



NATIONAL TRANSPORTATION SAFETY BOARD
Investigative Hearing

Norfolk Southern Railway general merchandise freight train 32N
derailment with subsequent hazardous material release and fires,
in East Palestine, Ohio, on February 3, 2023

| | |
|----------------|----------|
| GROUP | E |
| EXHIBIT | |
| 10 | |

Agency / Organization

Timken

Title

**Exhibit 10- Timken-AP-
AP2-Bearing-Install-
Manual_10179**



TIMKEN

Installing and Maintaining Timken® AP™ and AP-2™ Bearings

Diesel Locomotive, Passenger and Freight Car Applications





Guidelines for Bearings in Service

Service Inspection Recommendations

Whenever equipment is on a repair track, at a terminal or in the shop, visually inspect the roller bearings for:

- Overheating
- Broken, loose or missing parts such as cap screws, control devices, plugs, seals, cups, end caps, housings or adapters

Also examine the housings or adapters for proper seating on the bearing and for excessive wear. Repair or replace defective parts before returning the equipment to service.

Check Bearing Running Temperature

Running temperatures up to 100° F (37.7° C) above ambient are expected under normal operating conditions.

Various types of electronic thermal scanners are used to check temperatures during operation. Follow the manufacturer's instructions when using these devices to measure the bearing temperature.

If you identify an overheated bearing, it should be removed from service.

When a bearing is damaged to the extent that the wheel and axle must be removed, the housing or adapter must be sent to the shop along with the wheel and axle assembly to determine the cause of the damage.

Lubricant Contamination

Lubricant containing water is destructive to roller bearings, causing rapid wear. Take all possible precautions to prevent water from entering the bearing assembly. If the equipment is submerged or operated in water deep enough that water could have entered the bearings, remove the bearing assemblies from the axles and send them to Timken for reconditioning.

Drain pipes or holes in cars must be located so that drainage will not be directed at the bearing assemblies.

Inspect for Displaced Adapters

An adapter out of position causes a load concentration on the bearing that may result in serious bearing damage while in service.

If, for any reason, the truck frames are raised to the extent that the adapters could disengage from the bearings, inspect each assembly to make sure the adapters are properly seated on the bearings. This should not occur if frame keys are used and properly applied.

Accidental Damage

Bearings involved in derailment or collision, or subject to damage by fire, floods or other causes, must be removed from the axles and sent to Timken for reconditioning or remanufacturing.

After removing the bearings, check all axles for bending using an axle lathe or other suitable equipment. A bent axle will cause premature bearing damage due to the oscillating movement and uneven load distribution in the bearing.

Inspect bearing housings or adapters for distortion or other damage before returning them to service. If a damaged adapter or housing is returned to service, it could cause damage to the replacement bearing due to uneven concentration of load.

Also, inspect truck frames to ensure that they are not bent or distorted. Bent or distorted truck frames will create undesirable loads on the bearings, which can cause premature bearing damage.

For detailed information on bearing inspection, contact a Timken engineer or visit www.timken.com/rail. This site provides resources such as our Trackside Bearing Inspection guide and other maintenance literature.

NOTE

To avoid damaging the bearing when cleaning the exterior of equipment, the water stream should not be directed at the bearing seals.

If sandblast or shot blast cleaning the vehicle, a shield should be used to protect both the front and rear of the bearing assemblies from sand or shot.





Storage Procedures

Always handle bearings with care. Damage may result if the bearings are permitted to strike other objects.

Do not remove new bearings or components from the shipping package or remove the protective wrapping until you are ready to install the bearings. When removing new bearing parts from storage, do not clean the protective coating of lubricant.

Store unmounted roller bearings in an area that is clean and free from moisture. Periodically inspect stored roller bearings and correct any undesired condition immediately. Stored roller bearing assemblies that have been subjected to moisture must be sent to Timken for reconditioning.

Car wheel and axle assemblies equipped with roller bearings may be stored on a single storage track, overlapped as shown in fig. 18, to conserve storage space. With this storage track arrangement, the flanges of the wheels will not contact either the bearing or axle bodies of adjacent wheel and axle assemblies.

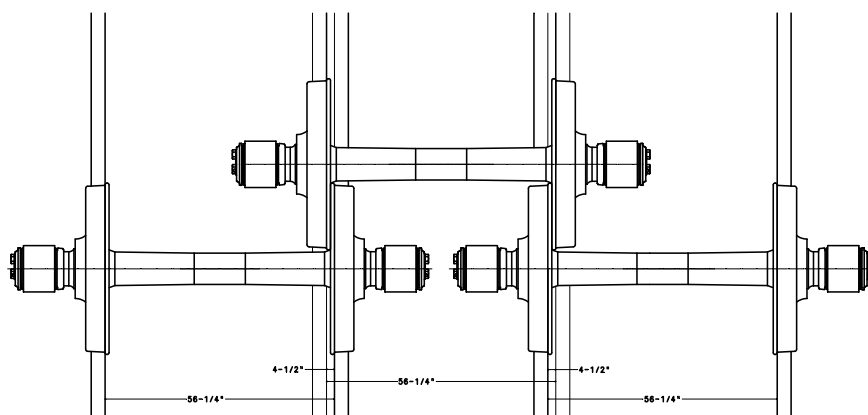


Fig. 18. Recommended storage spacing dimensions for shipping passenger car wheel and axle assemblies with bearings applied.

When these assemblies are not stored on a track, the wheels should be flange-to-flange, not overlapped.

Cars, coaches and locomotives equipped with roller bearings that remain stationary should be moved one car length every six months to distribute lubricant over the bearing surfaces. If the equipment is submerged in water deep enough that it could have entered the bearings, send the bearings to Timken for reconditioning.

Roller bearings placed in storage, whether new or used, should be returned to service in the order in which they were stored, oldest stock first.

