

## 2017 DRIVELINE/AXLE

### Propeller Shaft - Encore, Trax

## SPECIFICATIONS

### FASTENER SPECIFICATIONS

#### Reusable Threaded Fastener Tightening Specifications

| <b>NOTE:</b><br><i>All fasteners listed in this table can be reused after removal.</i> |                   |
|----------------------------------------------------------------------------------------|-------------------|
| Application                                                                            | Specification     |
|                                                                                        | Metric (English)  |
| Center Bearing Support Bolt                                                            | 42 N.m (31 lb ft) |
| Propeller Shaft Bolt                                                                   | 36 N.m (27 lb ft) |

## DIAGNOSTIC INFORMATION AND PROCEDURES

### SYMPTOMS - PROPELLER SHAFT

Before beginning diagnosis, review the system description and operation in order to familiarize yourself with the system function. Refer to [Propeller Shaft Description and Operation](#).

#### Classifying the Symptom

Propeller Shaft symptoms can usually be classified into the following categories:

- Leaks
- Noises
- Vibrations

Leak and noise related symptoms are diagnosed within the propeller shaft section. Vibration related symptoms are described within General information - Vibration Diagnosis and Correction refer to [Symptoms - Vibration Diagnosis and Correction](#).

#### Visual/Physical Inspection

- Inspect the system for aftermarket devices which could affect the operation of the propeller shaft.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

#### Symptom List

Refer to [Propeller Shaft Diagnosis](#) in order to diagnose the symptom.

### PROPELLER SHAFT DIAGNOSIS

Review the propeller shaft system function. Refer to [Propeller Shaft Description and Operation](#).

Inspect for loose or missing propeller shaft-to-flange bolts. Tighten or replace as necessary. Refer to [Two-Piece Propeller Shaft Replacement](#).

Inspect for loose bracket bolts and damaged rubber bushings. Tighten or replace as necessary. Refer to [Two-Piece Propeller Shaft Replacement](#).

The propeller shaft and the joints are not serviceable.

The joint seals should be inspected for the following:

- Tears
- Cracks
- Contamination of the lubricating grease

Carefully pinch the seal and feel for the presence of grit

- Loose or missing seal clamps
- Leakage of lubricating grease from the seals

The joints should be inspected for the following conditions:

- Binding or impeded motion during axial movement of the front and rear joints
- Binding or impeded motion during lateral movement of the rear joint
- Loose or missing crimped-on end caps
- Leakage of lubricating grease from the end caps

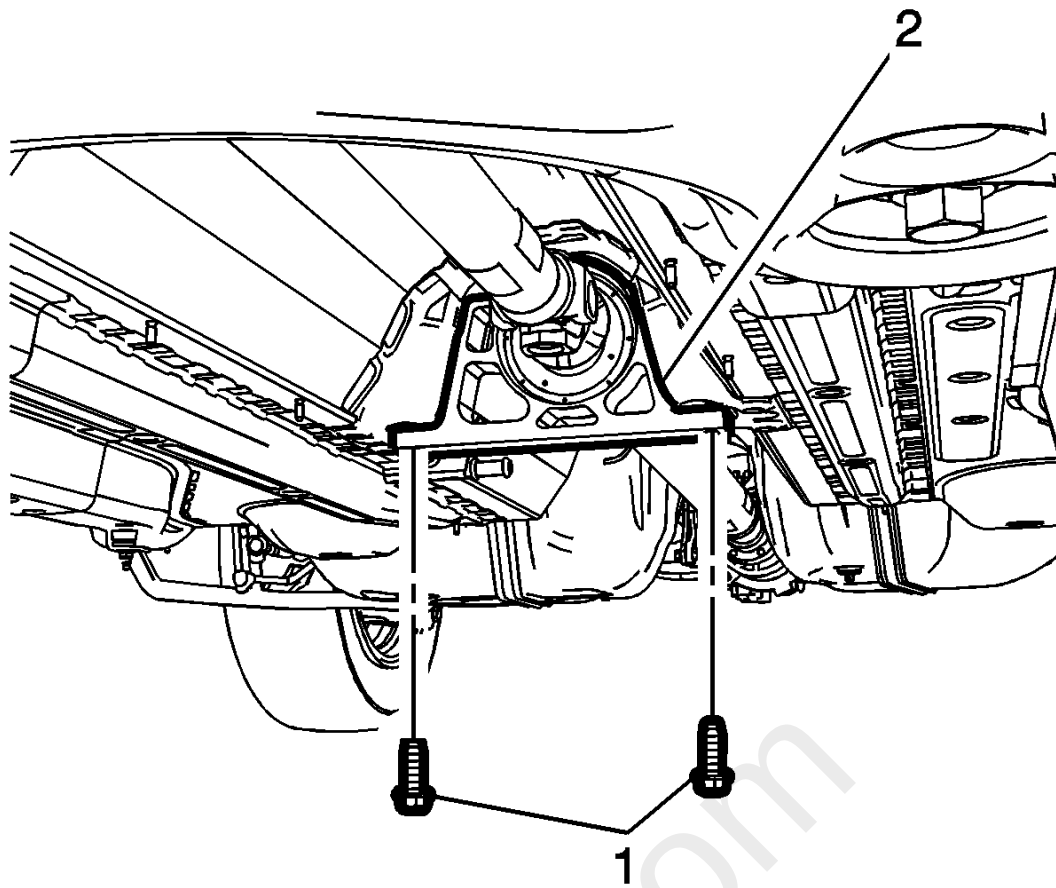
The propeller shaft must be replaced if any of the above conditions exist. This will ensure that the propeller shaft continues to operate as intended, and does not damage the other driveline components.

