

2014-01 – Driveline/Driveshaft Inspections

*Created: April 1, 2014
Revised: April 27, 2017
Revised: Sept. 27, 2018*

Summary

This Inspection Bulletin provides guidance for inspecting the driveline/driveshaft on a bus, truck or truck tractor during a roadside inspection, and for identifying when a vehicle is in violation and/or should be placed out of service (OOS).

An accompanying training video is available on the CVSA website at cvsa.org or on the CVSA App.

Background

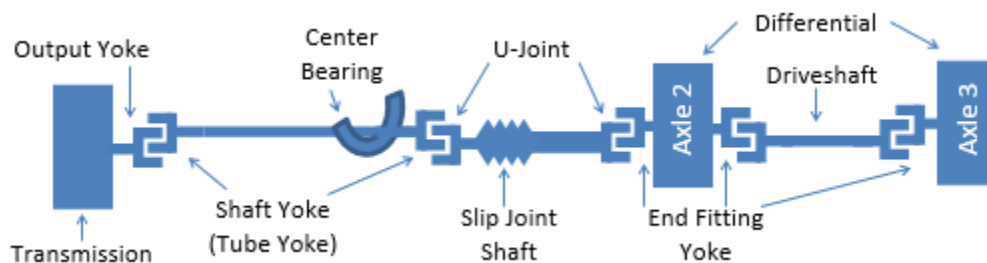
The driveline/driveshaft is part of the drivetrain and is responsible for transmitting the torque output from the engine/transmission to the rear differential(s) and subsequently to the drive axles and wheels.

Poorly maintained drivelines can lead to a vehicle's inability to move and/or driveline parts falling off the vehicle and becoming hazardous and/or airborne road debris. This road debris has been known to penetrate windshields, flatten tires and more. Once a driveline/driveshaft fails, the bus, truck or truck tractor can no longer move and then becomes a road hazard itself.

Applicability

Any bus, truck or truck tractor equipped with a visible external driveline/driveshaft.

Driveline/Driveshaft Components and Nomenclature



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Glossary of Terms

Bearing Cup Assembly — Consists of a bearing cup with needle rollers generally held in place by a seal guard and bearing seal.

Bearing Seal — A flexible member of a bearing cup assembly that prevents the escape of lubricant from or entry of foreign matter into a bearing.

End Fitting — An end yoke or companion flange that attaches a driveshaft to a transfer case or axle (pinion).

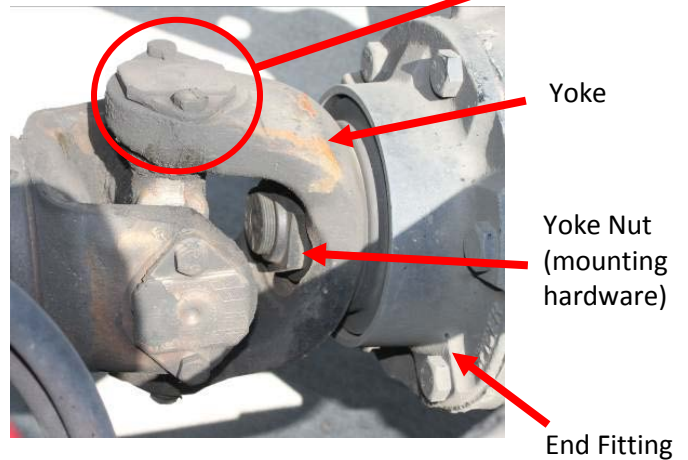
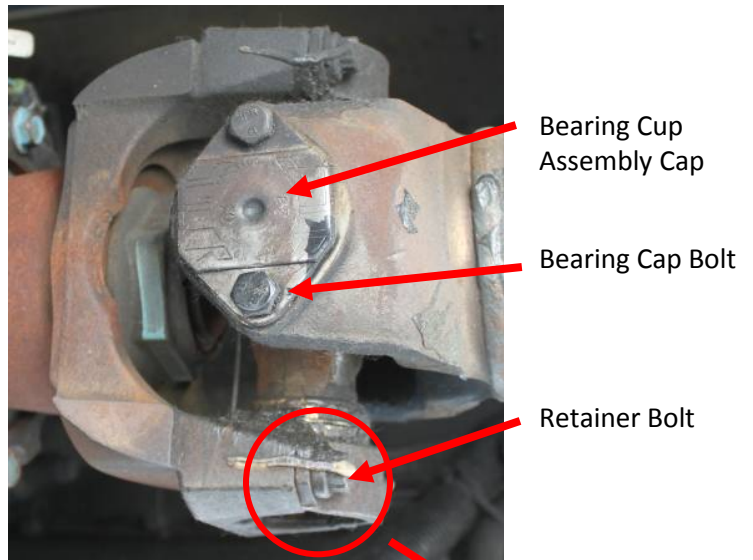
Yoke — A component that attaches a driveshaft to a transfer case or axle (pinion).

