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Title: Correct Driveline Angles and Their Relationship with the Truck Suspension

Applies To: all truck & bus (including BEV / EV)

## CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

05/16/2025 - Initial Article Release

## DESCRIPTION

This document reminds technicians of the critical relationship between the truck's suspension and the driveline operating angles. The information applies to diesel, gas, and electric vehicles.

## SYMPTOM(s)

The truck's rear suspension set-up & settings can significantly impact the driveline operating angles. If these angles are or become out of spec, then multiple issues can occur.

Proper driveline angles (ensuring u-joint cancellation) have always been important on trucks, but the popularity of non-greaseable u-joints is one factor that makes correct driveline angles so important. Greaseable u-joints get fresh lubricant at regular intervals, and the drivetrain on these trucks is often inspected more frequently.

Seemingly "small" changes in suspension ride height or torque rod lengths (on walking beam and some other suspension types) can create incorrect driveline operating angles. This can create damaging **torsional vibrations** that the driver may not feel. Over time, these vibrations can damage transmissions, u-joints, power dividers, and even the engine.

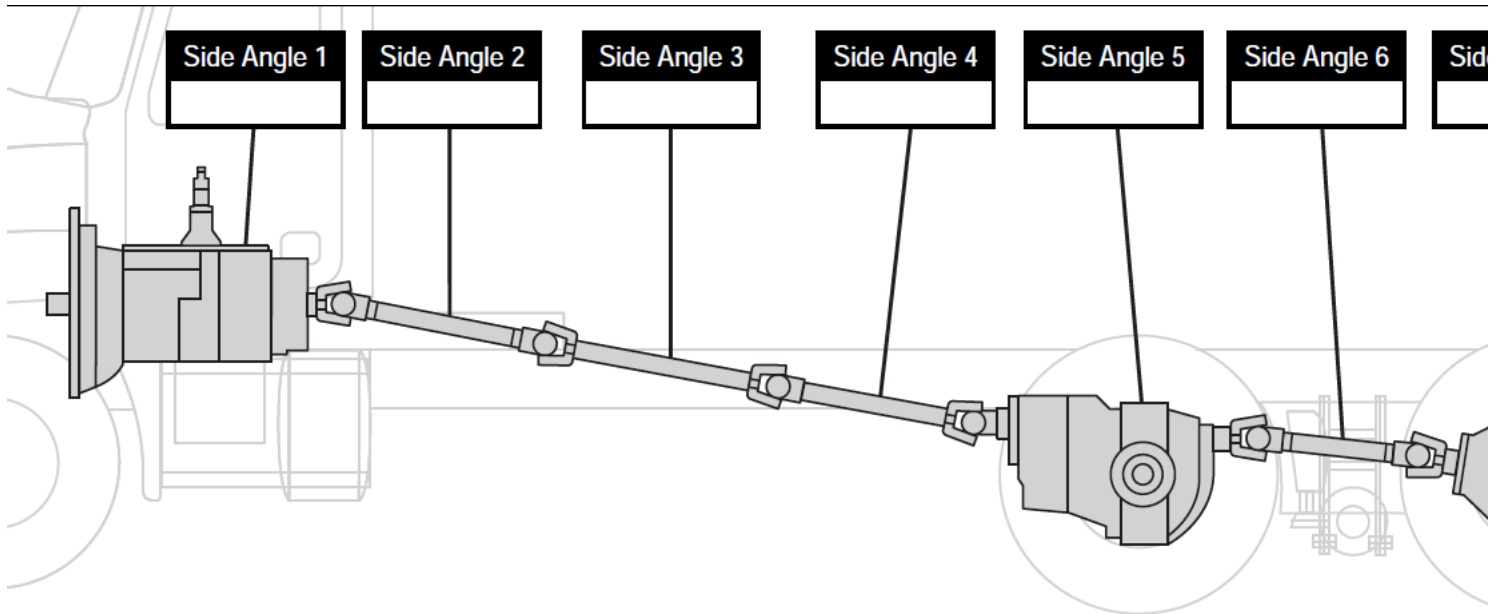
- If the powertrain of a truck or bus experiences an unexplained failure, the vehicle's driveline angles, pinion angles, yoke angles, frame rake, and suspension ride height should all be measured and analyzed using one of the industry's driveline analyzer tools (Allison, Meritor, Data, or other)
  - Additional information is in this [IK article](#)
- Suspension ride height should be measured as prescribed by the suspension mfg. or vehicle mfg. procedure.
  - Link to International's new [ride height tool](#)
  - Link to the IROS [ride height measuring procedure](#)

## Definitions

Torsional vibration is a twisting and untwisting action in a shaft that's caused by intermittent applications of engine power or torque. Severe torsional vibration can cause premature wear damage to drivetrain components. Incorrect driveline angles or out-of-phase drivelines can increase torsional vibrations in a drivetrain

Modification to a vehicle's suspension can cause driveline angles to become incorrect. For example, in some applications, moving the location of a driveline carrier bearing, even 5mm left or right or up or down, can cause the driveline to no longer meet design requirements.

Drivetrain component manufacturers (transmission, axle, and driveshaft) will often deny warranty if a failure of their component occurs and the driveline does not pass a driveline angle analysis (such as Allison iScaan).



## OTHER RESOURCES

- [Driveline Operating Angle Calculator](#)
- [Cummins-Meritor Sales, Dealer and Service Tools | Cummins Inc.](#)
- [Calculators | Spicer Parts](#)
- [Torsional Vibration](#)
- [Drive shaft velocity](#)
- [Truck Vibration Technology, LLC](#)

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