National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation Lug R-89-597

Date: December 5, 1989
In reply refer to: R-89-66 and -67

William H. Dempsey
President and Chief Executive Officer
Association of American Railroads
50 F Street, N.W.
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On May 11, 1987, a freight train derailed in Elm City, North Carolina.1/ The cause of the accident was determined to have been a burned-off journal on a tank car carrying ethylene glycol. The derailment resulted in the piercing of a tank car carrying oleum and the subsequent evacuation of the 2,500 residents of Elm City. The journal burn-off was caused by the failure of a field-lubricated roller bearing mounted inside a friction-bearing journal box on a modified truck side frame. The train had passed a hotbox detector located 15 miles from the derailment site. Postaccident testing showed the detector to have been functioning properly and calibrated correctly. Bearing failure was found to have resulted from loosening of the end cap screws, which had been in service almost 15 years.

On December 11, 1987, 25 freight cars derailed within Scott Air Force Base near Belleville, Illinois.2/ The cause of the derailment was determined to have been a burned-off journal on a tank car carrying white phosphorous that was coupled to three cars carrying liquefied petroleum gas. A precautionary evacuation took place although none of the cars ruptured. The burned-off journal was caused by the failure of a roller bearing mounted inside a friction-bearing journal box on a modified truck side frame. The train had traveled only 17 miles since its initial inspection and would have passed a hotbox detector in another 14 miles.

In both accidents, the potential danger of derailed cars carrying hazardous material was evident, and the failed bearings were mounted in modified freight car truck sides. Inspecting and servicing (field lubricated) roller bearings mounted in friction-bearing journal boxes on

1/ For detailed information, read Field Accident Brief 7058 (attached).
2/ For detailed information, read Field Accident Brief 7147 (attached).

5176

modified truck side frames is more difficult and awkward than standard roller bearing truck sides. The friction-bearing journal box surrounds the roller bearing, obscuring much of the bearing and limiting access.

The friction-bearing journal box may act as a heat dissipator for failing and overheated roller bearings and might also screen the roller bearing from proper detection by hotbox sensors. The elimination of cabooses and the loss of direct observation of the rear of a train, the greater length of trains, and the greater reliance on hotbox detectors has made accurate reading of roller-bearing temperatures critical, particularly when roller bearings can fail and burn off a journal in only a few miles.

Modification of friction-bearing journal boxes was originally intended as a short-term economic measure to minimize the initial shortage of roller-bearing truck sides while railroads and builders began wholesale conversion to roller bearings. Relatively few such modified truck sides are now in service, and of those remaining, many have been in service for more than 30 years and have fulfilled their economic life. Elimination of the modified truck sides from the car fleet should have little effect on interchange or commerce.

The Association of American Railroads (AAR) has recently recognized the problems associated with detecting roller-bearing temperatures within modified friction-bearing journal boxes by issuing two letters to its members and private car owners. Although the AAR letter dated March 10, 1988, does not prohibit the use of modified freight car truck sides, it does prohibit new modifications pending results of hotbox compatibility tests. The September 20, 1988, letter prohibits combining freight car trucks having modified truck sides with trucks having standard roller-bearing truck sides on the same car. The AAR has completed the hotbox compatibility tests. However, on February 28, 1989, the Safety Board was informed by the AAR Manager of Equipment and Construction Engineering that the results were inconclusive. In light of such results, eliminating the use of modified freight car truck sides appears prudent.

The Safety Board understands, through communications with the AAR Assistant Vice President, that plain bearings are scheduled to be eliminated from interchange service by January 1, 1994 and consideration given to eliminate plain bearings from hazardous material cars (tank cars) by January 1, 1991. Such a schedule presents an excellent opportunity to also remove modified truck side frames from interchange service, eliminating friction type side frames in any form. This would prevent any possibility of future conversions and minimize any confusion as to interchange acceptance.

