Uniform Procedures For Collision Repair

DT31—Driveshaft

 v.2.3

1. Description

This procedure describes the diagnosis, replacement, and inspection of a driveshaft. Diagnosis, repair, replacement, and inspection of U-joints is also included.

2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of driveshafts. This procedure is intended for use by professionals who are qualified through training and experience.

3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

HM01 Hazardous Materials
PS01 Personnel Safety

3.2 Other Information

Equipment-specific information
Vehicle-specific repair information

4. Equipment And Material Requirements

4.1 Equipment

The use of this equipment is included in this procedure:

- ❏ U-joint removal and pressing tool
- ❏ snap-ring pliers
- ❏ brass punch or drift
- ❏ dial indicator

Other vehicle-specific special tools may be required.

5. Damage Analysis

5.1 General Damage

Properly lift and support the vehicle before inspecting the driveshaft. Follow the vehicle maker's lifting procedures.

Inspect the driveshaft and U-joints for these conditions:

- ❏ visible damage
- ❏ improper previous repairs
- ❏ corrosion that has caused pitting
- ❏ fluid leaks
- ❏ evidence of grease contamination
- ❏ play between the driveshaft and U-joints
- ❏ seized U-joints
- ❏ damaged or missing driveshaft balance weights, if applicable
- ❏ excessive driveshaft runout (see **9.1)**
- ❏ damaged or worn center bearing support, if applicable

Damaged parts must be replaced. Verify the availability of replacement parts. Replacement of worn parts will be necessary to restore proper driveshaft performance. It may be necessary to replace U-joints on both ends of the driveshaft to restore proper driveshaft performance. Follow the vehicle maker's recommendations and procedures for the replacement of driveshaft parts.

Further checks may be required to determine the location and extent of damage. Follow the vehicle maker's recommendations. Road-test the vehicle, if possible, to confirm the diagnosis or verify proper operation of the driveshaft. See **11.2.**

6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Safety With Driveshafts And U-Joints

To prevent injury when working with driveshafts and U-joints:

- ❏ Properly lift and support the vehicle.
- ❏ Properly support the driveshaft during removal and installation. Assistance may be required.
- ❏ Keep your head and body clear of the path where the driveshaft would fall.
- ❏ Use the proper tools, and follow the equipment and vehicle makers' recommendations.

7. Environmental Safety

7.1 Grease And Fluids

Collect and properly dispose of contaminated grease and other fluids.

Hazardous material safety information is in **HM01**.

8. Vehicle Protection

8.1 Driveshaft And U-Joint

To prevent damage to driveshafts and U-joints:

- ❏ Support both ends of the driveshaft during removal and installation procedures. Assistance may be required. Do not allow the driveshaft to hang by a U-joint.
- ❏ Make reference position marks before disassembling any part of the driveshaft to ensure proper reassembly.
- ❏ Wrap tape around the bearing caps to prevent the bearings from separating from the U-joint crosspieces (spiders).

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8. Vehicle Protection (cont'd)

- ❑ Install wooden pads or other protection on vise jaws before clamping parts in a vise. Avoid overtightening the vise. Clamp the yoke, not the driveshaft tube, in the vise to avoid damaging the driveshaft tube. Properly support the driveshaft in a horizontal position.
- ❑ Remove bearing caps in double U-joints following the vehicle maker's recommended sequence.
- ❑ Install replacement U-joint kits as complete assemblies. Do not mix parts from other replacement kits.
- ❑ Avoid overfilling grease fittings.
- ❑ Protect the driveshaft and U-joint areas when applying anti-corrosion materials, to prevent unbalancing the driveshaft.

9. Repair Procedure

9.1 Measuring Driveshaft Runout

Driveshaft runout can be measured with the driveshaft on or off the vehicle. To measure driveshaft runout with the driveshaft on the vehicle:

- ❑ 1. Ensure that the vehicle transmission is in neutral and the parking brake is off.
- ❑ 2. Properly raise and support the vehicle so the wheels can hang free.
- ❑ 3. Mount a dial indicator on the vehicle or lift frame so the plunger can contact a clean area near the center of the driveshaft.
  Note: Some vehicle makers require a runout check at several locations on the driveshaft.
- ❑ 4. Zero the dial indicator.
- ❑ 5. Slowly rotate the driveshaft by hand for one revolution.
- ❑ 6. Total runout is the sum of the maximum readings above and below the zero line on the indicator. The total runout must be within the vehicle maker's specifications at each of the required locations. Follow the vehicle maker's recommendations for possible adjustments. A runout greater than the allowable limits, that cannot be adjusted, requires replacement of the driveshaft.

9.2 Driveshaft Removal

To remove a driveshaft:

- ❑ 1. Properly lift and support the vehicle.
- ❑ 2. Make alignment marks on the attaching flange areas for proper reinstallation.

