



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 16, 1999

In reply refer to: R-99-3

Honorable Jolene M. Molitoris
Administrator
Federal Railroad Administration
400 7th Street, S.W.
Washington, D.C. 20590

About 12:37 p.m. eastern daylight time on Saturday, June 20, 1998, 30 of the 148 cars making up eastbound CSX train Q316 derailed near Milepost (MP) 207.9 at Cox Landing, West Virginia. Of the derailed cars, three were loaded with hazardous material, and eight others contained hazardous material residue. Two of the loaded cars were damaged in the pileup and leaked a combined volume of about 21,500 gallons of formaldehyde solution. No one was injured during the derailment of the train; however, 15 persons reported minor injuries as a result of the release of formaldehyde. Total damages in the accident exceeded \$2.6 million.¹

The National Transportation Safety Board determined that the probable cause of this derailment was an unstable roadbed that resulted from the inadequate or ineffective measures taken by CSX Transportation, Inc., to permanently correct known drainage problems in the accident area.

Railroad track structure supports the weight of trains by distributing the load over a relatively wide area. The weight of the train is transferred from the rails to the crossties and from the crossties to the track ballast. The track ballast and subballast rest on the roadbed. Although different types of roadbed soil will react differently to an excessive amount of water, complete water saturation will generally destabilize a roadbed. To avoid such saturation, the track system, including ballast and subballast, must be able to guide both rain and drainage water away from the track structure. The track ballast allows water to drain through it, while the subballast should be impermeable, guiding water away from the subgrade and into the drainage ditches that parallel all railroad right-of-ways. These ditches are designed to flow water away from the track and toward culverts or terrain features that will channel the water away from the roadbed.

Before the accident, no culverts or other effective means of channeling water away from the track bed were located in the derailment area. According to statements from local residents, water stood in the ditches alongside the track until it either evaporated or soaked into the

¹ For more information, read Railroad Accident Report—*Derailed of a CSX Freight Train and Subsequent Hazardous Material Release at Cox Landing, West Virginia, June 20, 1998* (NTSB/RAR-99/01).

roadbed. At least partly because of the lack of effective drainage, the area in and around MP 207.9 had experienced instances of subgrade and surface problems, which had resulted in speed restrictions being placed on trackage in the derailment area. Track inspection records indicated that several locations near the derailment site had had track surface defects. In February 1998 and again in May 1998 (about 1 month before the accident), surface defects resulted in slow orders being issued for the accident area.

CSX was aware of and had attempted to address the roadbed instability in the vicinity of the derailment by adding ballast or other fill material. These measures, however, while temporarily effective, did not permanently solve the problem of roadbed instability, as indicated by the fact that in the area of the derailment, track inspectors noted numerous defects in cross level and curve elevation during the 12 months preceding the accident. In June 1998, the effects of inadequate drainage were exacerbated by above-average rainfall, which further contributed to roadbed saturation and made the roadbed even less able to maintain the integrity of the track geometry under load. With the roadbed thus weakened, the weight of trains passing through the area contributed to an irregular track surface. At some point, perhaps during the passage of train Q316 itself, the weakened subgrade allowed the cross level to degrade to the point that the cars passing through the area incurred a high degree of longitudinal roll. This rolling action would have decreased vertical force on the wheels on the outside rail of the curve and thus would have allowed, as happened in this accident, the flange of one or more wheels to “lift” and ride on top of the rail. The Safety Board therefore concluded that drainage in the accident area was inadequate and that, as a result, the roadbed in the derailment area likely became water-saturated, rendering the track structure unable to maintain track integrity under the load of train Q316.

While CSX added culverts and fill material to correct drainage problems, these measures may not address all the existing or potential drainage problems along the subdivision. Moreover, portions of the Ohio River Subdivision consist of lighter, older rail with observable, if relatively minor, defects in the form of head-checks. At least one of the several accidents that occurred on the subdivision before the Cox Landing derailment was caused by a broken rail. Also, some of the ties in the general area of the accident appeared to Safety Board investigators to be in poor condition. The Safety Board is concerned about these conditions, because the subdivision closely parallels the Ohio River, and the daily passage of two large trains carrying a variety of hazardous materials represents a significant risk to the river and the residents along it, should a derailment occur.

The Safety Board therefore made the following safety recommendation to CSX Transportation, Inc.:

Perform a comprehensive engineering analysis and evaluation of track and roadbed conditions on the Ohio River Subdivision and develop a plan and a timetable for correcting existing or potential deficiencies, including inadequate drainage, that may affect the safe passage of trains and the safe shipment of hazardous materials through the area. Provide to the National Transportation Safety Board a schedule to correct the deficiencies found during the evaluation. (R-99-4)

The Safety Board is concerned about the recurring nature of the track and roadbed problems evident along portions of the CSX's Ohio River Subdivision and believes that focused Federal oversight of CSX performance in this area is not only justified but is necessary for the protection of people and the environment along this route.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Federal Railroad Administration:

Review both the implementation and the management oversight of CSX Transportation's track inspection and maintenance programs for the Ohio River Subdivision and take the actions necessary to ensure the safe passage of trains and the safe shipment of hazardous materials through the area. (R-99-3)

Also, the Safety Board issued Safety Recommendations R-99-4 through -6 to CSX Transportation, Inc.; R-99-7 through -10 to Cabell and Wayne Counties' Local Emergency Planning Committee; and R-99-11 to Mountaineer Gas Company.

Please refer to Safety Recommendation R-99-3 in your reply. If you need additional information, you may call 202-314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: Jim Hall
Chairman