## REPAIR INSTRUCTIONS

### TWO-PIECE PROPELLER SHAFT REPLACEMENT

#### Removal Procedure

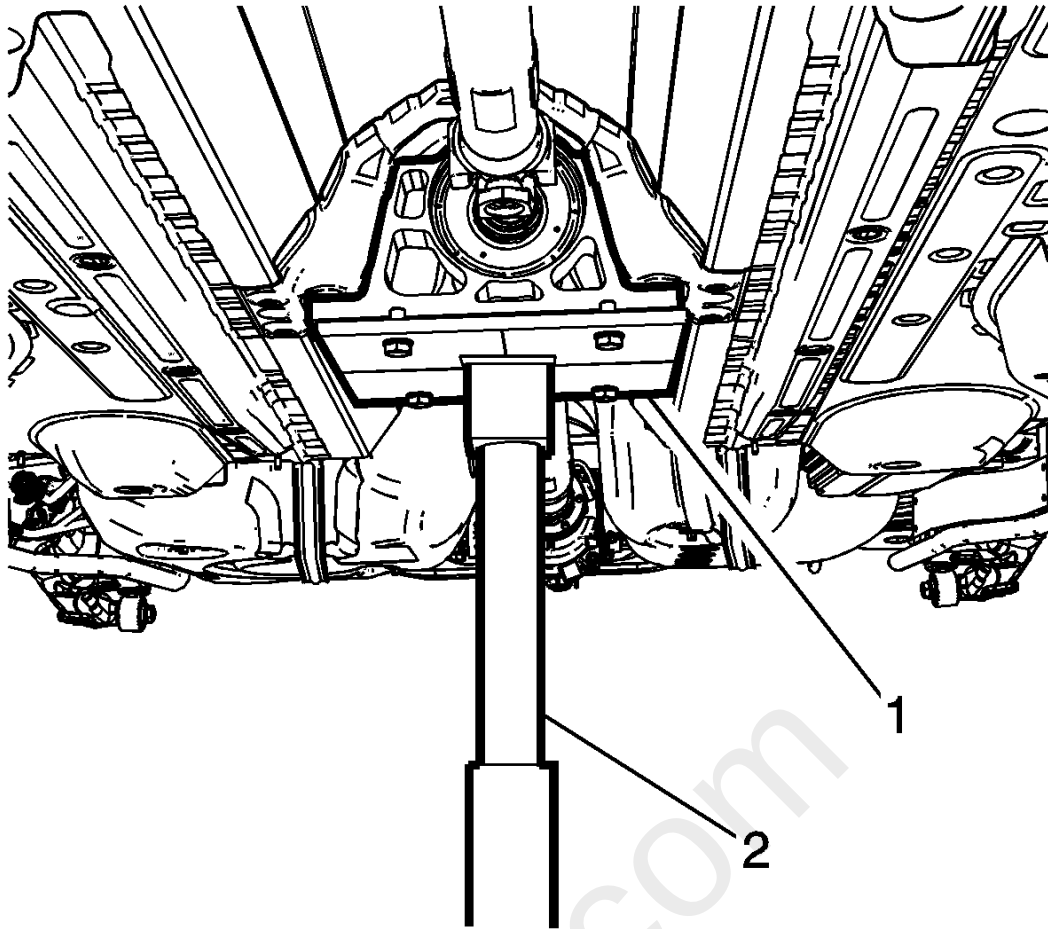
1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Remove the muffler assembly. [Exhaust Muffler Replacement \(2H0\)](#) [Exhaust Muffler Replacement \(LUV\)](#) [Exhaust Muffler Replacement \(LE2\)](#)
3. Remove the exhaust intermediate underbody heat shield. [Exhaust Intermediate Underbody Heat Shield Replacement](#) .



