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**4910-06-P**

**DEPARTMENT OF TRANSPORTATION**

**Federal Railroad Administration**

**Safety Advisory 2023-01; Evaluation of Policies and Procedures Related to the Use and Maintenance of Hot Bearing Wayside Detectors (Supplement).**

**AGENCY:** Federal Railroad Administration (FRA), Department of Transportation (DOT).

**ACTION:** Notice of Safety Advisory; Notice No. 2.

**SUMMARY:** On March 3, 2023, in response to a series of rail accidents suspected of being caused by burnt journal bearings, FRA published Safety Advisory 2023-01 addressing the use and maintenance of hot bearing detectors (HBDs). Since publication of that Safety Advisory, FRA has continued to evaluate railroads’ use of HBDs and on May 10, 2023, in New Castle, Pennsylvania, another accident occurred that is suspected of being the result of a burnt journal bearing. Preliminary information related to this most recent accident shows that the train involved passed a HBD which alarmed prior to the accident. Accordingly, FRA is issuing this Notice to supplement Safety Advisory 2023-01 with one additional recommendation. Specifically, this Notice adds a fifth recommendation to Safety Advisory 2023-01 recommending that railroads take action to evaluate the resiliency and accuracy of the overall process used to monitor and measure bearing health.

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*Disclaimer:* This Safety Advisory is considered guidance pursuant to DOT Order 2100.6A (June 7, 2021). Except when referencing laws, regulations, policies, or orders, the information in this Safety Advisory does not have the force and effect of law and is not meant to bind the public in any way. This document does not revise or replace any previously issued guidance.

## **SUPPLEMENTARY INFORMATION:**

### **Background**

In response to recent rail accidents, on February 21, 2023, while calling on the freight rail industry and Congress to take action to improve rail safety, U.S. Department of Transportation Secretary Pete Buttigieg reiterated the Department's commitment to enhancing rail safety through specific targeted actions.<sup>1</sup> In addition to various regulatory and other activities FRA already had underway at the time of Secretary Buttigieg's announcement, one of the actions announced included a focused inspection program of routes over which high-hazard flammable trains (HHFTs)<sup>2</sup> and other trains transporting large volumes of hazardous materials travel (Route Assessment). Subsequently, in response to continued derailments and the death of a Norfolk Southern Railway (NS) worker, FRA launched a supplemental safety assessment of NS, issued

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<sup>1</sup> See <https://www.transportation.gov/briefing-room/us-department-transportation-fact-sheet-steps-forward-freight-rail-industry-safety>.

<sup>2</sup> An HHFT is "a single train transporting 20 or more loaded tank cars of a Class 3 flammable liquid in a continuous block or a single train carrying 35 or more loaded tank cars of a Class 3 flammable liquid throughout the train consist." 49 CFR 171.8.

three safety advisories and two safety bulletins<sup>3</sup> calling attention to the risks FRA identified in the recent accidents.

### ***HHFT Route Assessment***

As noted above, in March 2023, FRA initiated a nationwide comprehensive assessment of HHFT routes and other rail routes over which large quantities of other hazardous materials are transported. The Route Assessment includes all FRA technical safety disciplines (i.e., hazardous materials, track, signal and train control, mechanical, operating practices, and grade crossing). The Route Assessment is designed to evaluate the overall condition of the rail infrastructure (including, but not limited to, the track, rolling stock, signal systems, and other equipment that affects or monitors the safety of rail operations) and railroads' compliance with both FRA safety regulations and the regulations of the Pipeline and Hazardous Materials Safety Administration.

Initial observations from the Route Assessment point to significant inconsistencies in the railroads' application of best practices associated with the installation and maintenance of HBDs, as well as in the assessment and use of HBD data to address failing or failed bearings. FRA is continuing to evaluate the tools, algorithms, and other methodologies railroads use to evaluate bearing health, and the training practices for all railroad employees involved in monitoring bearing health information and/or taking action in response to that information.

