Figure 124–1 Notice how the needle bearings have worn grooves into the bearing surface of the U-joint.

REAL WORLD FIX: The Squeaking Pickup Truck

The owner of a pickup truck complained that a squeaking noise occurred while driving in reverse. The “weeeeee-weeeeee” sound increased in frequency as the truck increased in speed, yet the noise did not occur when driving forward.

Because there was no apparent looseness in the U-joints, the service technician at first thought that the problem was inside either the transmission or the rear end. When the driveshaft was removed to further investigate the problem, it became obvious where the noise was coming from. The U-joint needle bearing had worn the cross-shaft bearing surface of the U-joint. - SEE FIGURE 124–1.

The noise occurred only in reverse because the wear had occurred in the forward direction, and therefore only when the torque was applied to the opposite direction did the needle bearing become bound up and start to make noise. A replacement U-joint solved the squeaking noise in reverse.
Figure 124-2  All U-joints and spline collars equipped with a grease fitting should be greased four times a year as part of a regular lubrication service. (Courtesy of Dana Corporation)

Figure 124-3  Many U-joints require a special grease gun tool to reach the grease fittings. Alemite is a brand name of lubrication equipment so many parts and tools use the Alemite name. (Courtesy of Dana Corporation)

Figure 124-4  Always mark the original location of U-joints before disassembly.
Figure 124-5
Two types of retaining methods that are commonly used at the rear U-joint at the differential. (Courtesy of Dana Corporation)

Figure 124-6
The best way to check any U-joint is to remove the driveshaft from the vehicle and move each joint in all directions. A good U-joint should be free to move without binding. (Courtesy of Dana Corporation)

TECH TIP: Spline Bind Cure

Driveline clunk often occurs in rear-wheel-drive vehicles when shifting between drive and reverse or when accelerating from a stop. Often the cause of this noise is excessive clearance between the teeth of the ring and pinion in the differential. Another cause is called spline bind, where the changing rear pinion angle creates a binding in the spline when the rear springs change in height. For example, when a pickup truck stops, the weight transfers toward the front and unloads the rear springs. The front of the differential noses downward and forward as the rear springs unload. When the driver accelerates forward, the rear of the truck squats downward, causing the driveshaft to be pulled rearward when the front of the differential rotates upward. This upward movement on the spline often causes the spline to bind and make a loud clunk when the bind is finally released.

The method recommended by vehicle manufacturers to eliminate this noise is to follow these steps:
1. Remove the driveshaft.
2. Clean the splines on both the driveshaft yoke and the transmission output shaft.
3. Remove any burrs on the splines with a small metal file (remove all filings).
4. Apply a high-temperature grease to the spline teeth of the yoke. Apply grease to each spline, but do not fill the splines. Synthetic chassis grease is preferred because of its high temperature resistance.
5. Reinstall the driveshaft.
TECH TIP: Use Tape to Be Safe
When removing a driveshaft, use tape to prevent the rear U-joint caps from falling off. If the caps fall off the U-joint, all of the needle bearings will fall out and scatter over the floor. SEE FIGURE 124–10.

Figure 124–7 Typical U-joint that uses an outside snap ring. This style of joint bolts directly to the companion flange that is attached to the pinion gear in the differential.

Figure 124–8 A U-joint that is held together by nylon and usually requires that heat be applied to release from the yoke.
Use a vise and two sockets to replace a U-joint. One socket fits over the bearing cap and one fits on the bearing to press fit the cap onto the crosspiece.

Taping the U-joint to prevent the caps from coming off.

A special tool being used to press apart a U-joint that is retained by injected plastic. Heat from a propane torch may be necessary to soften the plastic to avoid exerting too much force on the U-joint.
Figure 124-12 Removing the worn cross from the yoke.

Figure 124-13 When installing a new U-joint, position the grease fitting on the inboard side (toward the driveshaft tube) and in alignment with the grease fitting of the U-joint at the other end.

Figure 124-14 The working angle of most U-joints should be at least 1/2 degree to permit the needle bearing to rotate in the U-joint and should not exceed 3 degrees or a vibration can occur in the driveshaft, especially at higher speeds. The difference between the front and rear working angles should be within 1/2 degree of each other.
Figure 124-15  An inclinometer with a magnetic base is being used to measure the angle of the driveshaft at the rear U-joint.

Figure 124-16  Placing a tapered metal wedge between the rear leaf spring and the rear axle pedestal to correct rear U-joint working angles.

Figure 124-17  A transmission oil pan gasket leak allowed automatic transmission fluid (ATF) to saturate the rear transmission mount rubber, causing it to collapse. After replacing the defective mount, proper universal joint angles were restored and the driveline vibration was corrected.
TECH TIP: Quick and Easy Backlash Test

Whenever a driveline clunk is being diagnosed, one possible cause is excessive backlash. Backlash is the clearance between the ring gear teeth and differential pinion teeth in the differential. Another common cause of excessive backlash is too much clearance between differential carrier pinion teeth and side gear teeth. A quick test to check backlash involves three easy steps:

STEP 1: Hoist the vehicle on a frame contact lift, allowing the drive wheels to be rotated.