**Fig. 1: Center Bearing Bolts**

Courtesy of GENERAL MOTORS COMPANY

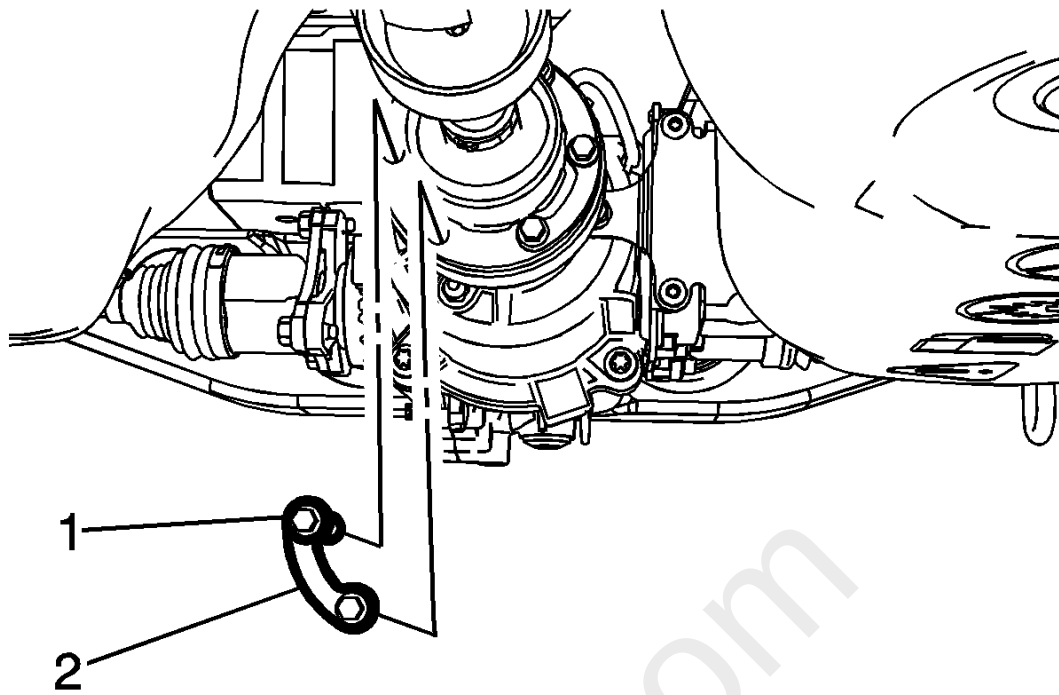
4. Remove the 2 center bearing bolts (1).



