Heavy-Duty TechTips

TIMKEN
Where You Turn

Volume 1 • Issue 3 **Promoting safe, proper bearing handling practices for the heavy-duty market**

Maximizing bearing performance and life remains an objective throughout The Timken Company, from design teams and manufacturing associates to our field sales team and distributors. TechTips helps you install and maintain Timken® bearings, seals and components to take full advantage of their performance and the systems in which they operate. For more information regarding Timken heavy-duty products and services, visit www.timken.com or contact your local Timken distributor.

SIGNS AND SYMPTOMS OF WHEEL-END PROBLEMS

When it comes to detecting wheel-end problems, it pays to take a closer look. Careful observation can reveal early signs and symptoms of wheel-end problems before bearings are damaged and need to be replaced. With prompt inspection and maintenance, you can reduce bearing damage in conventional wheel ends, and save on long-term costs. Begin with a simple walk-around wheel inspection.

Walk-Around Wheel Inspection

Bearing damage may have already begun if you notice:

- Hub cap sight glass that is discolored or burnt
- Low lube level in a hub cap sight glass
- Lube leakage on any external surface of a wheel hub or tire, both inboard and outboard sides (This sometimes appears as a lube swirl or spiral pattern on a hub or tire surface.)
- Abnormal tire wear
- Smoking or extremely hot hub cap (too hot to touch)

An alert driver can also detect early-stage problems.

Driver Observations

Bearing damage may have already begun if the driver notices:

- Wheel vibration
- Wheel wobble
- Wheel noise
- Smoke from a wheel end
- Increased stopping distance or decreased braking power
- Increased fuel consumption
- Abnormal side pull when brakes are applied
- Wheel lock-up or skidding

Risks of higher maintenance costs and wheel separation increase if these warnings signs are ignored and if wheel-end inspection and maintenance is not performed.

Evidence of more advanced wheel-end problems can be seen when wheel-ends are disassembled for regular maintenance.

Wheel-End Disassembly Analysis

Bearings may need to be replaced if you observe:

- Any nut face wear (adjusting nut or lug nuts)
- Bearing noisy when rotated
- Rust or moisture on any surface
- Spindle wear (bottom half shows more than top half)
- Thread wear
- Hub shoulder wear
- Hub bore wear
- Loss of adjusting nut torque or jam nut torque
- Bearing has been dropped
- Worn out or damaged seals

Bearings must be replaced if you observe:

- Dry, caked lube in the hub caps or any other internal cavity
- Metal particles in the lube, hub caps, hubs, or bearings
- Heat discoloration on the bearings or any other internal component (Don't confuse heat discoloration, which is non-removable stain and metal flow, with lube staining that is easily removed with fine emery cloth.)
- Evidence of the cups or cones spinning or turning (grooves on the cone backface, bore or spindle)
- Visual wear on any other bearing surface
- Any dents on the cage of the bearing assembly
- Spalling (flaking away) of bearing material on races or roller bodies (See Figs. 1 and 2.)
- Any raised metal or dents on the rollers or races

⚠ WARNING
Failure to replace a bearing under these circumstances can result in wheel separation creating a risk of serious bodily injury.

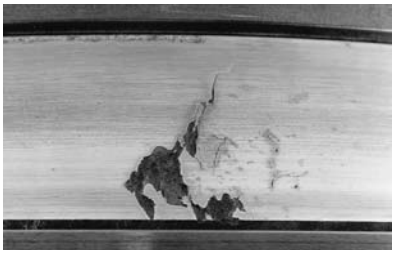

Fig. 1 – Point Surface Origin (PSO) spalling

Fig. 2 – Geometric Stress Concentration (GSC) spalling

Drivers and service mechanics/technicians that develop a keen eye for observing these signs and symptoms of wheel-end problems can help lower maintenance and repair costs and may help prevent wheel-end separations.

⚠ WARNING ***Failure to observe the following warnings could create a risk of serious bodily harm.***

Proper maintenance and handling practices are critical. Failure to follow installation instructions and to maintain proper lubrication can result in equipment failure.

Never spin a bearing with compressed air. The rolling elements may be forcefully expelled.

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