighten the axle bracket to body bolts just enough to hold the brackets flush to the body.

IMPORTANT: The axle through bolts must be tightened with the axle at the correct trim height and prior to torquing the axle bracket to body bolts.

11. Using the jack stands, raise the axle to the proper trim height specification by measuring the vertical distance between the bottom edge of the upper spring seat and the bottom of the notch in the lower spring seat. Refer to **Trim Height Inspection Procedure** in Suspension General Diagnosis for D Height Measurement.

NOTE: Refer to Fastener Notice .

12. Tighten the axle bushing through bolts.

Tighten: Tighten the bolts to 90 N.m (66 lb ft) +60 degrees

13. Insert two 12 mm diameter pins through the axle brackets into the underbody.

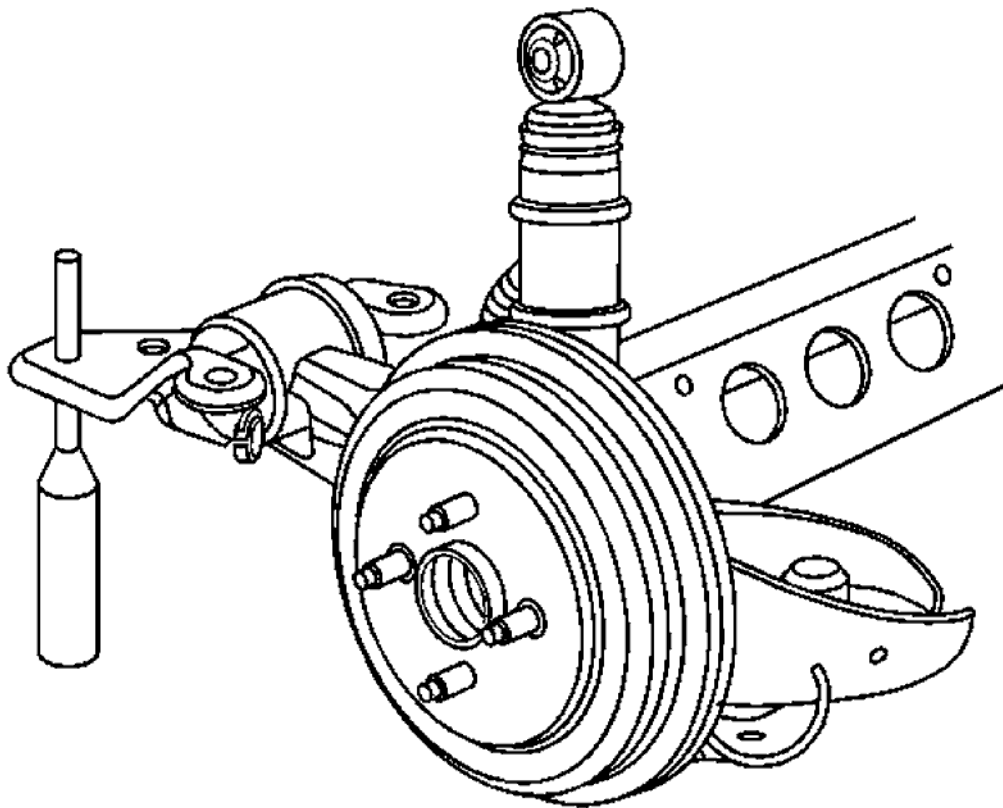


Fig. 23: View Of Left Side Of Axle Bracket
Courtesy of GENERAL MOTORS CORP.