**Fig. 2: Supporting Propeller Shaft**

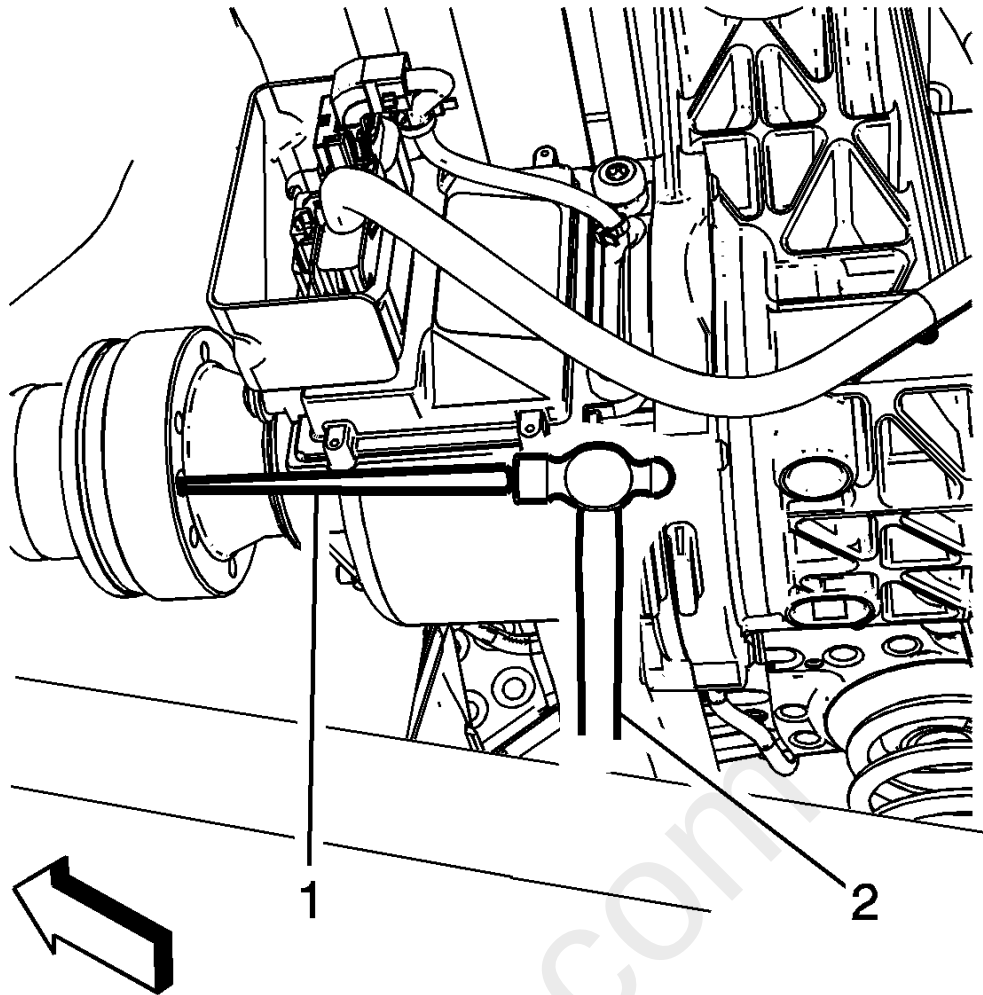
Courtesy of GENERAL MOTORS COMPANY

5. Using a hydraulic jack (2), support the propeller shaft at the center bearing (1).



**Fig. 3: Rear Propeller Shaft Bolts And Washers**  
Courtesy of GENERAL MOTORS COMPANY

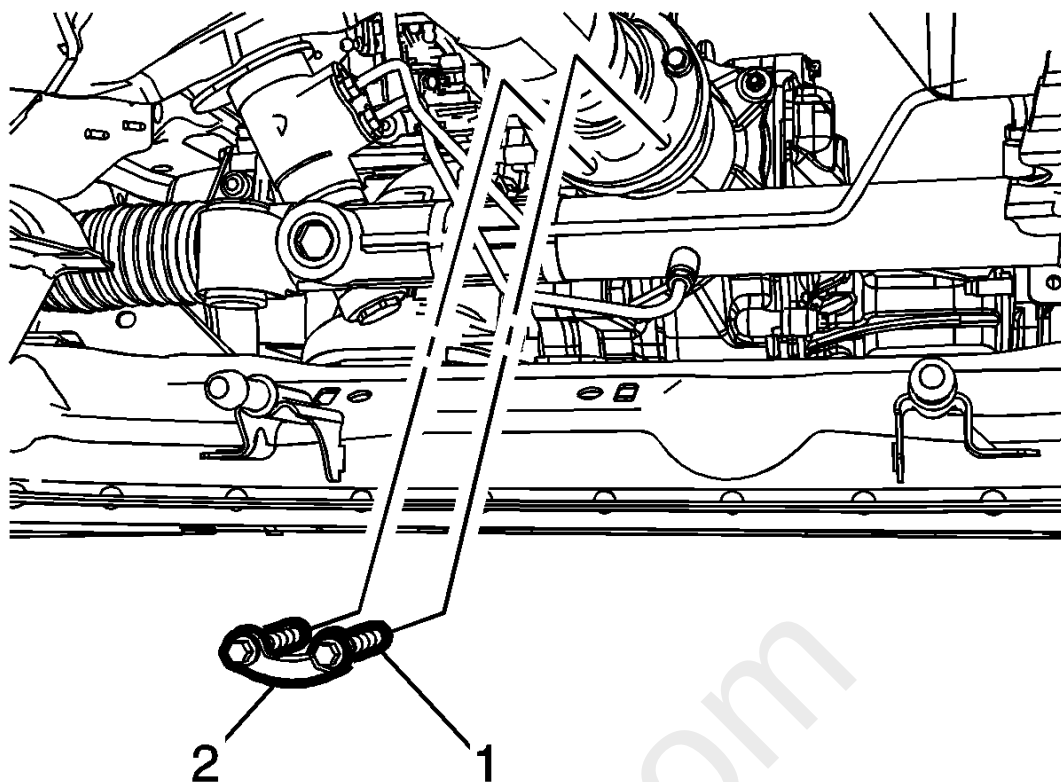
6. Remove the 6 rear propeller shaft bolts (1) and the 3 washers from the differential clutch flange.



**Fig. 4: Removing Propeller Shaft Using Hammer And Punch**

Courtesy of GENERAL MOTORS COMPANY

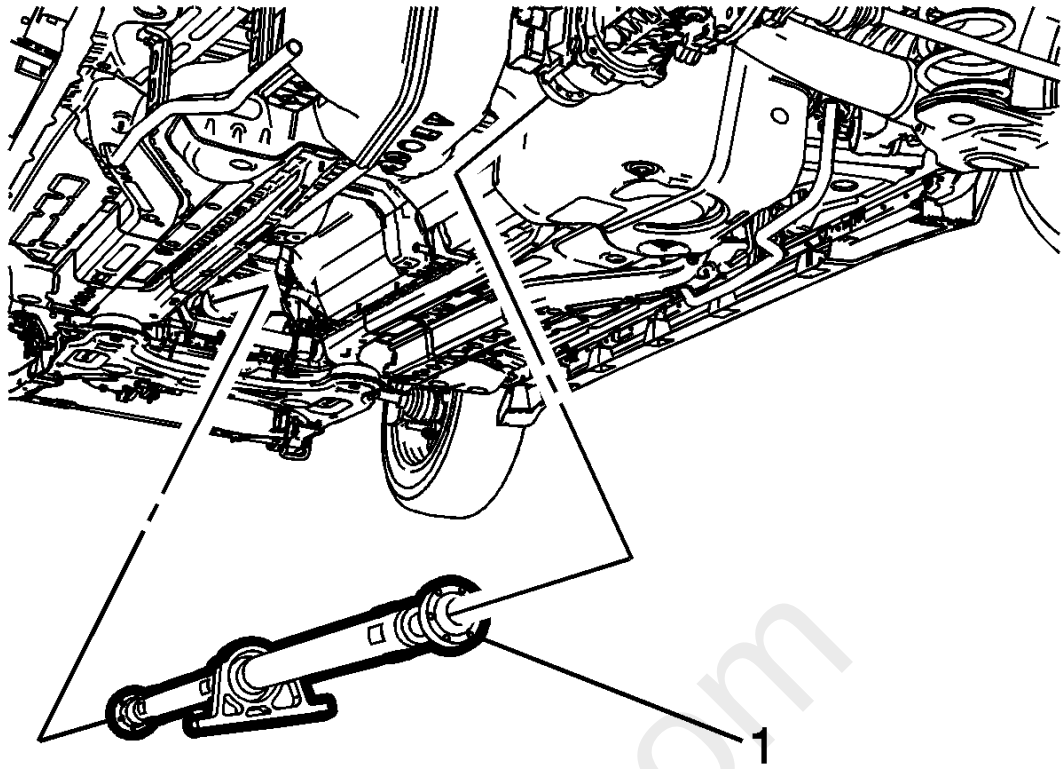
7. It may be necessary to use a punch (1) and the hammer (2) to remove the propeller shaft from the differential clutch flange.



