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National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 11, 1986
In reply refer to: R-86-01

Honorable William H. Dempsey
President and Chief Executive Officer
Association of American Railroads
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Washington, D.C. 20036

The National Transportation Safety Board has investigated 16 train derailments since 1981 that appear to have been caused by defective roller bearings on freight cars. The Safety Board's investigations revealed that all of the defective roller bearings were manufactured by Brenco Incorporated (Brenco) from 1978 through 1980. In an effort to meet the high demand by the railroad industry for freight car roller bearings in those years, Brenco increased the grinding and finishing speed used in the manufacture of its rollers. Metallurgical analysis of the failed bearings revealed that the heat generated by the speed increase resulted in case hardening of the surface of the bearings, which in turn created a layer of harder and more brittle metal of different molecular structure than the interior of the bearing. When these bearings failed, they displayed unusually rapid deterioration, which was especially difficult to detect by either crew observation or hot box detectors. As the bearing deteriorated, bits and pieces of the hardened metal spalled off, causing the bearing to heat rapidly with little or no warning of impending failure.

In service, these bearings displayed a higher failure rate than is normally expected. The Association of American Railroads (AAR) recommended in an April 1985 letter to its members that the rollers from the problem bearings be scrapped as wheels reach wear limits and bearings are reworked. Brenco is offering a direct exchange discount to encourage freight car owners to expedite the inspection and removal of the defective bearings.

Unfortunately, there is no easy way to identify these bearings without disassembly. The only markings on the outside are manufacturer and size. Since the identification numbers are on the inside of the outer ring of the bearing, it is virtually impossible to identify the problem bearings until they are disassembled. The size of the freight car fleet and the number of Brenco bearings in service makes singling out the problem bearings for identification and removal a practical impossibility. However, many private car fleet owners have been able to change out a large number of defective Brenco bearings because they have better records and controls than most railroads.

Although the Safety Board believes that all defective bearings should be removed from service, it acknowledges that a program to identify and remove all defective Brenco bearings from the entire freight car fleet may not be practical. Nevertheless, the Board believes that it is feasible to implement a program to identify and remove the defective bearings from freight cars that carry hazardous materials since the hazardous material car fleet receives more intensive management and the magnitude of potential derailment problems is greatest.

The Safety Board also believes that future problems identifying defective bearings manufactured during a specific timeframe could be precluded by use of an outside bearing dating system. One possible method would involve stamping the manufacturing, remanufacturing, or installation date on the locking plate of each bearing's end cap.

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

> Establish a standard for superficial identification of railroad car roller bearings to include date of manufacture, remanufacture, or installation. (Class II, Priority Action) (R-86-01)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, Member, concurred in this recommendation.

By: Jim Burnett
Chairman