Therefore, the National Transportation Safety Board recommends that the Association of American Railroads:

> Eliminate freight car truck sides that have been modified to incorporate roller bearings in a friction-bearing journal box on all freight cars used in hazardous material interchange service no later than January 1, 1991. (Class II, Priority Action) (R-89-66)

Eliminate freight car truck sides that have been modified to incorporate roller bearings in a friction-bearing journal box on all freight cars used in interchange service no later than January 1, 1994. (Class II, Priority Action) (R-89-67)

KOLSTAD, Acting Chairman, BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

By: James L. Kolstad
Acting Chairman

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

NTSB # ATL87FR014 **BRIEF OF ACCIDENT** **RUNDATE:** 10/18/88

File No. - 7058 05/11/87 ELM CITY, NC Time (Lcl) - 1030 EDT

---Basic Information---

Reporting Railroad - CSX
Type of Accident - DERAILMENT
Operating Phase - ENROUTE
Method of Operation - AUTOMATIC BLOCK TRAFFIC CONTROL

Property Losses
Railroad - $ 703,479.00
Non-Railroad - $ 347,000.00

Fire - NO

	Injuries			
	Fatal	Serious	Minor	None
Employees	0	0	0	4
Passengers	0	0	0	0
Motorist	0	0	0	0
Other	0	0	0	0

CSX - CSX TRANSPORTATION

---Railroad/Personnel Information---

Train Data
Railroad - CSX
Type of Train - FREIGHT
Train ID - EXTRA 7007 NORTH
Direction - NORTH
Speed (Est.) - 40
Speed (Auth.) - 60

Train Consist/Damage
No. Loco. Units - 6
No. Cars/Caboose - 137/1
End of Train Monitor - N/A
Length (Feet) - 8776
Trailing Tons - 9889
Loco. Damaged/Derailed - N/A
Cars Damaged/Derailed - 26/26

Crew Information
Front End - 2
Rear End - 2
Toxicology Performed - YES

Radio Communications
Radio Available - YES
Operational - YES

CSX - CSX TRANSPORTATION

---Environment/Operations Information---

Weather Data
Weather Condition - CLEAR
Condition of Light - DAYLIGHT

Line of Sight - 1300

Evacuation - YES

Itinerary
Last Departure Point
HAMLET, NC

Destination
RICHMOND, VA

Hazardous Materials
Involved - YES
Cars Involved - 5

Track Information
Type/No. of Tracks - MAIN/2
Gradient - LEVEL
Alignment - TANGENT

---Narrative---
CSX freight train Extra 7007 North, consisting of 6 locomotive units and 137 freight cars, traveling at 40 mph, had 26 cars derail. There was a spill of Oleum from a damaged tank car and the entire population of about 2500 persons was evacuated from town. There was no fire or personal injury. A failed freight car journal and overheated bearing associated with one of the derailed cars was found at the site. The train had passed over a hotbox detector without any indication of hot bearing about 15 miles prior to the derailment location. The roller bearing equipped truck had been modified from a friction bearing type about 15 years prior to the derailment.

File No. - 7058 | 05/11/87 | ELM CITY, NC | Time (Lcl) - 1030 EDT

Occurrence #1 - TRAIN COMPONENT SYSTEM/FAILURE/MALFUNCTION
Phase - MAINTAINING SPEED

Finding(s)
1. ROLLER TRUCK SIDE - FAILURE (TOTAL)
2. AXLE JOURNAL - BURN-OFF

Occurrence #2 - DERAILMENT,INITIAL
Phase - MAINTAINING SPEED

Finding(s)
3. WHEELS - SHEARED

Occurrence #3 - DERAILMENT, GENERAL
Phase - MAINTAINING SPEED

Occurrence #4 - RUPTURE OF TANK CAR
Phase - STOPPING

Finding(s)
4. DOME - OVERTORGUE

---Probable Cause---

The National Transportation Safety Board determines that the probable Cause(s) of this accident is/are finding(s) 1, 2, 3

