



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: May 22, 2008

In reply refer to: R-08-14

Mr. Charles W. Moorman
Chairman, President, and Chief Executive Officer
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The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

The recommendation in this letter addresses the Norfolk Southern Railway Company's (NS) ultrasonic rail inspection procedures. This recommendation is derived from the Safety Board's investigation of the October 20, 2006, derailment of NS train 68QB119 while crossing the Beaver River railroad bridge in New Brighton, Pennsylvania. As a result of this investigation,¹ the Safety Board has issued six safety recommendations, one of which is addressed to the NS. Information supporting this recommendation is provided below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

About 10:41 p.m. eastern daylight time on Friday, October 20, 2006, NS train 68QB119, en route from the Chicago, Illinois, area to Sewaren, New Jersey, derailed while crossing the Beaver River railroad bridge in New Brighton, Pennsylvania. The train consisted of a three-unit locomotive pulling 3 empty freight cars followed by 83 tank cars loaded with denatured ethanol, a flammable liquid. Twenty-three of the tank cars derailed near the east end of the bridge, with several of the cars falling into the Beaver River. Of the 23 derailed tank cars, about 20 released ethanol, which subsequently ignited and burned for about 48 hours. Some of the unburned ethanol liquid was released into the river and the surrounding soil. Homes and businesses within a seven-block area of New Brighton and in an area adjacent to the accident were evacuated for 2 days. No injuries or fatalities resulted from the accident. The NS estimated total damages to be \$5.8 million.¹

¹ For additional information, see <<http://www.nts.gov/publictn/2008/RAR0802.pdf>>. National Transportation Safety Board, *Derailment of Norfolk Southern Railway Company Train 68QB119 with Release of Hazardous Materials and Fire, New Brighton, Pennsylvania, October 20, 2006*, Railroad Accident Report NTSB RAR-08/02 (Washington, DC: NTSB, 2008).

The National Transportation Safety Board determined that the probable cause of the derailment of Norfolk Southern Railway Company train 68QB119 was the Norfolk Southern Railway Company's inadequate rail inspection and maintenance program that resulted in a rail fracture from an undetected internal defect. Contributing to the accident were the Federal Railroad Administration's inadequate oversight of the internal rail inspection process and its insufficient requirements for internal rail inspection.

Federal Railroad Administration (FRA) regulations require that all railroads conduct a "continuous search" when inspecting rail for internal defects. In the FRA's interpretation of the regulations, any rail inspection that is interrupted "as a result of rail surface conditions that inhibit the transmission or return of the signal" is not considered to be continuous under the regulation and therefore is not to be considered a valid inspection of the affected rail segment.

About a year and a half before the accident and without consulting the FRA, the NS gave its inspection contractor—Sperry Rail Service (Sperry)—new procedures for inspecting rail for internal defects. In effect, the new procedures permitted the equipment operator to ignore any loss of bottom signal as long as the continuous loss-of-signal distance did not exceed 5 feet of linear rail length. The new procedures were intended to address the detection of vertically oriented longitudinal rail head defects, not transverse defects. Although the new procedures were designed to address a different type of defect, the procedures were applied to the entire inspection process and thereby also affected the detection of transverse defects.

The point of derailment was within a rail segment about 9 feet long where, during the August 1, 2006, ultrasonic inspection, the inspection equipment had encountered an intermittent loss of bottom signal. Because the longest loss of bottom signal distance was only about 7 inches of linear rail length (which did not exceed the 5-foot minimum specified by the NS that would have required a repeat inspection), this rail segment was not examined further by the inspection equipment operator.

The flaking and shelling conditions found on the recovered rail head likely blocked the ultrasonic signals at several locations and caused the intermittent loss of bottom signal at the point of derailment. Because the NS did not require the contractor to repeat the inspection of the rail at these locations, the area was not examined further by Sperry, and the internal condition of the rail at these locations was left undetermined. The NS exception to the continuous search requirement eliminated an opportunity to detect the defect that led to the derailment by rerunning the inspection vehicle or by using more effective handheld inspection equipment.

Reinspection of a rail segment having a loss of bottom signal usually entails a handheld scan in which the inspector runs a handheld transducer across the running surface of the rail. Handheld scans can be more effective than inspection vehicles, but data are not available on the probability of detection for handheld inspections at a range of defect sizes. In tests conducted in the Safety Board's Materials Laboratory, handheld scans of segments of rail showed that two rail head internal defects having a size of 3 percent² or less were not detected by hand inspections at the running surface of the rail head. (These defects were found using a laboratory technique that scans the side of the rail head.) The estimated defect size at the time of the last inspection before

² Defect size is stated as a percentage of rail head area of a new rail head.

the accident was only slightly larger than the defects found using the laboratory technique. Even if the Sperry equipment operator had used a handheld scanning device to inspect the rail where the bottom signal was intermittently lost during his inspection on August 1, he still may not have found the defect that led to the rail fracture. Therefore, it could not be determined whether the defect that led to the rail fracture would have been found had a handheld inspection device been used to reinspect the area that had the loss of bottom signal on August 1, 2006.

Exempting any length of rail from a valid inspection could result in missing a defect that could grow to critical size before the next inspection and lead to rail failure under the load of a train. The Safety Board concludes that NS procedures that do not require a re-examination of rail where there is a signal loss during ultrasonic inspection means that those segments of rail can remain uninspected and in service indefinitely.

Therefore, the National Transportation Safety Board makes the following recommendation to the Norfolk Southern Railway Company:

Revise your ultrasonic rail inspection procedures to eliminate exceptions to the requirement for an uninterrupted, continuous search for rail defects. (R-08-14)

The Safety Board also issued safety recommendations to the Federal Railroad Administration and the Pipeline and Hazardous Materials Safety Administration.

In response to the recommendation in this letter, please refer to Safety Recommendation R-08-14. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our Tumbleweed secure mailbox procedures. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred in these recommendations.

[Original Signed]

By: Mark V. Rosenker
Chairman