### ***Supplemental Safety Assessment of Norfolk Southern***

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<sup>3</sup> <https://railroads.dot.gov/elibrary/safety-advisory-2023-01-evaluation-policies-and-procedures-related-use-and-maintenance-hot>; <https://railroads.dot.gov/elibrary/safety-advisory-2023-02-train-makeup-and-operational-safety-concerns>; <https://railroads.dot.gov/elibrary/safety-advisory-2023-03-accident-mitigation-and-train-length>; <https://railroads.dot.gov/elibrary/safety-bulletin-2023-01-switching-operation-accident>; <https://railroads.dot.gov/sites/fra.dot.gov/files/2023-03/Safety%20Bulletin%202023-02%20%28031623%29.pdf>.

On March 15, 2023, FRA initiated a supplemental safety assessment of NS (NS Assessment), with a specific focus on safety culture and training, as well as a deep dive into compliance with selected regulations and the status of recommendations from FRA’s 2022 System Audit of NS performed January through May of 2022<sup>4</sup>. The investigation phase of FRA’s NS Assessment was completed mid-May 2023, and analysis of survey results is currently in process. While FRA continues to analyze results to confirm FRA’s findings and any recommendations, several areas of concern have arisen, including the resiliency of NS’s processes and procedures for monitoring and actioning bearing health information from the railroad’s system of HBDs.

***New Castle, Pennsylvania Accident – May 10, 2023***

On May 10, 2023, at 11:24 p.m., a NS general merchandise train (i.e., not an HHFT) derailed nine cars in New Castle, Pennsylvania. Five cars derailed on a bridge over the Mahoning River. Both the National Transportation Safety Board and FRA are investigating the accident and both investigations are ongoing. Although no final conclusions as to the cause of the accident have been identified yet, preliminary information indicates that a burnt journal bearing played a role in the derailment and that the train involved passed at least one HBD that alarmed before the derailment. FRA is probing the communication and timing of the alarm to both the locomotive and the dispatch center, as well as the history and performance of the bearing in question. Of particular interest is the impact of failures or delays in the communication of bearing health information to those involved in the data analysis and decision-making process as

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<sup>4</sup> FRA Audit Number: 2022-NS Special Audit -01-1; <https://railroads.dot.gov/elibrary/fra-audit-report-norfolk-southern-railway-company>

to what action to take in response to the information and to enable the crew to take appropriate action.

***Safety Advisory 2023-01 Published March 3, 2023***

In Safety Advisory 2023-01, FRA recognized the value of wayside detection systems if they are appropriately installed, maintained, and utilized. As noted in that Safety Advisory, if implemented properly, wayside detectors enable railroads to assess the health of rail equipment and infrastructure to enable the early identification of mechanical or other defects. Nonetheless, as explained in Safety Advisory 2023-01, even with industry’s widespread use of wayside detection systems (such as HBDs), since 2021, at least five derailments have occurred that are suspected of being caused by mechanical defects (burnt journal bearings in particular).<sup>5</sup>

Each railroad involved in these five recent derailments had systems of HBDs intended to identify defective bearings or bearings experiencing anomalies that could lead to failures. However, in each case, despite the fact that those HBDs flagged at least one suspected bearing on each train, the derailments occurred. Accordingly, Safety Advisory 2023-01, as originally published, focused its recommendations on inspection and maintenance procedures related to the HBDs, the thresholds at which detectors are set to flag anomalies, and the training and qualification of personnel responsible for installing, inspecting, and maintaining HBDs. As originally published, the Safety Advisory also recommended that railroads “review current procedures

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<sup>5</sup> The five derailments include three derailments that occurred on NS (Warner Roberts, Georgia (July 12, 2022); Sandusky, Ohio (October 8, 2022); and East Palestine, Ohio (February 3, 2023)) and two derailments that occurred on the Kansas City Southern Railway (KCS) in 2021. The three NS derailments are discussed in detail in Safety Advisory 2023-01 and the 2021 KCS derailments occurred on August 2, 2021, and December 3, 2021, and in both cases, a HBD flagged a suspect bearing, but the crews were either unable to act in time to prevent a derailment or were directed to continue the train move resulting in a derailment.