**Fig. 5: Front Propeller Shaft Bolts**

Courtesy of GENERAL MOTORS COMPANY

8. Remove the 6 front propeller shaft bolts (1) and the 3 washers from the front differential pinion flange.

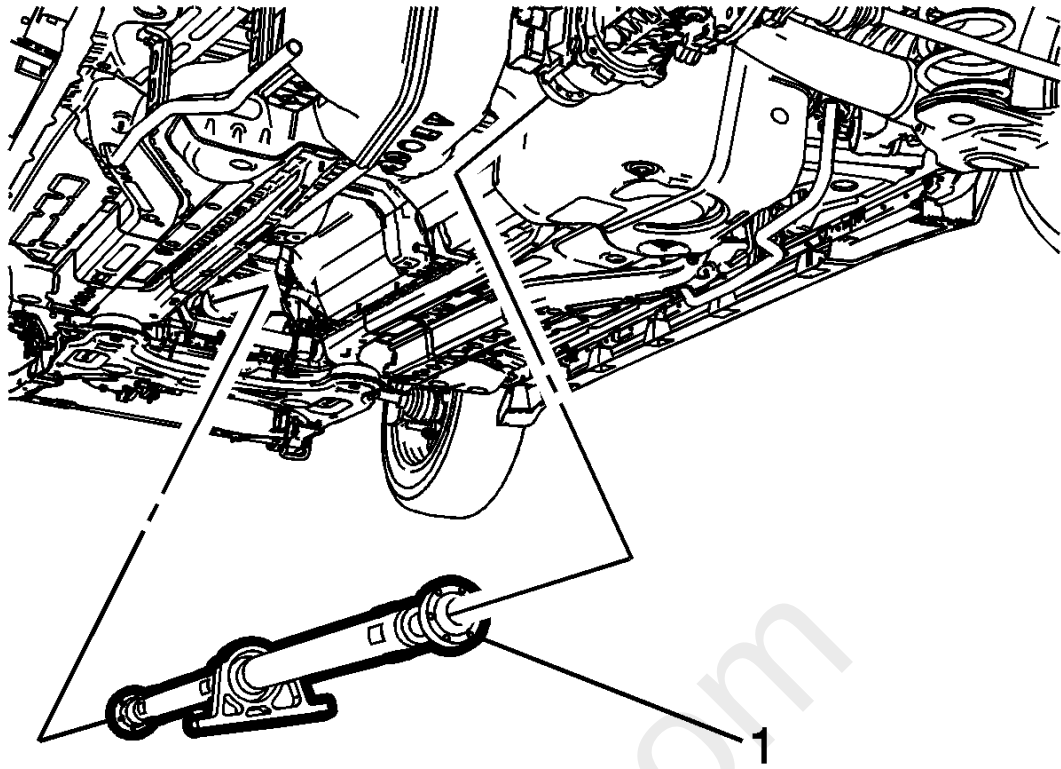


**Fig. 6: Propeller Shaft**

Courtesy of GENERAL MOTORS COMPANY

9. Remove the propeller shaft (1) from the vehicle.

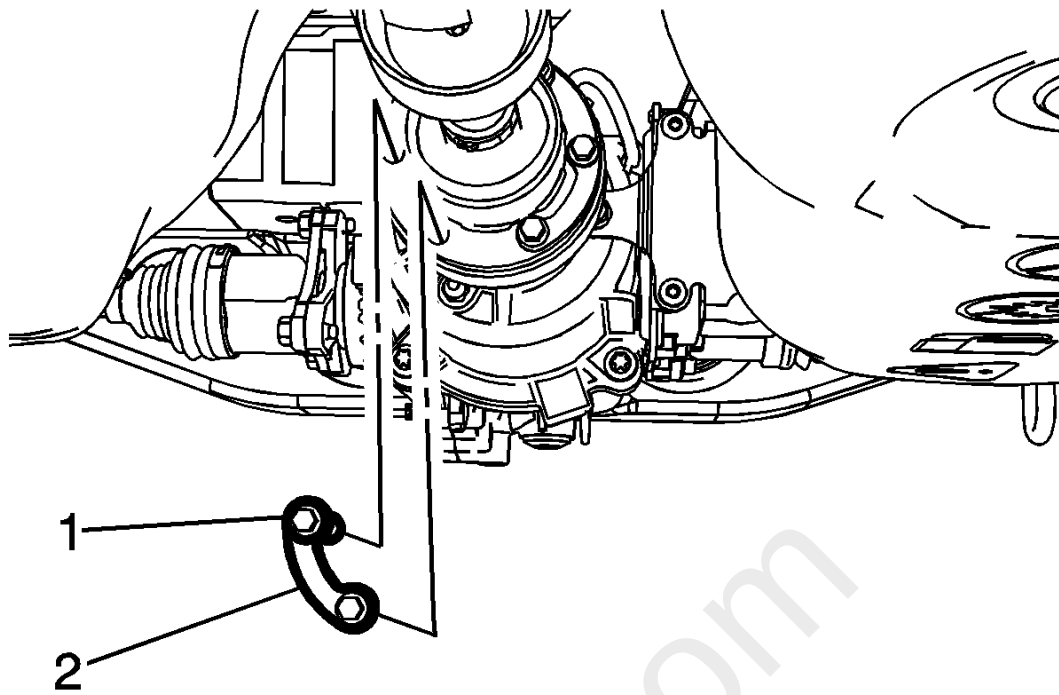