Slip Yoke — A slip member yoke with a female machined spline used for axial movement.

Spline — A machined element consisting of integral keys (splined teeth) or keyways (spaces) equally spaced around a circle or portion thereof.

Universal Joint — A mechanical device that can transmit torque and/or rotary motion from one shaft to another at fixed or varying angles of intersection of the shaft axes.

Yoke Shaft — A slip member yoke with a male machined spline used for axial movement.



Slip Yoke (Slip Joint)

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Inspection Procedure

Driveline/driveshaft defects may not be in violation until the condition meets the out-of-service criteria as outlined in the North American Standard Out-of-Service Criteria. Appropriate jurisdictional regulations must be consulted to determine appropriate violation references.

The inspection of the driveline/driveshaft will take place during Step 29 of the North American Standard Level I Inspection Procedure, and the driveline/driveshaft may also be viewed from the top during Step 17.

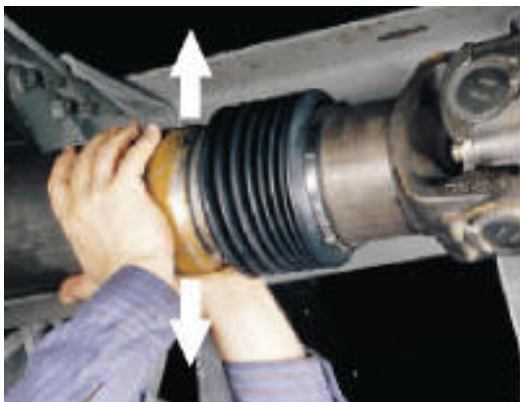
Beginning at the transmission end (front), visually inspect the driveline/driveshaft from the front to the rear for the following:

Inspecting Yoke End Fittings (Includes Slip Yoke, Yoke Shaft, Tube Yoke and End Fitting Yoke)



- Take hold of the end fitting with both hands. Try to move it vertically and horizontally to feel any looseness. NOTE: *If oil is evident coming from the transmission, it may be hot and officers should exercise caution.*

- Check all input and output end fittings (yokes at each end of driveshaft) for looseness or play. Ensure that all the mounting hardware (nuts, bolts, etc.) are not loose by hand pressure, broken or missing.



- Inspect the yoke end for cracks.
- Attempt to move the slip joint yoke shaft by hand. Check to see if there is any movement. Movement indicates wear in the splines of the slip joint.

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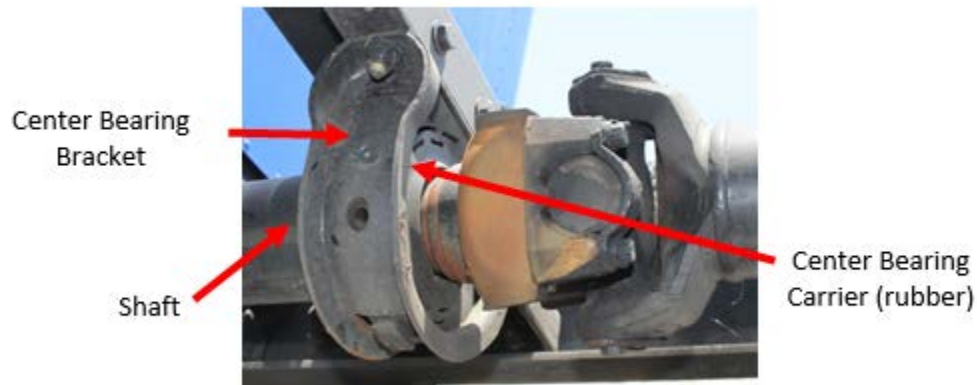
Inspecting Universal Joints



- Attempt to rotate the universal joint ends in opposing directions. With hand pressure only, determine if there is any independent rotational movement between the opposing yoke ends.
- Verify all bearing cup assembly caps are in place.
- With hand pressure, ensure the universal joint bolts are not loose, broken or missing.

Inspecting Center Bearing (Carrier Bearing)

- Inspect the center bearing bracket, bracket bolts and mounting hardware and ensure they are not loose or broken.
- Inspect the center bearing bracket for cracks.
- With hand pressure only, push up and pull down on the driveshaft to check for movement in the center bearing carrier. Movement of shaft in the center bearing carrier is not a violation until the out-of-service criteria is met.



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Inspecting the Driveshaft Tube

- Inspect the driveshaft tube for cracks.
- Inspect for any obvious cracked welds at the driveshaft tube end.
- Ensure the driveshaft tube has no obvious twists.



Inspection Guidance

When cracks in components, excessive movement, a twisted shaft tube or missing or loose fasteners are discovered during inspection, in all cases the North American Standard Out-of-Service Criteria should be consulted for appropriate action.