

SP-20

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

Log R-511

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Forwarded to:

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President
Association of American Railroads
1920 L Street, N. W.
Washington, D. C. 20036

SAFETY RECOMMENDATION(S)
R-85-23

At 9:30 a.m. on April 10, 1984, 18 cars of eastbound Seaboard System Railroad freight train FERHL derailed at Marshville, North Carolina, following the failure of a freight car axle journal as a result of the journal overheating. Two of the four derailed tank cars loaded with methanol, a flammable liquid, were breached during the derailment, and the released methanol was ignited. Three buildings and four automobiles were destroyed by the fire. An estimated 2,100 persons within a 1-mile radius of the accident site were evacuated, U.S. Highway 74 was closed, and the fire was allowed to burn until it subsided at 10 p.m. on the day of the accident. One person received a minor injury during the evacuation. Damage was estimated to be \$1,383,000. ^{1/}

In this accident the tank cars transporting methanol were of the "stub sill" design, and their bottom outlets were struck during the derailment. The two tank cars that were not breached had internal valves, and their bottom outlet nozzles had breaking grooves that had been cut into the nozzles near the bottom of the tank. When these nozzles were broken from the tank, the valve seat was not destroyed, nor was a shearing force applied to the tank shell where the valve was attached; consequently, the methanol was safely contained by the tank. The two other tank cars containing methanol had bottom outlet nozzles less than 6 inches in length for which breaking grooves or other protection were not required. When these nozzles were struck during the derailment, the stress was transferred to the tank shells which were torn open, releasing their contents.

^{1/} For more detailed information read Railroad Accident Report — "Seaboard System Railroad Freight Train FERHL Derailment and Fire, Marshville, North Carolina, April 10, 1984" (NTSB/RAR-85/05)

The release of methanol increased greatly the severity of this accident. Had all bottom outlets been protected on the tank cars containing methanol, it is likely that there would have been no release of hazardous materials, there would have been no fires, and there would have been no need to have evacuated the town. The tank car industry and the railroads have been improving the protection of bottom outlets for several years. Protection now is required by Interchange Rules of the Association of American Railroads (AAR) so that new tank cars are being fitted with protection and retrofit of existing cars is in progress according to a time schedule based on the hazard posed by the material transported. Installation of protection on all tank cars is scheduled for completion by 1990.

The Safety Board is concerned about the release of hazardous materials from tank cars involved in derailments because the released materials escalate the severity of the accident. The released hazardous materials often fuel fires that are capable of producing the heat necessary to cause a violent rupture of other tank cars carrying hazardous materials that were not breached by the derailment. The hazardous materials released when a bottom outlet fails threaten the safety of the crewmembers, the public, emergency response personnel, and spectators. The release of these materials results in the evacuation of the area and the disruption of activities at nearby facilities. In addition to the hazards posed to the public safety and health, the released materials damage the environment resulting in enormous cleanup expenditures. The cleanup of the materials released as a result of the Livingston, Louisiana, derailment cost in excess of \$10 million. ^{2/}

In the earlier years of the AAR tank car bottom discontinuity retrofit program, it was necessary for the industry to experiment with methods of protection and methods of applying that protection. Some types of protection and some methods of application had to be abandoned or modified. Another problem was the many different configurations of bottom discontinuities which required many different designs for the proper protection. Some tank cars had insulation jackets that presented additional problems. Tank cars with exterior heater systems have an irregular or corrugated bottom surface to which the bottom protection must be applied. Now the type of protection and method of application is perfected, and the time necessary to retrofit a car should have been reduced considerably. Nevertheless, fewer than 22 percent of the cars requiring protection have been modified, although 57 percent of the projected timeframe has passed.

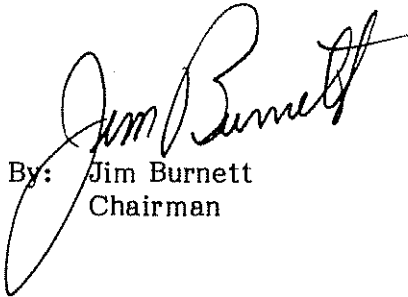
There are many tank cars yet to be retrofitted with bottom outlet protection which transport poisonous liquids, flammable liquids, corrosive liquids, combustible liquids, and other materials that pose a threat to the public and the environment. The tank cars that are used to transport many of these hazardous materials will not be required to be retrofitted with bottom outlet protection until July 1, 1990. While actions taken by the AAR are commendable, the Safety Board believes that the schedule for completion of the tank car retrofit should be expedited and encourages the AAR to ask owners of tank cars to accelerate their application of bottom outlet protective devices.

^{2/} Railroad Accident Report--"Derailment of Illinois Central Gulf Railroad Freight Train Extra 9629 East (GS-2-28) and Release of Hazardous Materials, Livingston, Louisiana, September 28, 1982" (NTSB/RAR-83/05).

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

Accelerate the schedule of the ongoing industry program for protecting bottom discontinuities on existing stub-sill tank cars so as to complete retrofiting by July 31, 1988. (Class II, Priority Action) (R-85-23)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in this recommendation.


By: Jim Burnett
Chairman