#### **Installation Procedure**



**Fig. 7: Propeller Shaft**

Courtesy of GENERAL MOTORS COMPANY

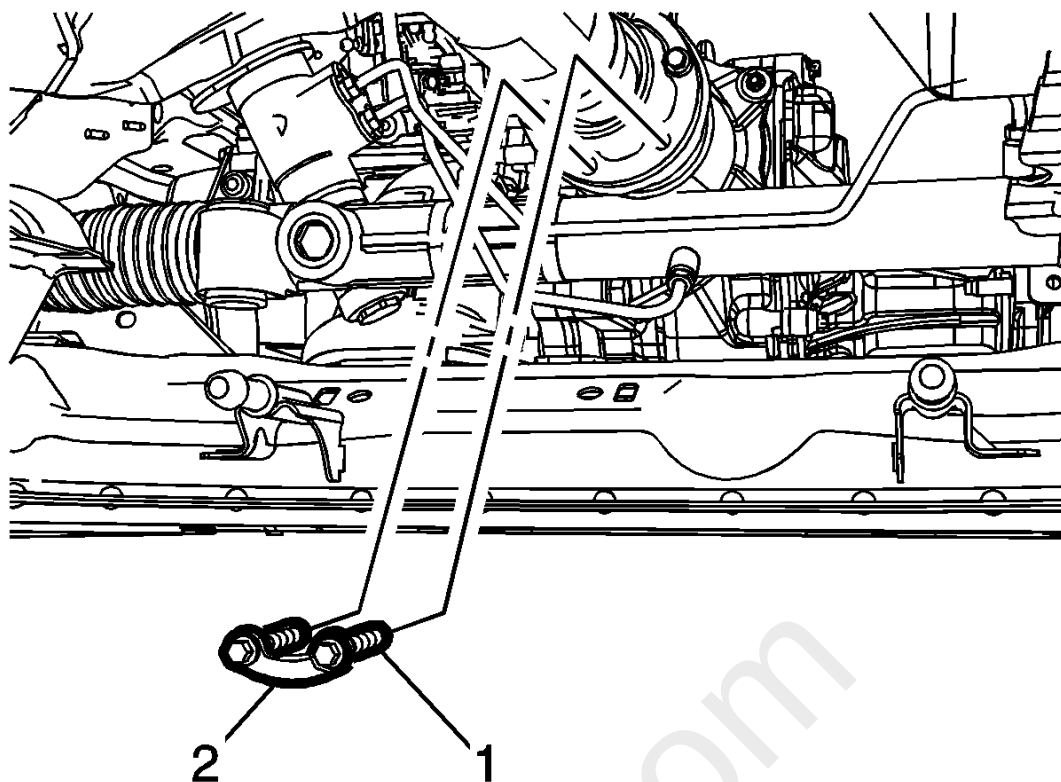
1. Position the propeller shaft (1) in the vehicle.



**Fig. 8: Rear Propeller Shaft Bolts And Washers**

**Courtesy of GENERAL MOTORS COMPANY**

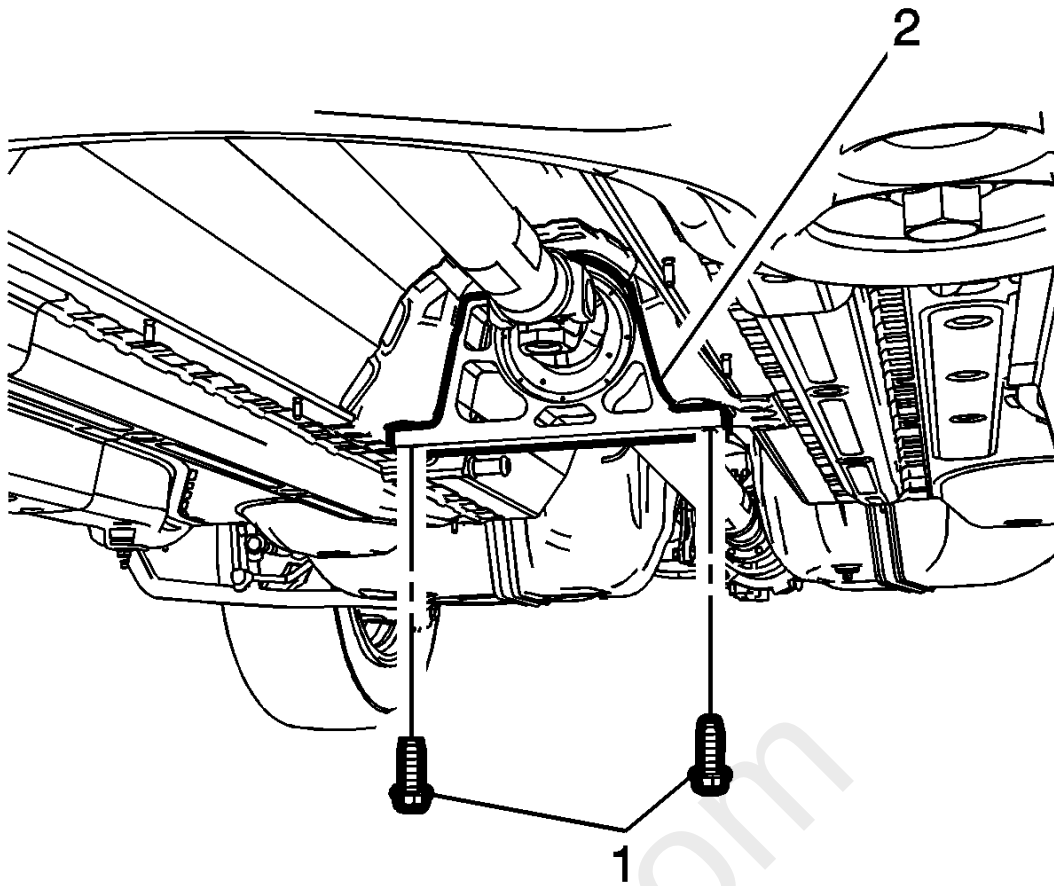
2. Install two of the rear propeller shaft bolts (1) and washer (2) to hold the propeller shaft in place to the differential clutch flange.