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- ❑ 3. Remove all parts required to access the driveshaft, and to prevent damage. This may include the exhaust system, crossmember brackets, etc.
- ❑ 4. Remove the fasteners that attach the driveshaft to the differential. Replace one-time or damaged fasteners. If the fasteners are being replaced, use fasteners that are the same size, type, and strength as the original fasteners.
- ❑ 5. On two-section shafts, remove the fasteners holding the bearing support assembly. Note the placement and number of any shims or washers.
- ❑ 6. Lower the rear of the driveshaft, then pull it straight rearward until the slip yoke is free. Remove the driveshaft from the vehicle.
- ❑ 7. Install a plug into the transmission housing, if required to prevent transmission fluid from leaking.
- ❑ 8. Inspect the couplings, bearings, bushings, etc. for damage or excessive wear. Follow the vehicle maker's recommendations for conditions that require part replacement. Transfer any alignment marks to replacement parts.

9.3 Driveshaft Installation

To install a driveshaft:

- ❑ 1. Lightly lubricate the slip yoke.
- ❑ 2. Remove the plug in the transmission housing.
- ❑ 3. Position the driveshaft under the vehicle using the alignment marks, and insert the slip yoke into the transmission housing. Properly support the driveshaft to keep it in a straight line.
- ❑ 4. If the driveshaft has a center mount, loosely install the fasteners into the center housing. Make sure to install the required number of shims or washers in their original locations.
- ❑ 5. Raise the rear of the driveshaft and line it up with the alignment marks and fastener holes. Loosely install the fasteners.
- ❑ 6. Verify that the driveshaft is aligned and angled properly. Torque the fasteners to the vehicle maker's recommendations.
- ❑ 7. Properly lubricate joints and pivots that are equipped with grease fittings.
- ❑ 8. Install all parts that were removed for access.
- ❑ 9. Lower the vehicle.
- ❑ 10. Check the transmission fluid level. Add fluid if required.
- ❑ 11. Road-test the vehicle. See **11.2**.

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9.4 U-Joint Removal

To remove a U-joint:

❑ 1. Note the position of the joint before removing the driveshaft.
❑ 2. Remove the driveshaft from the vehicle. See **9.1**.
❑ 3. Secure the driveshaft yoke in a vise. Avoid overtightening the vise. Support the driveshaft tube in a horizontal position.
❑ 4. Remove the fasteners holding the U-joint bearing caps. Note: Double U-joints require removing the bearing caps in a specific sequence, then removing each U-joint separately from the center ball joint. Follow the vehicle maker's recommendations.
❑ 5. Press the spider from the yoke and remove the bearing cap and bearings. Use sockets, C-clamp, chisel, or other tools if required.
❑ 6. Inspect the driveshaft yoke and inner splines for damage. Damaged parts require yoke or driveshaft replacement. Rough edges should be removed with a file.

9.5 U-Joint Installation

To install a replacement U-joint:

❑ 1. Clean any contamination from inside the yoke.
❑ 2. Remove the bearing caps from the replacement U-joint. Properly lubricate the needle bearings, if required. Make sure the bearings are in the proper position.
❑ 3. Position the replacement spider inside the yoke so one bearing cap can be installed.
❑ 4. Position the assembly in a vise and press the bearing cap partially onto the spider.
❑ 5. Remove the assembly from the vise and position the spider so the other bearing cap can be installed.
❑ 6. Position the yoke in the vise and press so both bearing caps move into their proper position. Turn the spider while tightening to make sure there is no binding or shifting of the bearings. If there is binding, check the needle bearings for misalignment.
❑ 7. Install the fasteners to secure the bearing caps.
❑ 8. Install the remaining bearing caps.
❑ 9. If the U-joint is equipped with grease fittings, fill the joint with the proper grease. Do not overfill.

10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Do not install salvage driveshafts having any of these defects:

- ❏ visible damage
- ❏ evidence of having been heated, welded, or damaged
- ❏ corrosion that has caused pitting
- ❏ improper previous repairs
- ❏ any play between the driveshaft and the U-joints
- ❏ runout exceeding the vehicle maker's specification limits
- ❏ wear or binding when turning the center bearing support, if applicable

Replace the U-joints on salvage driveshafts.

11. Inspection And Testing

11.1 Driveshaft And U-Joint Inspection

When repairs are completed, inspect driveshafts and U-joints for these conditions:

- ❏ proper alignment and angle
- ❏ proper transmission fluid level
- ❏ proper differential or transfer case fluid level
- ❏ proper lubrication at all grease fittings and pivot locations
- ❏ no undercoating or other contamination on the driveshaft
- ❏ fasteners torqued to the vehicle maker's recommendations

Correct any defects.

11.2 Driveshaft Road-Test

Road-test the vehicle and check for these conditions:

- ❏ drivetrain vibration
- ❏ unusual noises when accelerating, upshifting, or downshifting

Correct any defects.