

R-337F

# NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: August 31, 1981

Forwarded to:

Mr. W. H. Dempsey  
President  
Association of American Railroads  
1920 L Street, N. W.  
Washington, D.C. 20036

SAFETY RECOMMENDATION(S)

R-81-86 and -87

During the past 5 years, the National Transportation Safety Board has investigated nine accidents in which hot box detectors have identified an overheated journal bearing in a train, but appropriate or correct action was not taken to prevent the subsequent derailment of the trains. These accidents resulted in one injury to an employee and an estimated total of \$4,800,000 in property damage. Although the injury/fatality rate for these particular accidents was low, the accidents were preventable, and the Safety Board believes that the potential for serious or even catastrophic derailments is significant. The following is a synopsis of each of the nine accidents which were investigated by the Safety Board. 1/

On December 20, 1976, a derailment occurred at Northbrook, Illinois, on the Chicago and Northwestern Railroad. The train had been stopped by the dispatcher 20 miles before the derailment location for inspection of an overheated journal bearing on the 14th car from the locomotive. An inspection by the traincrew failed to uncover the potentially hazardous overheated journal bearing and the train proceeded. The cause of the derailment at Northbrook was a broken journal on the 14th car from the locomotive due to an overheated bearing. No personal injuries resulted from the accident. Property damage was estimated at \$605,000.

On December 25, 1978, a derailment occurred on the Chicago and Northwestern Railroad at Cedar Rapids, Iowa. A hot box detector identified an overheated journal bearing in the train, but the employee who read the tape display took no action to stop the train. A broken journal on the car identified by the hot box detector caused the derailment. There were no personal injuries from this accident. Property damage was estimated at \$316,000.

On March 15, 1979, a derailment occurred on the Chicago, Milwaukee, St. Paul and Pacific Railroad at Franksville, Wisconsin. A hot box detector had previously identified an overheated journal bearing in the train; however, the information forwarded to the traincrew incorrectly identified both the location of the car and the side of the train on which the overheated journal bearing was located. The traincrew

1/ For more detailed information, read Special Investigation Report--"Recent Accident History of Hot Box Detector Data Management" (NTSB-SIR-81-1).

inspected the train using the incorrect information and did not find the overheated bearing. The train proceeded and subsequently derailed because of a journal bearing failure. There were no personal injuries as a result of this accident. Property damage was estimated at \$190,000.

On May 28, 1979, a derailment occurred on the Burlington Northern Railroad at Hanover, Illinois. The hot box detector indicated an overheated journal bearing on a wayside display. The traincrew correctly computed the location as the 57th car from the locomotive but failed to verify the presence of an overheated bearing on the car. The train derailed due to a broken journal on the 57th car from the locomotive. There were no personal injuries as a result of the accident. Property damage was estimated at \$385,000.

On August 20, 1980, a derailment occurred on the Burlington Northern Railroad at Cassville, Wisconsin. The hot box detector had previously indicated an overheated journal bearing on a wayside display. The traincrew incorrectly computed the bearing's location from the number indicated on the wayside display and failed to verify the presence of an overheated bearing. The train subsequently derailed as a result of a journal bearing failure. There were no personal injuries as a result of the accident. Property damage was estimated at \$744,000.

On October 25, 1980, a derailment occurred on the Louisville and Nashville Railroad at Upton, Indiana. The hot box detector had previously indicated an overheated journal bearing on a wayside display. The traincrew incorrectly computed the location of the overheated bearing and thus failed to locate it. The train proceeded and subsequently derailed due to a broken journal. There was one personal injury to a crewmember. Property damage was estimated at \$1,080,000.

On February 14, 1981, a derailment occurred at Buckley, Illinois, on the Illinois Central Gulf Railroad. The hot box detector tape display indicated an overheated journal bearing. The operator read and signed the tape but took no action. The train subsequently derailed due to a broken journal which had been overheated. There were no personal injuries as a result of the accident. Property damage was estimated at \$238,000.

On March 5, 1981, a derailment occurred at Marcellus, Michigan, on the Grand Trunk Western Railroad. The hot box detector indicated the location of an overheated journal bearing on a wayside display, but the traincrew incorrectly computed the actual location of the potentially hazardous bearing. The overheated bearing was not located when the train was inspected. The train proceeded and subsequently derailed due to a journal failure. There were no personal injuries. Property damage was estimated at \$292,000.

The most recent accident occurred on May 3, 1981, when a broken journal resulted in a derailment at Dowell, Illinois, on the Illinois Central Gulf Railroad. The train involved had been previously stopped twice for inspection of the 50th car from the locomotive. Two different traincrews inspected the train. Neither traincrew located the bearing which eventually failed on the 50th car from the locomotive. There were no personal injuries as a result of the accident. Property damage was estimated at \$950,000.

As noted in three of the nine accidents, the crewmembers inspecting the train were unable to determine that the journal bearings indicated by the hot box detector were overheated. The reasons for this are related in part to the instructions given to the crew concerning the method for confirming hot bearings. Some railroads instruct crews to touch the bearings with their hands; others indicate use of a gloved hand. Other railroads issue crayons which melt at given temperatures to help traincrews to determine the

actual temperature of a bearing. Successfully locating an overheated bearing may depend on the type of bearing which has failed. The failure of a conventional solid bearing may be accompanied by smoke or visible flame. The absence of smoke or smoke and fire in a roller bearing failure makes it difficult for a traincrew to identify the location of the bearing. Operational conditions are also a factor. During inclement weather, delays in inspecting an indicated overheated bearing may allow sufficient time for the bearing to cool, and thus prevent its detection. In territory where heavy braking is required, traincrews may misinterpret the heat from brake shoes when comparing journal bearing temperatures.

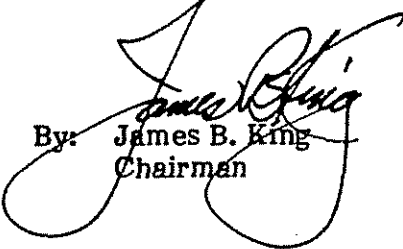
Although the circumstances for each of the nine derailments were different, the causal factors involved the manner in which the hot box detector data was handled. The Safety Board is concerned that the use of data from hot box detectors is not adequate to ensure maximum safety and to prevent future accidents. The Safety Board believes that all personnel (train crewmembers and readers of hot box detector information) should be properly trained and instructed and that procedures should be established regarding the proper use of all data obtained from hot box detector systems.

Because of the problems associated with traincrews positively identifying an overheated journal bearing failure and the desirability of reviewing current railroad training and procedures for handling hot box detector data, the National Transportation Safety Board recommends that the Association of American Railroads:

Initiate research to devise a visible means on or near the bearing mounting surface or box to alert railroad employees of the presence of overheated roller bearings and conventional solid bearings that have been identified by a hot box detector. (Class II, Priority Action) (R-81-86)

Advise its member railroads of the circumstances of the accidents described in this special investigation and urge them to evaluate their existing training and procedures for handling hot box detector data and to make any changes deemed appropriate to achieve further reduction of overheated journal bearing accidents. (Class II, Priority Action) (R-81-87)

DRIVER, Vice Chairman, McADAMS, and GOLDMAN, Members, concurred in these recommendations. KING, Chairman, and BURSLEY, Member, did not participate.

  
By: James B. King  
Chairman