



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

<b>GROUP</b>	<b>E</b>
<b>EXHIBIT</b>	
1	

Agency / Organization

**NTSB**

Title

**Exhibit 1- bearing images**



**L1 BEARING & JOURNAL SEPARATED**



**L1 Bearing**

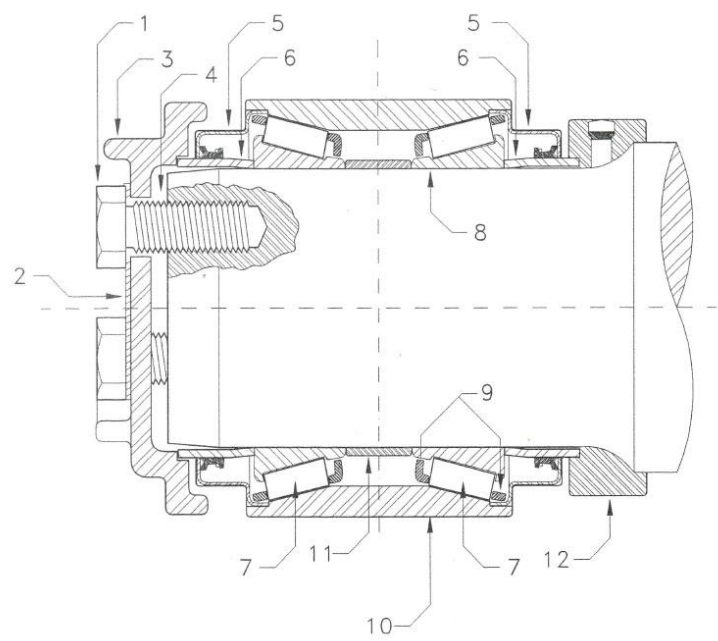


**L1 Journal**



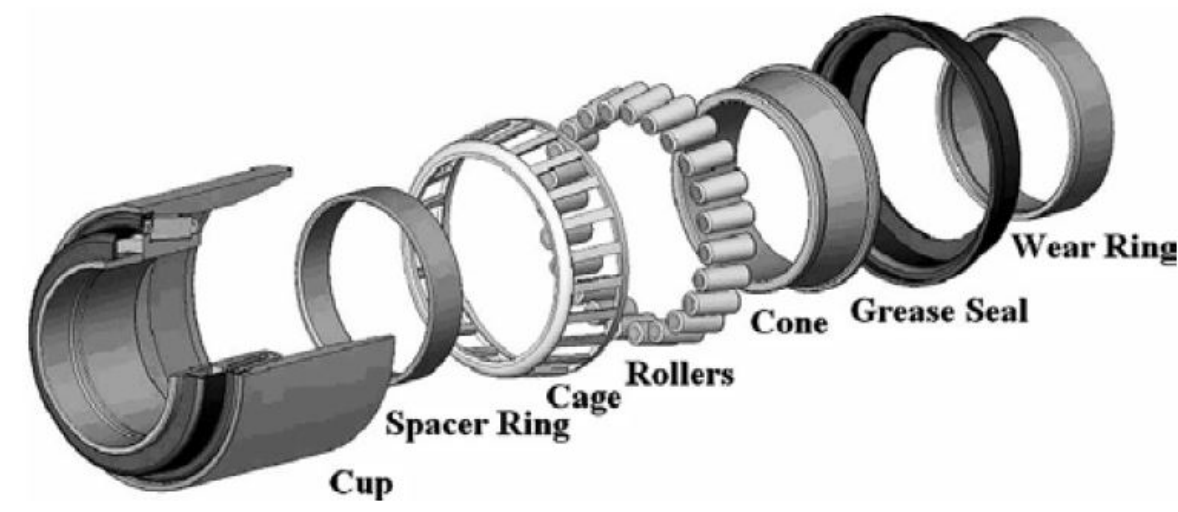
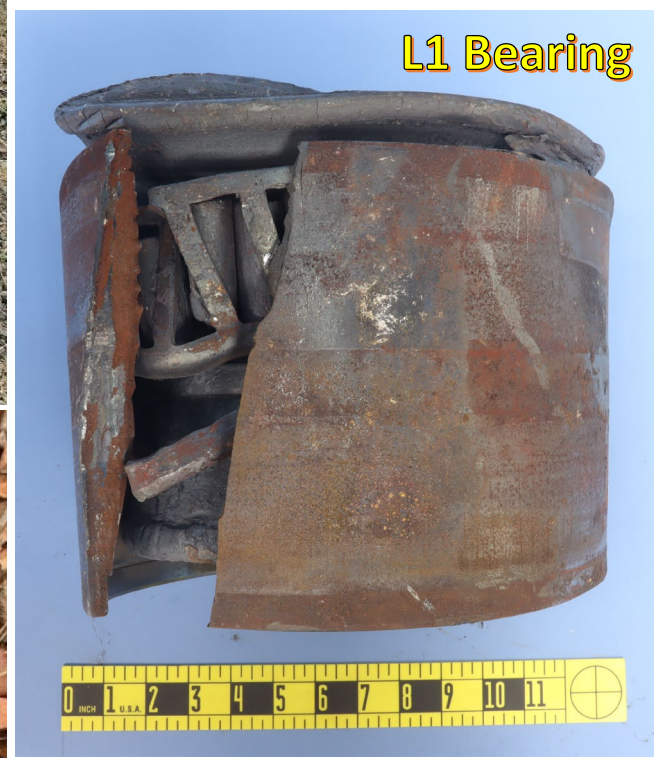
**R1 BEARING & JOURNAL INTACT**

