



4910-06-P

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

Safety Advisory 2012-04; Worn Rail Conditions

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

ACTION: Notice of Safety Advisory.

SUMMARY: FRA is issuing Safety Advisory 2012-04 to remind track owners, railroads, and their track inspectors of the importance of complying with the applicable rail management programs and engineering procedures that address rail with severe rail head wear and rolling contact fatigue (RCF) conditions. FRA is issuing this notice in response to a July 11, 2012, derailment in Ohio that a preliminary investigation indicates was likely caused by the failure of multiple defects involving detail fractures in rail exhibiting significant vertical head loss (rail head wear) and gage-side-oriented RCF. This notice contains recommendations to track owners to ensure that their employees and other entities performing track inspections comply with the requirements of the applicable engineering procedures that address critical rail head wear, particularly if the track under inspection exhibits significant RCF or a sudden increase in localized rail failure.

FOR FURTHER INFORMATION CONTACT: Carlo M. Patrick, Staff Director, Rail and Infrastructure Integrity Division, Office of Railroad Safety, FRA, 1200 New Jersey Avenue, SE., Washington, DC 20590, telephone (202) 493-6399; or Elisabeth Galotto,

Trial Attorney, Office of Chief Counsel, FRA, 1200 New Jersey Avenue, SE.,
Washington, DC 20590, telephone (202) 493-0270.

SUPPLEMENTARY INFORMATION:

Background

A recent accident has highlighted the need for additional action by track owners and other entities and individuals responsible for compliance with the Track Safety Standards (49 CFR part 213). The following discussion provides a brief summary of the circumstances surrounding a recent train derailment, which appears to have involved a rail with severe rail head wear. Information regarding this incident is based on FRA's preliminary investigation and findings to date. The probable causes and contributing factors, if any, have not yet been determined by FRA. Therefore, nothing in this safety advisory is intended to attribute a cause to this incident or place responsibility for this incident on the acts or omissions of any person or entity.

On July 11, 2012, an eastbound Norfolk Southern Railway Company (NS) freight train, traveling at 23 mph, derailed in Columbus, OH. Of the 13 cars that derailed, 3 contained hazardous materials. Two of the cars, which contained ethanol, a flammable liquid, were compromised, causing a fire near the Columbus Fairgrounds. Residents and businesses within a 1-mile radius of the accident were evacuated. In addition to the damages to the track and to equipment in the train, CSX Transportation, Inc.'s Columbus Line (which runs parallel to the NS track in this area) was shut down due to heat from the fire.

FRA's preliminary investigation indicates that the derailment may have occurred because of accelerated defect development in the rail. During the derailment

investigation process, FRA discovered that five rail failures had occurred on various portions of the track subsequent to the last nondestructive rail inspection at this location. FRA believes that this accelerated defect development was possibly influenced by the significant rail head wear, and attributed to the presence of the RCF.

Given this accident, FRA recommends that each entity responsible for the inspection and maintenance of track review, reemphasize, and adhere to the requirements of the track owner's (1) engineering instructions concerning rail wear limits that address inspecting track to identify internal rail flaws; and (2) programs for the management of rail that exhibits severe rail head wear and RCF. As the discussion above indicates, this is especially critical for track over which large quantities of hazardous materials or passengers are transported due to the potential catastrophic impacts that can result from a derailment of these types of trains.

Rail head wear occurs primarily on the gage-side face when the rail is located on the high side of a curve, due to the exertion of wheel flange forces. Vertical rail head wear occurs on the rail head running surface from wheel/rail interaction during cyclical loading. The development of internal rail defects is an inevitable consequence of the accumulation and effects of fatigue under repeated loading. In practice, the growth rate of rail defects is considered highly variable and unpredictable. Moreover, heavy axle loading on worn rail can lead to the accelerated development of rail surface fatigue, and this may prevent detection of an underlying rail flaw by test equipment during the rail inspection process.

Under 49 CFR 213.237(a), FRA requires all Class 4 and 5 track, as well as Class 3 track over which passenger trains operate, to be tested for internal rail defects at

least once after every accumulation of 40 mgt of traffic or once a year, whichever is shorter. Class 3 track, over which passenger trains do not operate, is required to be tested at least once after every accumulation of 30 mgt of traffic or once a year, whichever is longer. However, as a result of the unpredictability of defect development, many railroads test for internal rail defects using a performance-based method that focuses on the rate of defect development, which typically results in testing for internal defects at a frequency shorter than required by FRA regulation. Yet, a nondestructive test system is typically designed to perform optimally on an ideal test specimen surface. Conditions, such as extreme cyclical loading, can result in rail head wear and RCF and thus affect the integrity of these rail flaw inspections.

Recommended Action: In light of the above, FRA recommends that each track owner:

1. Review with its employees the circumstances of the derailment identified above and ensure that the employees report any incidents where a sudden increase of rail failure occurs in a localized area.
2. Discuss with its employees the requirements of its own engineering instructions and ensure that the employees can identify locations that exhibit excessive rail head wear and RCF.
3. Review its current engineering instructions to ensure that the procedures are consistent with the industry standard for rail replacement.
4. Ensure that its employees responsible for the rail inspection process have been adequately trained and are capable of performing proper inspection procedures.

5. Consider and use, as appropriate, recently developed rail inspection technology that is more capable of identifying transverse-oriented defects under RCF.
6. Review recent rail inspection records to identify any incidents involving sudden or accelerated broken rail for future inspection or replacement focus.
7. Apply appropriate slow orders at locations that exhibit rail head wear approaching the limits specified in its own respective engineering instructions until the rail is replaced.
8. Develop an internal software program on rail management that will assist in the identification of sudden or accelerated rail failure incidents, if such a program is not already in place.

FRA encourages railroad industry members and other track owners to take actions that are consistent with the preceding recommendations and to take other actions to help ensure the safety of the Nation's railroads, its employees, and the general public. FRA may modify this Safety Advisory 2012-04, issue additional safety advisories, or take other appropriate actions it deems necessary under its rail safety authority to ensure the highest level of safety on the Nation's railroads.

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Jo Strang
Associate Administrator for Railroad Safety/Chief Safety Officer

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