



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: March 12, 2001

In reply refer to: R-01-05

Mr. Robert A. Matthews
President
Railway Progress Institute
700 North Fairfax Street
Suite 601
Alexandria, Virginia 22314-2098

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the adequacy of inspection and testing requirements for pressure relief devices on railroad tank cars. The recommendation is derived from the Safety Board's investigation of the catastrophic rupture of a railroad tank car containing hazardous waste near Clymers, Indiana, on February 18, 1999,¹ and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued 10 safety recommendations, 1 of which is addressed to the Railway Progress Institute. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

About 12:05 a.m. on February 18, 1999, railroad tank car UTLX 643593, which was on the west unloading rack at the Essroc Cement Corporation cement plant near Clymers, Indiana, sustained a sudden and catastrophic rupture that propelled the tank car's tank about 750 feet and over multistory storage tanks. There were no injuries or fatalities. Total damages, including property damage and costs from lost production, were estimated at nearly \$8.2 million. The National Transportation Safety Board determined that the probable cause of the accident was the failure of Essroc Cement Corporation and CP Recycling of Indiana management to develop and implement safe procedures for offloading toluene diisocyanate (TDI) matter wastes, resulting in the

¹ For more information, see forthcoming Hazardous Materials Accident Report NTSB/HZM-01/01: *Catastrophic Rupture of a Railroad Tank Car Containing Hazardous Waste Near Clymers, Indiana, February 18, 1999* (Washington, DC: National Transportation Safety Board, 2001).

overpressurization of the tank car from chemical self-reaction and expansion of the TDI matter wastes.

In addition to the causal issues that the Safety Board investigated with regard to this accident, the Board studied the efficacy of the pressure relief devices on the tank cars inspected following this accident. After the Clymers accident, the Federal Railroad Administration (FRA) mandated that the pressure relief valves from 4 of 24 tank cars containing TDI matter wastes in storage near Clymers be pressure-tested in accordance with the U.S. Department of Transportation (DOT) *Hazardous Materials Regulations* before any of the tank cars could be transported for unloading. When these tests were performed in March 1999, three of the four valves were not due for retesting until 2003. Each valve had 4 years remaining of its 10-year test cycle. The fourth valve, also on a 10-year test cycle, was due for a retest in 1999. The pressure relief valve from UTLX 643593 was on a 10-year test cycle and not due for a retest until 2003. This valve was also examined and tested in May 1999. All five pressure relief valves failed to meet the tolerances for the start-to-discharge pressure and vapor-tight pressure as required under the regulations.

The teardown and inspection of the pressure relief valves from these five tank cars (the four cars that the FRA required to be tested and UTLX 643593) demonstrated that the valves were in a deteriorated condition. The ethylene propylene rubber O-rings showed evidence of swelling, hardness, and brittleness, and the metallic components exhibited varying degrees of rust, scale, pitting, and grit. Replacement of the deteriorated O-rings in the pressure relief valve from UTLX 643593 with new O-rings did not, by itself, bring about proper operation of the valve. Even with the new O-rings, the pressure relief valve from UTLX 643953 was within the tolerances for the start-to-discharge and vapor-tight pressures only after all dirt, grit, and other debris had been removed from the sealing surfaces of the valve. Consequently, it appears that the accumulation of rust, scale, and dirt caused the five pressure relief valves to fail to meet the required start-to-discharge and vapor-pressure standards. Therefore, the Safety Board concluded that, based on the deteriorated condition of the pressure relief valves examined in this investigation and the failure of these valves to activate as required, the pressure relief valves on tank cars that transport hazardous materials may require more frequent and rigorous testing to ensure that they remain functional.

The testing interval for a tank car and its components under the DOT *Hazardous Materials Regulations* depends in part upon the types of products that are transported in the tank car. Tank cars that transport corrosive materials must be inspected and retested every 5 to 10 years, whereas tank cars that transport noncorrosive materials must be inspected and retested every 10 years. The regulations also require testing and inspection if there is evidence of damage, corrosion, cracks, dents, or deformation or if the tank car is involved in an accident and is repaired. However, the deterioration of the pressure relief valves from UTLX 643593 and the other four tank cars was only detected when the valves were disassembled and inspected.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Railway Progress Institute:

Assist the Federal Railroad Administration and the Research and Special Programs Administration in the evaluation of the deterioration of pressure relief devices through normal service and the development of inspection criteria to

ensure that the pressure relief devices remain functional between regular inspection intervals. (R-01-05)

The Safety Board also issued safety recommendations to the Federal Railroad Administration, the Research and Special Programs Administration, the Association of American Railroads, the Lyondell Chemical Company, the Olin Corporation, the Essroc Cement Corporation, and CP Recycling, Inc., and Affiliated Companies. In your response to the recommendation in this letter, please refer to Safety Recommendation R-01-05. If you need additional information, you may call (202) 314-6170.

Acting Chairman CARMODY and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: Carol J. Carmody
Acting Chairman