governing actions responding to HBD alerts to ensure required actions are commensurate with the risk of the operation involved,” but the Advisory did not make any recommendations related to ensuring the effectiveness, reliability, and robustness of such procedures. In other words, as originally published, Safety Advisory 2023-01 did not address the effectiveness of railroads’ established processes and procedures in ensuring adequate and accurate bearing health data is gathered from detectors, analyzed, and communicated to all railroad personnel responsible for making decisions or taking action in response to that data. FRA notes that the process of gathering, monitoring, reporting, analyzing, and actioning information from detectors includes tasks that, if incorrectly done, can introduce risk. For instance, an error in HBD installation or maintenance that is not identified by commissioning testing, may impact the reporting of HBD measurements. Similarly, processes with insufficient redundancies or cross-checks to ensure each necessary step or task is performed timely and accurately may lead to failures in the processes that allow a valid detector alert or alarm to go undetected. Accordingly, in addition to the four recommendations contained in Safety Advisory 2023-01 as originally published, with this supplementary notice, FRA is making a fifth recommendation to railroads. Specifically, FRA recommends that railroads evaluate each step and task performed by railroad personnel to identify any potential points where non-revealing failures may occur (i.e., any steps or tasks that, if not performed or performed incorrectly or timely, could mislead decision makers when actioning a HBD report or lack of a HBD report). FRA also recommends that railroads implement appropriate safeguards to minimize the impact of any non-revealing failures when monitoring, analyzing, and responding to detector information.

## **Recommended Railroad Action**

In light of the above discussion, FRA is revising the recommendations included in Safety Advisory 2023-01 to add recommendation number 5 below. For ease of reference, FRA's existing recommendations 1 through 4 are reproduced below, along with additional recommendation 5. Accordingly, FRA recommends that railroads take the following actions:

1. Review existing HBD system inspection and maintenance policies and procedures for compliance with existing industry standards and manufacturer recommendations for HBDs.

2. Review existing procedures to train and qualify personnel responsible for installing, inspecting, and maintaining HBDs to ensure they have the appropriate knowledge and skills. Railroads should also develop and implement appropriate training on the inspection and maintenance requirements for HBDs and provide that training at appropriate intervals to ensure the required knowledge and skill of inspection and maintenance personnel. Further, railroads should evaluate their training content and training frequency to ensure any employee who may be called upon to evaluate a suspect bearing has the necessary training, experience, and qualifications. FRA also encourages railroads to ensure these individuals are available at all hours of operations across a railroad's network.

3. Review current HBD detector thresholds in light of recent derailments, and all other relevant available data (including data from any close calls or near misses), to determine the adequacy of the railroad's current thresholds. Thresholds should be established for single measurement as well as multiple measurements of individual bearings to enable temperature trend analysis.

4. Review current procedures governing actions responding to HBD alerts to ensure required actions are commensurate with the risk of the operation involved. With regard to trains transporting any quantity of hazardous materials, FRA recommends railroads adopt the procedures outlined in AAR's OT-55 for key trains as an initial measure.

5. Rigorously evaluate the resiliency and accuracy of the overall process used to monitor and act upon information from wayside detectors, with specific focus on steps and tasks that, if not performed or performed incorrectly, could mislead decision makers. The process of monitoring, reporting, inspecting, analyzing, and acting on information from detectors includes tasks that, if incorrectly executed, could introduce risk. Railroads should also evaluate each step and task performed by railroad personnel to pinpoint any HBD reporting failures and implement appropriate safeguards to minimize the impact of those failures when monitoring, analyzing, and responding to detector information.

## **Conclusion**

In general, as noted in Safety Advisory 2023-01 as originally published, the issues identified in this Safety Advisory and this supplementary notice are indicators of a railroad's safety culture. Implementing procedures that ensure safety, and training personnel so those procedures become second nature, is vital. Equally important is the commitment, throughout the organization, to safety and empowerment of personnel to live up to that commitment. Specifically, personnel should be encouraged and empowered to develop, implement, and comply with procedures that may temporarily impact operations, but maximize safety, just as those executing the procedures should

be empowered to strictly adhere to those procedures, even if it delays a train. The railroads should evaluate their safety culture not only as it relates to the issues indicated in this Safety Advisory, but to all aspects of their operations.

FRA encourages railroads to continue to take actions consistent with Safety Advisory 2023-01 as originally published and the additional recommendation in this supplementary notice, as well as any other complementary actions, to ensure the safety of rail transportation. FRA may modify this Safety Advisory and supplementary notice, issue additional safety advisories, or take other actions necessary to ensure the highest level of safety on the Nation's railroads, including pursuing other corrective measures under its authority.

Issued in Washington, DC.



**Amitabha Bose,**  
*Administrator.*