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DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

Notice of **Safety Advisory** 2006-02

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

ACTION: Notice of **safety advisory**.

SUMMARY: This **safety advisory** provides recommended practices for the testing, classification, and reuse of second-hand rail.\1\ The purpose of this **safety advisory** is to reduce the number of rail defects that occur when second-hand rail is used.

\1\ Second-hand rail is sometimes also referred to as relay rail.

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SUPPLEMENTARY INFORMATION:

Background

Derailment in Nodaway, Iowa

On March 17, 2001, Amtrak train No. 5-17, the California Zephyr, derailed near Nodaway, Iowa. Amtrak train No. 5-17 consisted of two locomotive units and 16 cars. All but the last five cars derailed. As a result of the derailment, 78 people were injured, including one fatal injury. At the time of the accident, Amtrak train No. 5-17 was operating over FRA Class 4 \2\ track belonging to the BNSF Railway (BNSF) Creston Subdivision.

\2\ Over Class 4 track, the maximum allowable operating speed for freight trains is 60 mph, and the maximum allowable operating speed for passenger trains is 80 mph. See 49 CFR 213.9.

Near MP 419.90, the locomotive engineer experienced a ``tugging'' sensation in connection with the train's progress and heard a ``grinding, screeching, noise.'' He made an emergency brake application. When the locomotives came to a stop, the engineer realized that the train's cars had uncoupled from the locomotives, and most cars had derailed. The cars were about 1/8 mile behind the stopped locomotives.

A broken rail was discovered at the point of derailment. The broken pieces of rail were reassembled at the scene, and it was determined that they came from a 15-foot, 6-inch section of rail (referred to as a ``plug'') that had been installed as replacement rail at this location in February 2001. The replacement plug had been installed because BNSF discovered internal defects near MP 419.92 during a routine scan of the existing rail on February 13, 2001. A short section of the continuous welded rail that contained the defects was removed, and a replacement rail was inserted. The plug did not receive an ultrasonic inspection immediately before or after installation. It would have been visually inspected for obvious surface damage, defects, and excessive wear before installation.

Following the derailment, the National Transportation Board (NTSB) and FRA conducted an investigation. The NTSB issued a report, NTSB RAB-02-1 (adopted

March 5, 2002), which provides the underlying basis for FRA's recommendations in this **safety advisory**. The NTSB could not reliably determine the source of the plug and considered two different accounts. Based on either account, however, the replacement rail would have been removed from another track location for reuse. Analysis conducted by the NTSB indicated that the plug rail had multiple internal defects. Specifically, the NTSB laboratory found that the rail failed due to fatigue initiating from cracks associated with the precipitation of internal hydrogen. Cracks associated with the precipitation of internal hydrogen occur in steels due to excessive hydrogen content during processing. As a result of its investigation of this accident, the NTSB made the following recommendation to FRA: Require railroads to conduct ultrasonic or other appropriate inspections to ensure that rail used to replace defective segments of existing rail is free from internal defects. (R-02-5).

Existing Regulatory Requirements

FRA's regulations set forth the requirements for the inspection of rail. They are found in 49 CFR Sec. 213.237 and include procedures for the inspection of internal rail defects.

Rail Inspection Procedures on the BNSF Creston Subdivision

On the Creston Subdivision, BNSF's procedure for the inspection of internal rail flaws not only met, but also exceeded, the standard specified in Sec. 213.237. Paragraph (a) of Sec. 213.237 requires a continuous search for internal defects to be made of all rail in Class 4 track at least once every 40 million gross tons (mgt) or once a year, whichever interval is shorter. However, BNSF scanned the rail for internal defects once every 30 days. Most railroads rely on the fact that all existing rail is ultrasonically scanned while in place in the track, in accordance with the requirements of Sec. 213.237. Therefore, if a piece of rail has been removed from a track location and stored for future use as a replacement rail, a railroad may assume that the replacement rail was scanned while in its previous location and that it passed its inspection. This was the process used for the plug rail that failed in the Nodaway accident. Despite the assumption that the rail had been scanned and passed its inspection, this rail was, in fact, defective. FRA notes that rail in main track that is subject to testing

under Sec. 213.237, and is removed from track for future use can be relatively free of internal defects if the last test occurred shortly before the rail's removal. However, FRA notes that rail that is removed from track at the end of a testing cycle, or rail that is taken from track that is not subject to the requirements of Sec. 213.237, is more likely to have defects.

Recommendations

The Federal Track **Safety** Standards prescribe minimum standards. Railroads are not precluded from prescribing additional or more stringent standards that are consistent with sound maintenance practices. In response to the accident in Nodaway, Iowa and the resulting NTSB recommendations, FRA makes the recommendations identified below.

(1) FRA recommends that railroads retest for internal rail flaws the entire length of any rail that is removed from track and stored for reuse. The railroad should conduct this retest before that rail carries revenue traffic. This recommendation applies to rail being installed into track that is subject to the rail testing requirements specified in Sec. 213.237. After completing the retest and finding no internal rail flaws, the railroad should physically mark the rail with the words ``fully re-tested'' or with other appropriate language. Such rail would then be suitable for reuse in track subject to testing under Sec. 213.237.

(2) FRA recognizes that some railroads do not have the equipment to test second-hand rail in accordance with the above recommendation. In such cases, FRA encourages railroads to develop a classification program. The classification program is intended to decrease the likelihood that a railroad will install second-hand rail with defects back into active track. FRA recommends that, at a minimum, the classification program for railroads that do not have out-of-track testing capabilities include the following rail identification procedures:

(a) Classify rail as either reuseable or not reusable. Distinctly mark as reusable rail that is: taken from track subject to the testing requirements of Sec. 213.237, intended for use in track subject to the testing requirements of Sec. 213.237, and has accumulated less than 15 million gross tons (mgt) since the last valid rail test;

(b) Prohibit the reuse of the following second-hand rails in track that is subject to the testing requirements of Sec. 213.237: (i) rail removed from track that is not subject to the testing requirements of Sec. 213.237 and (ii) rail that does not have a classification marking pursuant to either recommendations (1) or (2)(a) of this **safety advisory**; and

(c) Develop and use a highly visible permanent marking system to mark defective rails that railroads remove from track after identifying internal defects in those rails. The highly visible permanent marking system should include visible, etched markings (e.g., score lines from an abrasive rail saw or a cutting torch) on the rail head at the specific area(s) on the rail where the defects are detected. This marking is in addition to the highly visible marking of defective rails required by Sec. 213.237(c).

Issued in Washington, DC, on March 2, 2006.
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Deputy Associate Administrator for **Safety** Standards and Program Development.
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