14. Align the left side axle bracket and snug down the bolts.

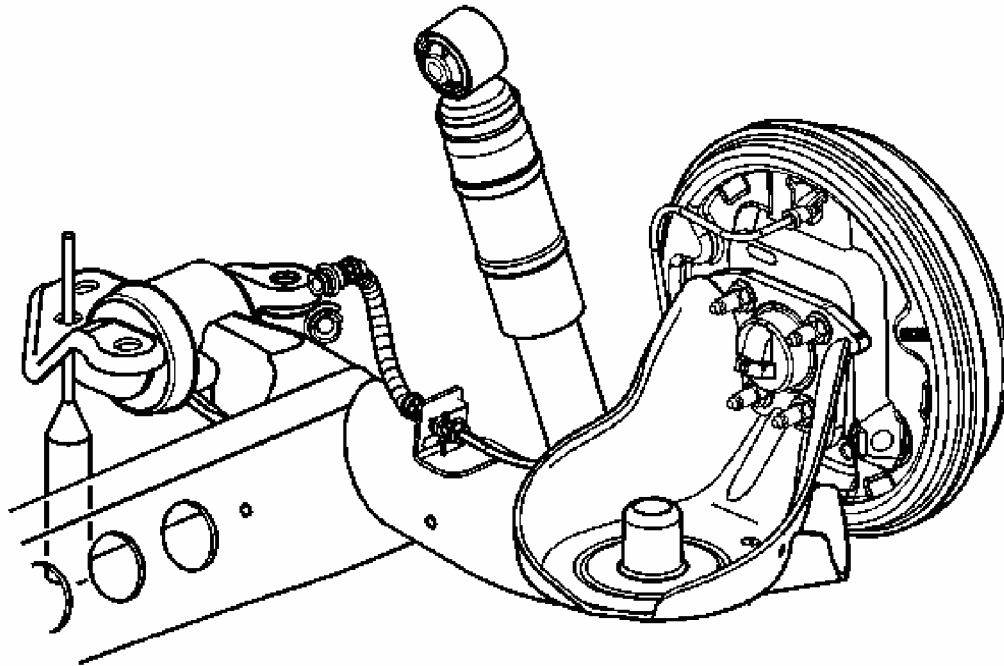


Fig. 24: View Of Right Side Of Axle Bracket
Courtesy of GENERAL MOTORS CORP.

15. Align the right side axle bracket and snug down the bolts.
16. Tighten all the bracket to body bolts.

Tighten: Tighten the bolts to 90 N.m (66 lb ft) +30 degrees.

17. With the axle supported by the jack stands, remove the lower shock bolts.
18. Lower the jacks in order to install the coil springs.
19. Install the coil springs, making sure the colored tag is facing the rear of the vehicle.
20. Raise the jacks until the springs are slightly compressed in order to install the lower shock bolts. Refer to **Shock Absorber Replacement**.

Tighten: Tighten the lower bolts to 125 N.m (92 lb ft).

21. Remove the jack stands.
22. Reposition the rear brake hose brackets to the body.
23. Install the brake hose bracket attaching nuts.
24. Install the rear wheels. Refer to **Tire and Wheel Removal and Installation** .

25. Lower the vehicle.

WHEEL STUD REPLACEMENT

Tools Required

J 43631 Ball Joint Remover

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the brake drum. Refer to **Brake Drum Replacement** in Drum Brakes.

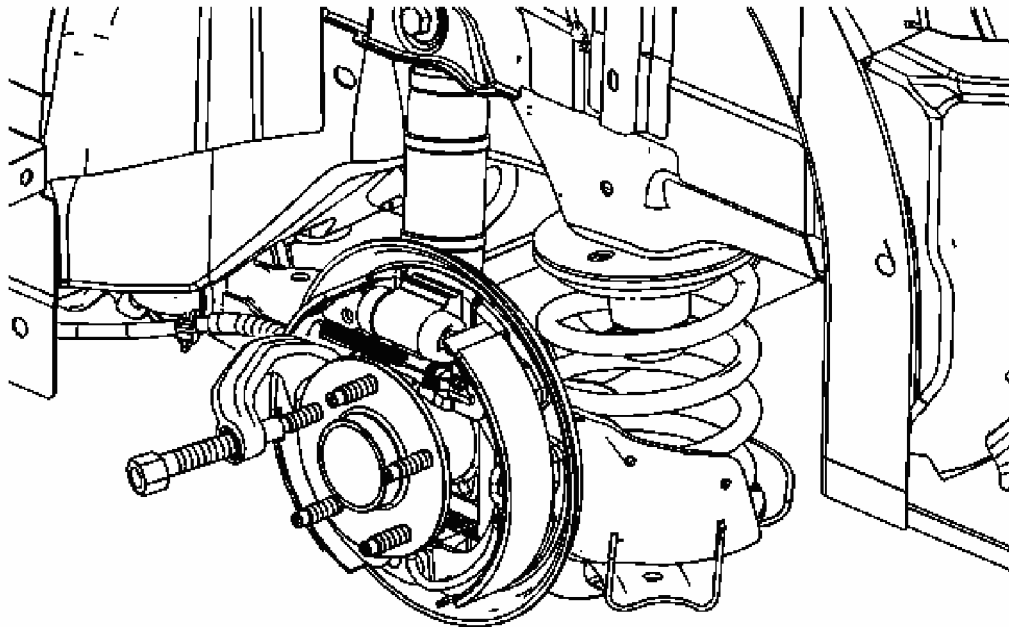


Fig. 25: Removing Wheel Stud
Courtesy of GENERAL MOTORS CORP.

