

Log R-632c



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: January 14, 1992

In Reply Refer To: R-91-73

Mr. William H. Dempsey
President and Chief Executive Officer
Association of American Railroads
American Railroads Building
50 F Street, N.W.
Washington, D.C. 20001

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. Damage from the derailment was estimated \$1,835,000.¹

Postaccident on-site evidence indicated that a 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 show that improper temperature control of continuous welded rail (CWR) during installation is the major cause of track buckling. The Safety Board reviewed procedures that BN's welding gang followed while they installed CWR in the accident area and the quality review measures of BN supervisors and found several practices to be inadequate or improper.

The Safety Board's audit of BN's *Daily Report for Holland In Track Welding Gang No. 41* shows that gang No. 41 worked 62 days on BN's second subdivision eastbound mainline, including Batavia. Excluding rain days (nonworking days), the records show that the welding gang recorded rail temperatures on 48 of the 62 days. Of the 48 days on which they recorded temperatures, records show that on 32 days

¹For 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).

the rail temperatures were not at or above the required neutral rail temperature for the zone. On October 17-19, the gang recorded no temperatures above 49° F. According to testimony, these ambient temperatures were the rail laying (anchoring) temperatures. When BN increased the minimum rail laying temperature to 95° F, the disparity between the actual laying temperature and the specified minimum rail laying temperature also increased.

Although gang No. 41 had a rail heater on-site when they were in the Batavia area, they integrated the rail heater late into the production line, during their last 2 weeks of work. In addition, the inexperience of the new operator raises concerns as to the quality of work performed. Most importantly, the gang did not use match marks to ensure that the rail had been thoroughly and properly heated, or any other procedures, such as vibrating the rail, to ensure that the rail had free movement as it expanded. The gang's general foreman testified that he determined gap distance at anchor points based on his experience as opposed to taking cold rail temperatures. This made correct determination of proper temperature differential and rail expansion gap improbable. The Safety Board believes that such practices, where fractions of an inch in rail length can cause tons of excessive longitudinal rail force, are not sufficient to ensure a safe track structure.

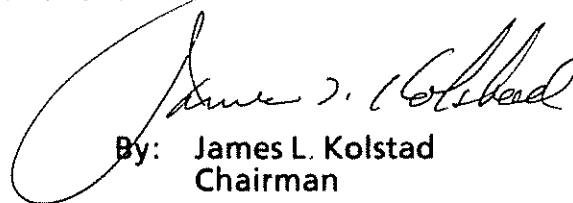
The gang's installation procedures could have been facilitated if they had been able to use a reliable measurement device to determine longitudinal stress in the rail. Currently, the Federal Railroad Administration (FRA) and the AAR are funding research development and prototype testing of a device that may be used to determine actual longitudinal rail stress and predict when excessive stress will occur. To date, no reliable device exists. The Safety Board believes that the FRA and AAR should continue to provide funding for such a measurement device which would enable crews to alleviate the guesswork in their temperature control measures.

Therefore, the National Transportation Safety Board recommends that the Association of American Railroads:

Cooperate with the Federal Railroad Administration in continuing to provide support 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. 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-91-73)

Also, the Safety Board issued Safety Recommendations R-91-65 and -66 to the Federal Railroad Administration; R-91-67 through -70 to the Burlington Northern Railroad Company; and R-91-71 and -72 to the National Railroad Passenger Corporation (Amtrak).

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, HART and HAMMERSCHMIDT, Members, concurred in this recommendation.



By: James L. Kolstad
Chairman