

# DRIVELINE PHASING

## SERVICE/TECHNICAL

DATE: September 29, 2017

TO: All Dana Aftermarket Group Spicer® Driveshaft Customers

Phased driveshafts and coupling shafts are commonly used in main and interaxle drivelines to reduce vibration levels in the powertrain and extend driveline, transmission, and axle life.

### 1. What is Phasing?

- Phasing is a term used to describe the alignment of the yokes with each other at both ends of the driveshaft. Phase angle is the relative rotational position of each yoke on a driveshaft or coupling shaft. When the yoke ears are in line with each other, this is referred to as “in phase”. “Out of phase” shaft assemblies have lug ears that are not in alignment at both ends, but are offset by a prescribed angle.



“IN PHASE”



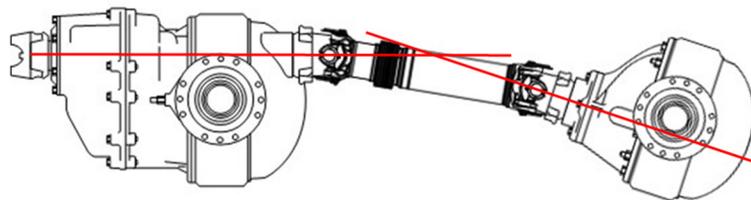
“OUT OF PHASE” or “PHASED”

### 2. Why is it important?

- High torsional vibration levels can damage universal joints, slip splines, transmission bearings, axle bearings, shafts and gearing reducing their effective service life. Excessive center bearing loads can damage the rubber isolator in the center bearing assembly and shorten the service life.

### 3. Why do we phase interaxle driveshafts?

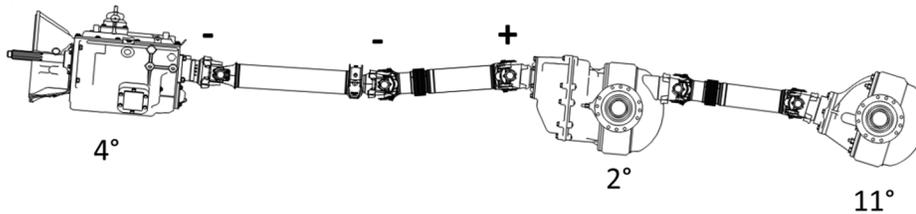
- Phasing is done on some interaxle drivelines to cancel torsional vibrations. Torsional vibrations occur twice every time the driveshaft rotates. These vibrations are the result of driveline speed combined with poor universal joint cancellation from unequal true universal joint angles or equal true universal joint angles not in the same plane. Phasing is used when proper cancellation cannot be achieved by adjusting the driveline angles. Common interaxle arrangements that require phasing are intersecting angle (or broken back) arrangements combined with a top view offset between the forward output and rear input shafts.



INTERSECTING ANGLE OR “BROKEN BACK” ARRANGEMENT

#### 4. Why do we phase main driveshafts or coupling shafts?

- Similar to interaxle drivelines, phasing is done on some driveshafts and coupling shafts in the main driveline to reduce torsional vibration levels. Phasing multi-piece main drivelines with support bearings can also reduce the side loading on the center bearing assemblies. Phased main drivelines are typically used for optimizing the torsional vibration level and center bearing loads when the engine/transmission angle differs from the axle pinion angle or when driveshaft angles change from positive to negative.

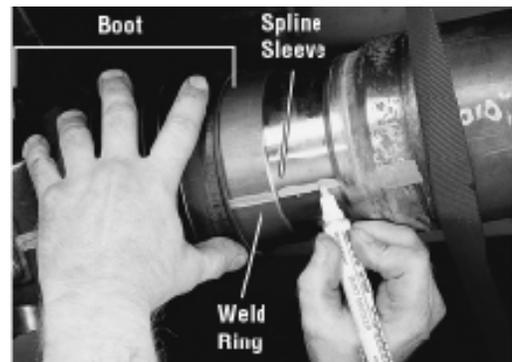


#### 5. How do I know if the driveshaft or coupling shaft is phased properly?

- To determine if a shaft is built out of phase look for the Spicer part number on the Spicer label on the tube. If the label is not legible, the driveshaft part numbers can be obtained from the OEM Dealer using the vehicle identification number (VIN). Then call Dana Tech Service to reference the original drawing to determine the correct phasing.

#### 6. How do we assure proper reassembly of the driveshaft in its original position?

- Using a marking stick, paint marker or other legible marking device, mark all bearing positions in relation to yokes at the effected universal joint as illustrated. Also mark the relative position of the slip spline components as shown. This assures proper reassembly of the driveshaft into the vehicle in its original position.



**CAUTION: DO NOT ALTER THE PHASING OF A DRIVESHAFT OR COUPLING SHAFT WITHOUT APPROVAL FROM THE VEHICLE MANUFACTURER.**

As always, we appreciate your continued business and support of genuine Spicer® products!

Sincerely,

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