**Wheel Set 1 – Opposite View**



- 1. Cap Screws
- 2. Locking Plate
- 3. End Cap
- 4. Cap Screw Seal Rings
- 5. Seal
- 6. Seal Wear Rings
- 7. Roller
- 8. Cone
- 9. Cage
- 10. Cup
- 11. Spacer
- 12. Backing Ring



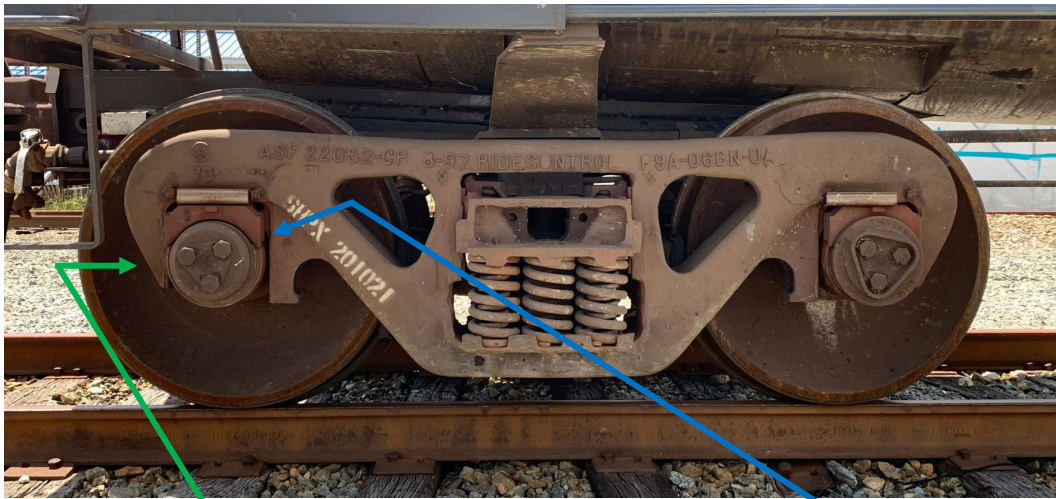


Source: *Temperature Profiles of Railroad Tapered Roller Bearings with Defective Inner and Outer Rings*, Constantine M. Tarawneh et al, Proceedings of the 2016 Joint Rail Conference, ASME, 2016.

Source: *Failure Analysis of Railroad Components*, Hans Iwand & Joel Hassebrock, ASM Handbook Volume 11A, ASM International, 2021.







**VISIBLY LEAKING BEARING WITH CLEARLY FORMED DROPLETS**



**INBOARD SEAL OUT OF POSITION**

**BEARING LEAK INDICATION - SLUNG GREASE**