NATIONAL TRANSPORTATION SAFETY BOARD
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NTSB # CHI88FR008 — **BRIEF OF ACCIDENT** — **RUNDATE:** 10/18/88

File No. - 7147 — 12/11/87 — BELLEVILLE, IL — Time (Lcl) - 2245 CST

---Basic Information---

Reporting Railroad - NS
Type of Accident - DERAILMENT
Operating Phase - ENROUTE
Method of Operation - AUTOMATIC BLOCK TIMETABLE

Property Losses
Railroad - $ 469,300.00
Non-Railroad - $ 0

Fire - NO

Injuries	Fatal	Serious	Minor	None
Employees	0	0	0	5
Passengers	0	0	0	0
Motorist	0	0	0	0
Other	0	0	0	0

NS - NORFOLK SOUTHERN RAILWAY COMPANY

---Railroad/Personnel Information---

Train Data
Railroad - NS
Type of Train - FREIGHT
Train ID - EXTRA 7006
Direction - EAST
Speed (Est.) - 43
Speed (Auth.) - 45

Train Consist/Damage
No. Loco. Units - 3
No. Cars/Caboose - 99/0
End of Train Monitor - N/A
Length (Feet) - 5900
Trailing Tons - 8119
Loco. Damaged/Derailed - N/A
Cars Damaged/Derailed - 25/25

Crew Information
Front End - 5
Rear End - 0
Toxicology Performed - YES

Radio Communications
Radio Available - YES
Operational - YES

NS - NORFOLK SOUTHERN RAILWAY COMPANY

---Environment/Operations Information---

Weather Data
Weather Condition - CLEAR
Condition of Light - DARK

Line of Sight - 1000

Evacuation - YES

Itinerary
Last Departure Point
EAST ST. LOUIS, IL

Destination
LOUISVILLE, KY

Hazardous Materials
Involved - YES
Cars Involved - 4

Track Information
Type/No. of Tracks - MAIN/1
Gradient - DES. 0.02
Alignment - TANGENT

---Narrative---
NS FREIGHT TRAIN EXTRA 7006 EAST WITH 3 LOCOMOTIVE UNITS AND 99 CARS HAD 25 CARS DERAIL AT SCOTT AFB NEAR THE TOWN OF BELLEVILLE, IL. THE TRAIN WAS TRAVELING AT A RECORDED SPEED OF 43 MPH WHEN THE BL-1 WHEEL BEARING OF THE 37TH CAR FAILED, OVERHEATED AND THE AXLE JOURNAL BURNT OFF. THE FIRST HOT BOX DETECTOR WAS 12.1 MILES PASSED THE ACCIDENT LOCATION. INVOLVED IN THE DERAILMENT WERE 3 CARS OF L.P. GAS AND 1 CAR OF WHITE PHOSPHORUS. SCOTT AIR FORCE PERSONNEL BEGAN A CAUTIONARY EVACUATION DUE TO THE CLOSE PROXIMITY OF HOUSING TO THE L.P. GAS.

File No. - 7147 | 12/11/87 | BELLEVILLE, IL | Time (Lcl) - 2245 CST

Occurrence #1 - TRAIN COMPONENT SYSTEM/FAILURE/MALFUNCTION
Phase - MAINTAINING SPEED

Finding(s)
1. AXLE JOURNAL - BURN-OFF
2. EQUIPMENT INSPECTION - INADEQUATE - CARMAN
3. EQUIPMENT MAINTENANCE - INADEQUATE - OTHER GOVERNMENT PERSONNEL
4. INSUFFICIENT STANDARDS/REQUIREMENTS - OTHER GOVERNMENT PERSONNEL

Occurrence #2 - DERAILMENT
Phase - MAINTAINING SPEED

Finding(s)
5. LIGHT CONDITION - NIGHT

---Probable Cause---

The National Transportation Safety Board determines that the probable Cause(s) of this accident is/are finding(s) 1

Factor(s) relating to this accident is/are finding(s) 2, 3, 4