4. Using the **J 43631** , remove and discard the wheel stud.

Installation Procedure

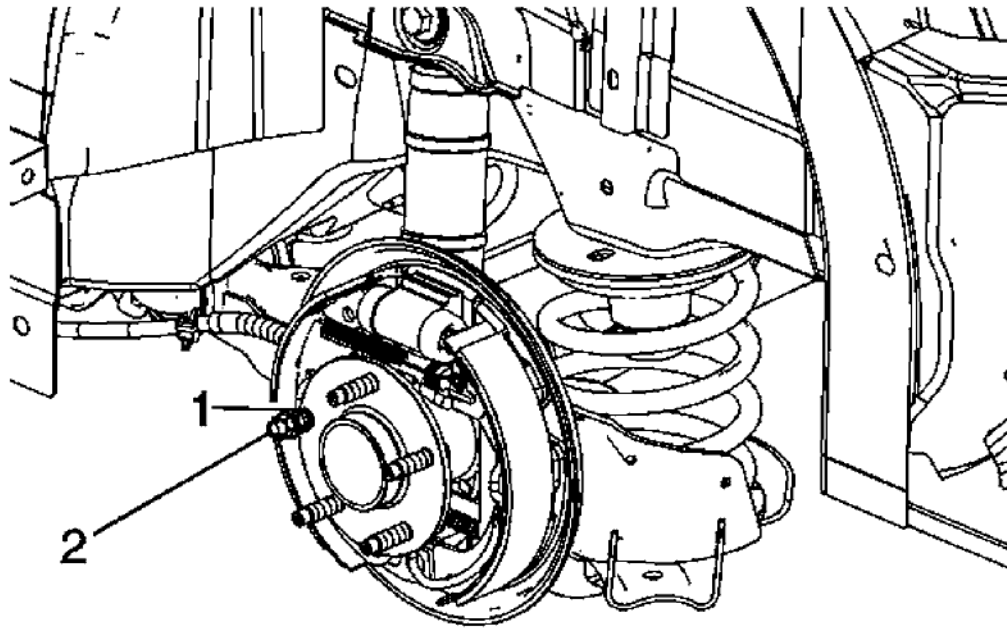


Fig. 26: Wheel Nut & Washer
Courtesy of GENERAL MOTORS CORP.

1. Install the NEW wheel stud into the wheel bearing hub.
2. Add enough washers (1) in order to draw the stud into the hub.
3. Install the wheel nut (2) with the flat side against the washers.
4. Tighten the wheel nut until the head of the wheel stud is fully seated against the back of the bearing hub flange.
5. Remove the wheel nut and the washers.
6. Install the brake drum. Refer to **Brake Drum Replacement** in Drum Brakes.
7. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
8. Lower the vehicle.

DESCRIPTION AND OPERATION

GENERAL DESCRIPTION

This vehicle has a semi-independent twist-beam rear suspension system consisting of the following components:

- An axle with integral trailing arms

- A V shaped twisting cross beam
- Two coil springs
- Two standard shock absorbers
- An optional integrated stabilizer bar