STEP 2: Have an assistant hold one drive wheel and the driveshaft to keep them from turning.

STEP 3: Move the other drive wheel, observing how far the tire can rotate. This is the amount of backlash in the differential; it should be less than 1 in. (25 mm) of movement measured at the tire.

If the tire can move more than 1 in. (25 mm), then the differential should be inspected for wear and parts should be replaced as necessary. If the tire moves less than 1 in. (25 mm), then the backlash between the ring gear and pinion is probably not the cause of the noise.

Figure 124-18
The hub nut must be removed before the hub bearing assembly or drive axle shaft can be removed from the vehicle.

Figure 124-19
Many knuckles are attached to the ball joint on the lower control arm by a pinch bolt.
The preferred method for separating the tie rod end from the steering knuckle is to use a puller such as the one shown. A “pickle-fork” type tool should be used only if the tie rod is going to be replaced. A pickle-fork type tool can damage or tear the rubber grease boot. Striking the tie rod end with a hammer while holding another hammer behind the joint to shock and break the taper from the steering knuckle can also be used.

Many drive axles are retained by torque prevailing nuts that must not be reused. Torque prevailing nuts are slightly deformed or contain a plastic insert that holds the nut tight (retains the torque) to the shaft without loosening.

A special General Motors tool is being used to separate the drive axle shaft from the wheel hub bearing.
Figure 124-23 Most inner CV joints can be separated from the transaxle with a prybar.

Figure 124-24 When removing a drive axle shaft assembly, use care to avoid pulling the plunge joint apart.

Figure 124-25 If other service work requires that just one end of the drive axle shaft be disconnected from the vehicle, be sure that the free end is supported to prevent damage to the protective boot or allowing the joint to separate.
With a scribe, mark the location of the boots before removal. The replacement boots must be in the same location.

Most CV joints use a snap ring to retain the joint on the drive axle shaft.

After releasing the snap ring, most CV joints can be tapped off the shaft using a brass or shot-filled plastic (dead-blow) hammer.
Typical outer CV joint after removing the boot and the joint from the drive axle shaft. This joint was removed from the vehicle because a torn boot was found. After disassembly and cleaning, the joint was found to be OK and was put back into service. Even though the grease looks terrible, there was enough grease in the joint to provide enough lubrication to prevent any wear from occurring.

The cage of this Rzeppa-type CV joint is rotated so that one ball at a time can be removed. Some joints require that the technician use a brass punch and a hammer to move the cage.

Be sure to use all of the grease supplied with the replacement joint or boot kit. Use only the grease supplied and do not use substitute grease.
Figure 124–32  A screwdriver is shown, but a punch would be better, to keep the rotor from rotating while removing or installing the drive axle shaft spindle nut.

Figure 124–33  The engine had to be raised higher to get the new (noncollapsed) engine mount installed.

REAL WORLD FIX: The Vibrating Buick

The owner of a front-wheel-drive Buick complained that it vibrated during acceleration only. The vehicle would also pull toward one side during acceleration. An inspection discovered a worn (cracked) engine mount. After replacing the mount, the CV joint angles were restored and both the vibration and the pulling to one side during acceleration were solved. • SEE FIGURE 124–33.
Tools needed to replace a drive axle shaft on a General Motors vehicle include a punch, sockets, plus a puller bearing/axle shaft special tool.

The drive axle shaft retaining nut can be loosened with the tire on the ground, or use a drift inserted into the rotor cooling fins before removing the nut.

Using a special tool to push the drive axle splines from the bearing assembly.
DRIVE AXLE SHAFT REPLACEMENT 4
Remove the disc brake caliper and support it out of the way. Then, remove the disc brake rotor.

DRIVE AXLE SHAFT REPLACEMENT 5
To allow for the removal of the drive axle shaft, the strut is removed from the steering knuckle assembly.

DRIVE AXLE SHAFT REPLACEMENT 6
A prybar is used to separate the inner drive axle shaft joint from the transaxle.
DRIVE AXLE SHAFT REPLACEMENT 7  After the inner joint splines have been released from the transaxle, carefully remove the drive axle shaft assembly from the vehicle.

DRIVE AXLE SHAFT REPLACEMENT 8  To install, reverse the disassembly procedure and be sure to install the washer under the retainer nut, and always use a new prevailing torque nut.

DRIVE AXLE SHAFT REPLACEMENT 9  Reinstall the disc brake rotor and caliper and then torque the drive axle shaft retaining nut to factory specifications.