**Fig. 9: Front Propeller Shaft Bolts**

Courtesy of GENERAL MOTORS COMPANY

3. Install two of the front propeller shaft bolts (1) and washer (2) to hold the propeller shaft in place to the front differential pinion flange.



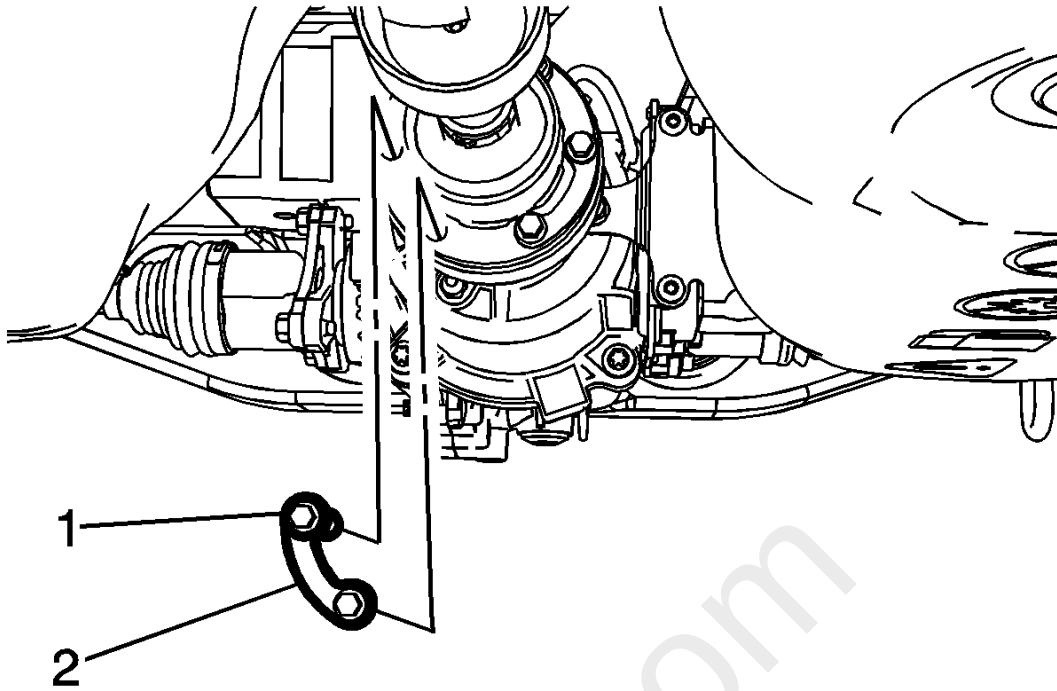
**Fig. 10: Center Bearing Bolts**

Courtesy of GENERAL MOTORS COMPANY

4. Position the propeller shaft center bearing (2) in the mounting bracket.

**CAUTION:** Refer to Fastener Caution .

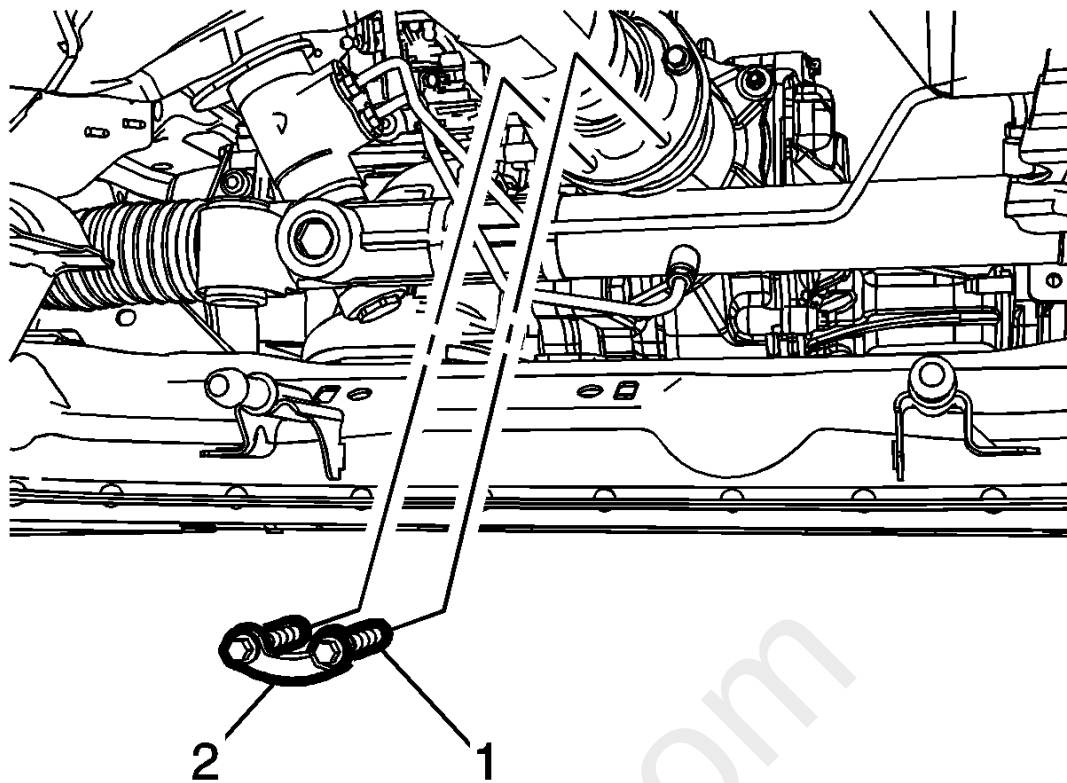
5. Install the center bearing bolts (1) and tighten to 42 N.m (31 lb ft).



**Fig. 11: Rear Propeller Shaft Bolts And Washers**

**Courtesy of GENERAL MOTORS COMPANY**

6. Install the remaining rear propeller shaft bolts (1) and washers (2) and tighten the bolts (1) to 36 N.m (27 lb ft).



**Fig. 12: Front Propeller Shaft Bolts**

Courtesy of GENERAL MOTORS COMPANY

7. Install the remaining front propeller shaft bolts (1) and washers (2) and tighten the bolts (1) to 36 N.m (27 lb ft).
8. Install the exhaust intermediate underbody heat shield. [Exhaust Intermediate Underbody Heat Shield Replacement](#)
9. Install the muffler assembly. [Exhaust Muffler Replacement \(2H0\)](#) [Exhaust Muffler Replacement \(LUV\)](#) [Exhaust Muffler Replacement \(LE2\)](#)
10. Remove the support and lower the vehicle.

## DESCRIPTION AND OPERATION

### PROPELLER SHAFT DESCRIPTION AND OPERATION

The function of the propeller shaft is to transfer power from the transfer case to the differential clutch. It consists of three pipe sections, a front Rzeppa joint, two Polhem joints in the center and a rear Rzeppa joint. The propeller shaft's support bearings are fitted by the Polhem joints. The bearings are mounted in rubber bushings which are fitted in brackets, and these in turn are bolted to the underside of the vehicle. The position of the brackets is very precisely measured during vehicle manufacture. The propeller shaft does not run in a straight line between the transfer case and the differential clutch but is instead gently curved, and this is to avoid vibration.

#### Front Drive Shaft

The propeller shaft connects into the transfer case pinion with a splines equipped pin which is part of the front drive shaft universal joint. The function of the joint is to handle the difference in angle between pinion and propeller shaft, as well as to be flexible longitudinally.