Axle Assembly

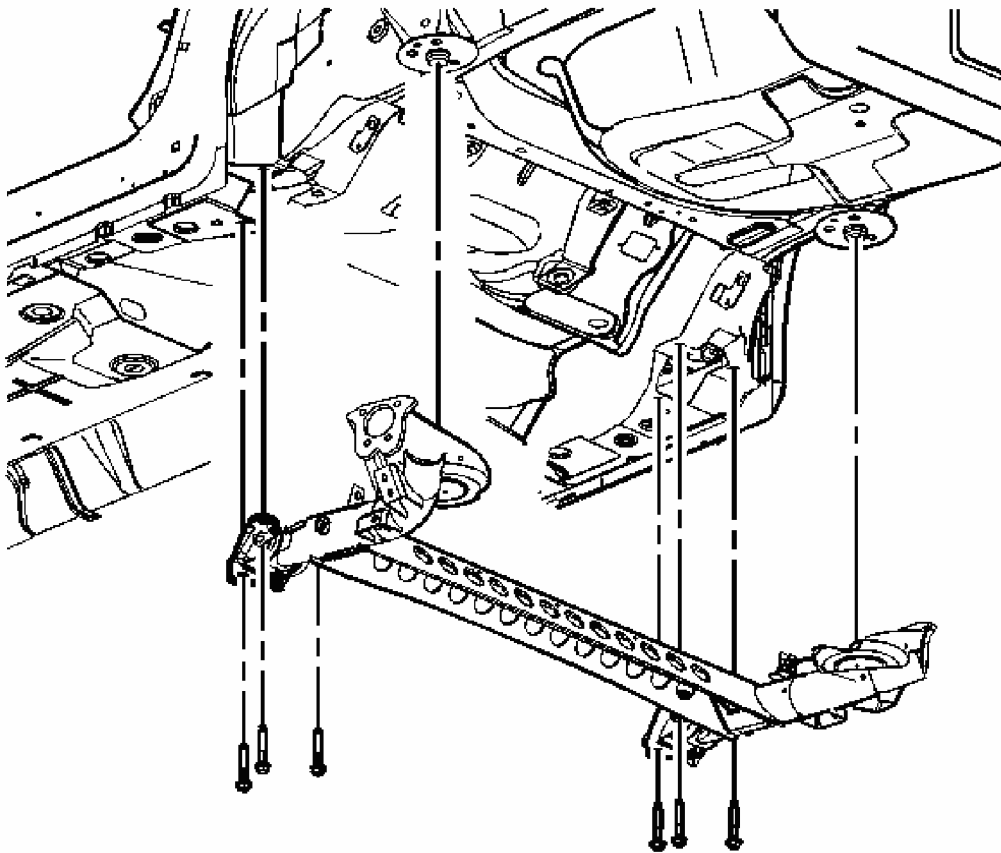


Fig. 27: View Of Rear Axle Bushing Bracket
Courtesy of GENERAL MOTORS CORP.

The axle assembly attaches to the underbody through a rubber bushing and bracket located at the front of each integral trailing arm. The brackets are bolted to the underbody side rails. The axle structure itself maintains the geometrical relationship of the wheels relative to the centerline of the body. The optional stabilizer shaft is welded to the inside of the "V" shaped axle beam and is non-serviceable.

Rear axle to vehicle alignment is achieved through alignment holes located in both the left

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and right axle bracket and underbody. Whenever the rear axle is removed for service, it is important that the rear axle is re-installed in its proper position relative to the centerline of the vehicle. Use two 12 mm rods to achieve this alignment. Insert each rod through the axle bracket into the underbody, then tighten the bracket bolts.

Rear camber and tow are not adjustable. Replace any damaged suspension components as necessary.

Coil Springs

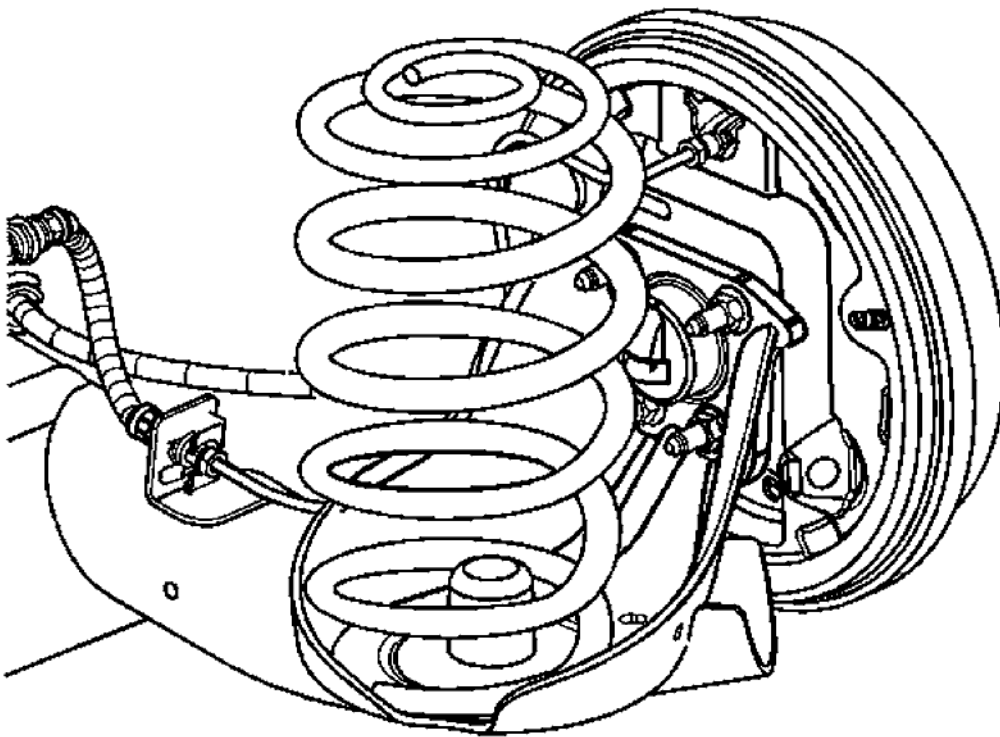


Fig. 28: Identifying Coil Spring
Courtesy of GENERAL MOTORS CORP.

