Log R-632

National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: January 14, 1992

In Reply Refer To: R-91-65 and -66

Honorable Gilbert C. Carmichael
Administrator
Federal Railroad Administration
400 7th Street, S.W., Room 8206
Washington D.C. 20590

About 1:26 p.m. central daylight time on April 23, 1990, eastbound National Railroad Passenger Corporation (Amtrak) train No. 6, the California Zephyr, derailed at Batavia, Iowa, while operating on the Burlington Northern Railroad (BN). One passenger received serious injuries; 10 crew members and 75 passengers received minor injuries. The estimated damage was $1,835,000.[1]

The derailment occurred on the second subdivision of BN's Galesburg division. A segment of BN's mainline between Chicago and Denver, the second subdivision runs east-west for 230.5 miles between Galesburg, Illinois, and Creston, Iowa. Originally built in 1864 as part of the Chicago, Burlington & Quincy Railroad, the subdivision is heavily traveled. The mainline rail through Batavia from milepost (MP) 266.7 to MP 273.1 is 129-pound continuous welded rail (CWR). The left hand turnout to the crossover, which the train passed just before derailment, was constructed of 132-pound rail with Pandrol rail fasteners.

During the 9 months before the accident, BN had performed a significant amount of track work in the Batavia area. In August 1989, the crossover between the eastbound and westbound mainline tracks had been moved about 200 feet west toward the grade crossing and reversed for the current westbound to eastbound movements. Crews also replaced the old crossover turnout with a new prefabricated 132-pound rail turnout. Between June and November 1989, BN crews field-welded all rail joints in the eastbound mainline turnout of the crossover (on which the accident train traveled). Between August 30 and November 17, 1989, BN's welding gang No. 41 field-welded all the 129-pound jointed rail on the eastbound mainline

[1]For more detailed information, read Railroad Accident Report--"Derailment of Amtrak Train No.6 on the Burlington Northern Railroad at Batavia, Iowa April 23, 1990" (NTSB/RAR-91/05).

between MP 250 and MP 266.3 into CWR using Holland welding equipment. On November 22, 1989, BN surfaced and lined the eastbound mainline through Batavia including the crossover turnout.

Postaccident on-site evidence indicated that as train No. 6 passed through Batavia, the track on the eastbound mainline buckled underneath the train beyond the frog, derailing the last eight cars. Physical indicators of a track buckle included the distance the mainline tracks shifted, the face gouging of the rail, the ambient weather conditions, and the location of the track near anchor points.

Track buckling results from heat expansion in the rail beyond the ability of the track structure to restrain the longitudinal forces. Studies conducted by the Association of American Railroads (AAR) show that improper temperature control of CWR during installation is the major cause of track buckling. The AAR report concluded, "Proper control of the rail laying temperature requires a well-defined and consistent rail laying procedure. While most railroads have a formal procedure, there are variations, even on a given railroad, as to the consistent application of this procedure. This consistency is especially important for installation in periods of cold weather."

Currently no Federal standards exist specifically for CWR. On March 29, 1982, the Safety Board sent a letter to the FRA in response to a Notice of Proposed Rule Making (NPRM), "Track Safety Standards; Miscellaneous Amendments," Docket No. RST-3, No. 3, which was published at 47 FR 7275 on February 18, 1982. A portion of the letter addressed the proposal to drop Section 213.119, Continuous Welded Rail from the FRA track safety standards which read:

> 49 CFR Part 213.119 Continuous welded rail.
>
> (a) When continuous welded rail is being installed, it must be installed at, or adjusted for, a rail temperature range that should not result in compressive or tensile forces that will produce lateral displacement of the track, or pulling apart of rail ends or welds.
>
> (b) After continuous welded rail has been installed, it should not be disturbed at rail temperatures higher than its installation or adjusted installation temperature.

The Safety Board responded in part:

> This section should be retained, strengthened, and enforced because rail temperature is an important safety consideration. Even the subject rulemaking proposal acknowledges the importance of controlling thermal stress in continuous welded rail; but fails to propose action for accomplishing needed controls.

In 1982, the FRA removed the CWR section from their safety standards because they stated that the individual railroads already had adequate rules and practices in place to ensure a safe CWR track structure. The FRA also held that the regulation was unenforceable because no accurate means existed for measuring longitudinal rail force.

Recently both the U.S. House of Representatives and the Senate have drafted specific legislation to enhance rail safety by: providing positive incentives for railroads to improve their safety records; beefing up inspection and enforcement activities; and asking the FRA to update some of its current regulations to reflect changing technology and new knowledge. A portion of House Bill H.R. 2607 deals specifically with CWR.

Currently Congressional Bill H.R. 2607, dated September 1991, proposes to amend 49 CFR Part 202s2, directing the Secretary of Transportation to conduct a review of track safety standards to include as a minimum:

(A) an evaluation of procedures associated with maintaining and installing continuous welded rail and its attendant structure;

(B) an evaluation of the need for revisions to rules with respect to track subject to exception from track safety standards;

In previous investigations of railroad accidents, the Safety Board has addressed the importance of temperature control of CWR and its ability to absorb the dynamic forces of trains in order that railroad operations may be conducted safely. Although much information has been developed from the research of the behavior of CWR, much of the present thinking about track structure capabilities and limitations is still supposition because of the wide variety of factors that affect neutral rail temperature such as ambient temperature, location, maintenance, and rail traffic. Standards relating to track structure should include a safety margin sufficient to reflect the inability to predict, with reasonable accuracy, the effects of operating conditions upon safety. Therefore, the Safety Board believes that the FRA should reinstate and expand Section 213.119 to ensure proper temperature control procedures for installing and maintaining CWR.

Therefore, the National Transportation Safety Board recommends that the Federal Railroad Administration:

> Conduct a review of track safety standards to include as a minimum an evaluation of procedures associated with maintaining and installing continuous welded rail and its attendant structure. (Class II, Priority Action) (R-91-65)
>
> Continue to provide funding for on-going research development and prototype testing for a reliable device that can be used to determine actual longitudinal rail stress and predict when excessive longitudinal rail stress will occur, and upon adoption and implementation of such a device, assist railroads to implement and/or modify continuous welded rail standards to more effectively prevent track buckling. (Class II, Priority Action) (R-91-66)

Also, the Safety Board issued Safety Recommendations R-91-67 through -70 to the Burlington Northern Railroad; R-91-71 and -72 to the National Railroad Passenger Corporation (Amtrak); and R-91-73 to the Association of American Railroads.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, HART and HAMMERSCHMIDT, Members, concurred in these recommendations.

By: James L. Kolstad
Chairman