#### Support Bearings

Directly after the Polhem joints are the propeller shaft's support bearings, which are the single-row, permanently-lubricated groove ball bearing type. They are fitted in rubber bushings which in turn are fitted in brackets.

The brackets are bolted to the underside of the vehicle and their position is very precisely measured during vehicle manufacture. If the support bearing brackets are fitted incorrectly then vibration will occur.

### **Rear Drive Shaft**

The propeller shaft connects to the differential clutch driver by means of the rear drive shaft universal joint which is bolted to the driver.

The function of the joint is to handle the difference in angle between differential clutch driver and propeller shaft, as well as to be flexible longitudinally. The rear drive shaft universal joint is also a Rzeppa joint and is friction welded to the rear pipe section and constitutes one unit together with the propeller shaft.

### **Front/Rear Drive Shaft Universal Joint (Rzeppa Joint)**

The Rzeppa joint consists of an outer bearing race, which also constitutes the joint's housing. On its inside are 6 semi-spherical grooves. The inner bearing race consists of a cylindrical section, in the periphery of which are 6 semi-spherical grooves. The inner bearing race is fitted inside the outer one and there are 6 steel balls between the grooves. A ball holder is fitted between the outer and inner bearing races. There are steel balls between the bearing races which transfer the movement between outer and inner bearing races.

### **Center Joints (Polhem Joint)**

There are Polhem joints fitted between front and center pipe sections as well as between center and rear pipe sections. Their function is to handle the angle difference between pipe sections. The joints are angled 45 degrees in relation to each other to avoid vibration.

The Polhem joint consists of two forks, produced in forged steel which grip a cross by means of arms. The pins of the cross are mounted in needle bearings in the forks' bearing sleeves. The sleeves are permanently locked in the forks by means of compressive strain.

The bearing sleeves are permanently lubricated with synthetic special grease which contains molybdenum disulphide.

The drive shaft universal joint is friction welded to the relevant pipe section and constitutes one unit together with the propeller shaft.

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