The coil springs support the weight of the vehicle in the rear. Two spring rates exist on this vehicle, base and up-level, depending on the suspension option code. Rubber insulators isolate the coil spring at the upper and lower spring seat.

Shock Absorber

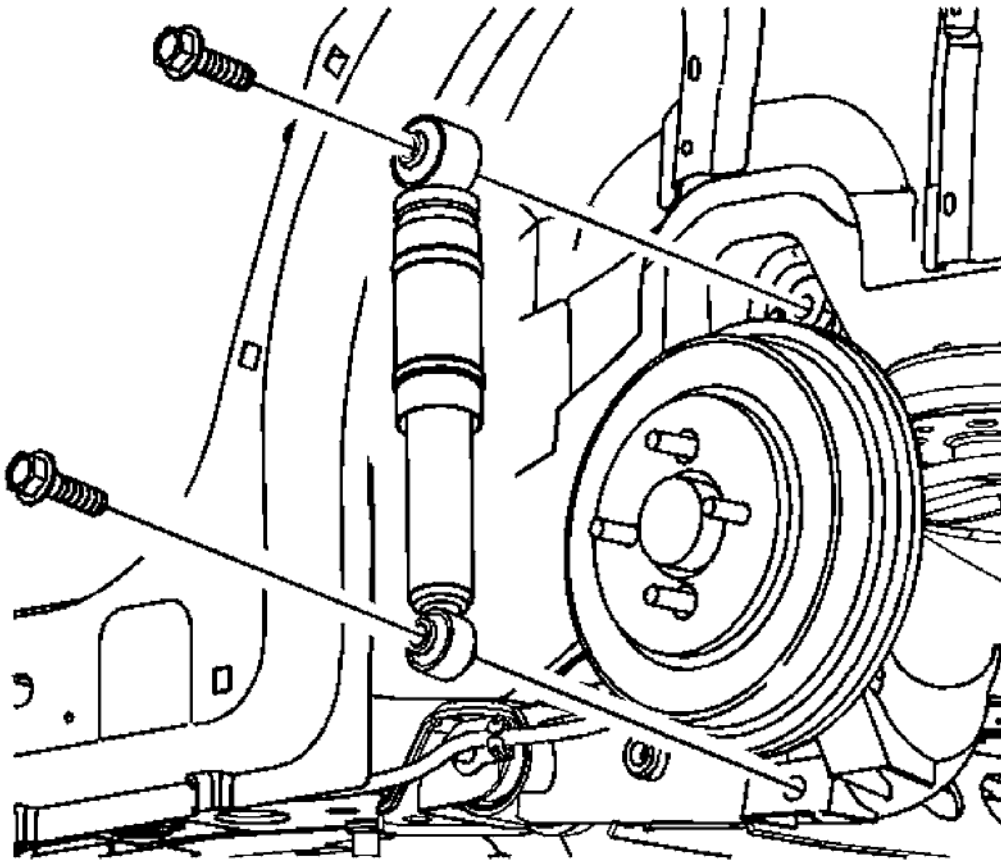


Fig. 29: View Of Shock Absorber
Courtesy of GENERAL MOTORS CORP.

The shock absorbers are bolted to the rear axle and the vehicle underbody. The shock absorbers are non-adjustable and non-refillable. Service of the shocks requires replacement of the shock assembly.

Wheel Bearing/Hub Assembly

A single hub and bearing assembly is bolted to both ends of the rear axle assembly. The hub and bearing assembly is a sealed unit that eliminates the need for wheel bearing adjustment or periodic maintenance. On ABS equipped vehicles, the wheel speed sensors are integrated into the wheel bearing assemblies.

Although the rear suspension components are lubricated for life and require no routine lubrication, they should be inspected periodically for damage and wear.

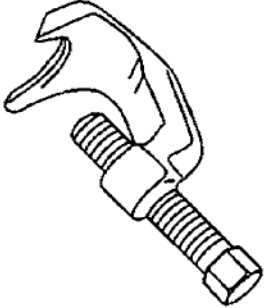
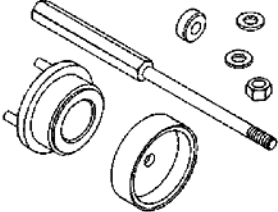
SPECIAL TOOLS AND EQUIPMENT

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SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 43631 Ball Joint Remover
	J 44570 Rear Axle Bushing Remover/Installer