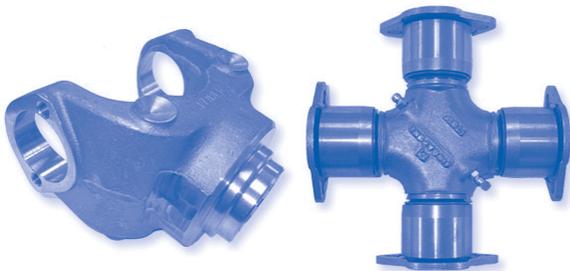


Driveline Tips - Angles and Vibrations



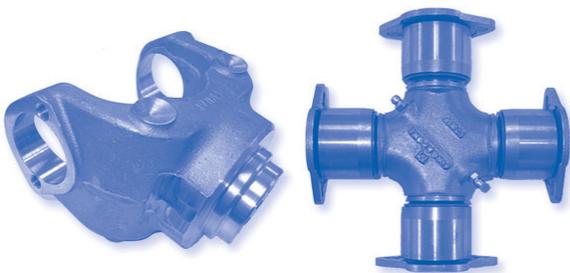
1. Driveline vibrations can occur as five various types, transverse, torsional, inertial excitation, critical speed and secondary coupling vibrations.
2. Transverse vibrations are simplest to repair and usually involve balance issues on driveshaft.
3. Torsional vibrations are more serious vibration issues that are usually related to driveline working angles, and bending and twisting motion experienced by driveshaft.
4. Large working angles will usually introduce torsional vibrations. Keeping driveline slope 3° to 6° is preferred. The smaller the angles, the less chance of torsionals.
5. Cancellation angles is the process where you keep the front and rear working angles to a + / - 1° of each other. Keeping angles small and + / - 1° of each other will help cancel out torsionals.
6. Ride height will affect angles and relate to vibration issues. When checking into a vibration issue the truck should be loaded.
7. There are two types of angles to be aware of, simple 1 plane angles and compound angles.
8. Simple 1 plane angles are where the driveshaft connects to the rear axle and is in a straight line plane.
9. Compound angle is where the driveshaft is offset in relation to the transmission and rear axle, not in a straight line plane.
10. Driveline slope is the direction, up, or down, of the driveshaft and the slope should not exceed 3° to 6° to avoid torsional vibrations.



Driveline Tips - Failure Analysis



1. Shock load is failure where engineered values are exceeded and sudden sharp spike in load value will shear related parts. Clean break in appearance.
2. Brinelling is where the needle bearings will embed themselves into the trunion surface, due to lack of movement (rotation) and lube. Appearance will be multiple ridges around the trunion surface.
3. Galling is the condition where due to lack of lube and the presence of heat, two metal surfaces will weld, fuse themselves together. The bearing cap will become permanently attached to end of trunion.



4. Spalling is where due to foreign presence of material (moisture) lube will be diluted and no longer provide protection against heat resulting in eventual failure.

5. Fatigue is where due to time, heat, stress loads and various chemical exposure to materials, the surface will begin to deteriorate and break down. A surface pitting or flaking will occur resulting in structural weakening and eventual failure.
6. Beach marks are visual markings on failed surface related to shock load. You can see cracks, fissure marks on surface that increased over time prior to ultimate failure.
7. Critical speed / tube failure is where tubing collapsed, crimped, separated due to shock load / critical speed.
8. Imbalance issue is when weights are missing or placed too close to tube weld seam. Can cause static vibrations as a jump rope, resulting in ultimate failure.
9. Lube recommended is NLGI EP 2. Lack of proper lubrication will result in premature failure.
10. Driveline slope should have a minimum of 1/2° to spread lube in the U-joint bearing caps, and avoid failure due to lack of lube.