



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

109# R-586B

Date: December 9, 1987

In reply refer to: R-87-32

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On May 18, 1986, 14 of the 23 passenger cars of a Norfolk and Western Railway Company (N&W) passenger excursion train powered by a steam locomotive derailed near Suffolk, Virginia. Of the approximately 1,000 train passengers, all of whom were N&W employees and their relatives and guests, 177 were injured; 19 of the injured were hospitalized. The estimated cost of damage was \$231,530. ^{1/}

The physical evidence and the testimony of the crew and passengers suggest strongly that as the train approached the turnout on the westbound track at the accident site, it passed over track that was already laterally displaced. Lateral displacement of track occurs more often in the early spring and early summer months as ambient temperatures increase and as daily temperatures vary widely. In May 1986, the continuous-welded rail (CWR) on the middle and westbound main tracks at the accident site was subject to variations in temperature, which could have produced tensile and compressive rail stresses that could have readily produced a lateral track displacement. The wide variations in ambient temperatures from the high of 91° F on May 7 to 46° F on May 11 followed by the high temperatures on the day of the derailment were significant because the changes in temperature created increases in the rail stresses that had to be resisted by the turnout.

Compressive rail stresses normally are contained by properly maintained rail anchors and ballast section. Train operation creates additional compressive stresses in the rail, and combined with the effects of increased temperature and disturbed track conditions, the train exacerbates the effects with the possible result of laterally displaced track. The issuance of a "heat wave" order is one method to reduce the effects of the train on the track. A slow moving train is less likely to contribute to the displacement of track than one that is moving rapidly; further, if a track problem develops the consequences will be lessened.

^{1/} For more detailed information, read Railroad Accident Report—"Derailment of Steam Excursion Train Norfolk and Western Railway Company Train Extra 611 West, Suffolk, Virginia, May 18, 1986" (NTSB/RAR-87/05).

On May 6 1987, a prototype shoulder ballast cleaner was being operated on the westbound main train when it struck the east end of the switch at the accident site and damaged eight adjustable brace plate bolts. The Safety Board believes that during the repair process the track was jacked up significantly to cause the tie/ballast interface to be disturbed. This reduced the ability of the track structure at the turnout to resist the forces in the rail created by the increasing temperature on that day. On the following day, when the section foreman realigned the track and removed a slow order placed on the track because of the track condition, the ambient temperature recorded by the National Weather Service (NWS) at Norfolk was 79° F. However, a "heat wave" order effectively reducing the effects of a train on the track was issued by the dispatcher about 2:44 p.m. on the same day, after the temperature went above 90° F, the threshold for issuing "heat wave" orders on that track section.

On the day of the accident, the dispatcher at Crewe reported a temperature of 86° F to the conductor of the train between the time the conductor reported for duty at 12:15 p.m. and the time the train departed at 1:31 p.m. At 1:50 p.m., the NWS at Norfolk recorded a temperature of 89° F. N&W officials testified that the threshold limit for issuing "heat wave" orders was not uniform throughout the Norfolk Southern Corporation system before the derailment, but in June 1986 the threshold was standardized at 85° F. The Safety Board believes that had the threshold limitation been standardized at 85° F earlier, a "heat wave" order would have been issued on May 18, 1986, and may have prevented or lessened the effects of the accident.

The N&W's method of obtaining ambient temperatures at midnight, 6 a.m., noon, and 6 p.m. is a standard procedure throughout the railroad industry. Wayside operators normally report the weather conditions at their location to the dispatcher at these time intervals. However, 6 a.m., midnight, and 6 p.m. are not periods of maximum temperatures. On May 7, 1986, the maximum temperature occurred at 1:50 p.m. On the day of the accident, the maximum temperature occurred between the hours of 2 p.m. and 4 p.m. The Safety Board believes that the effects of temperature changes on CWR requires that the times for monitoring temperatures be modified to include the occurrences of maximum temperatures.

Therefore, the National Transportation Safety Board recommends that the American Short Line Railroad Association and the Association of American Railroads:

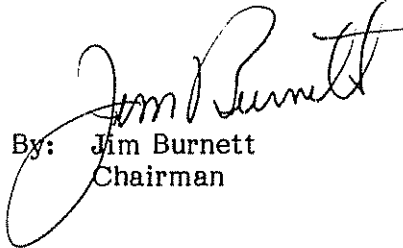
Instruct its membership to revise, to reflect the occurrences of the maximum changes in ambient temperatures, the times at which such temperatures are obtained for the purpose of placing slow orders on continuous-welded rail track. (Class II, Priority Action) (R-87-32)

The Safety Board also issued Safety Recommendations R-87-24 through -29 to the Norfolk and Western Railway Company; R-87-30 and -31 to the National Railroad Historical Society, the American Association of Private Railroad Car Owners, Inc., the American Short Line Railroad Association, and the Association of American Railroads; and R-87-33 through -37 to the Federal Railroad Administration.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken

or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-87-32 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and NALL and KOLSTAD, Members, concurred in this recommendation. LAUBER, Member, did not participate.


By: Jim Burnett
Chairman