

Ray-508

SP-20

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 17, 1985

Forwarded to:

Honorable John H. Riley
Administrator
Federal Railroad Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

R-85-59 and -60

About 4:45 a.m., December 31, 1984, RAIX 7033, a tank car loaded with ethylene oxide by the Union Carbide Corporation, was discovered leaking in the Missouri Pacific Railroad Company (MP) railyard in North Little Rock, Arkansas. The leaking ethylene oxide formed a vapor cloud. Fearing an explosion, railyard management ordered an evacuation and formulated plans to transfer the remaining ethylene oxide from the leaking tank car to another tank car. About 12 hours later, local authorities ordered, as a precautionary measure, that an additional area 1 mile in radius, containing an estimated 2,500 persons, be evacuated for the duration of the product transfer. The evacuation order was lifted at 11:25 a.m. the following day.

The leaking tank car, an insulated DOT specification 111A100W4, stub-sill tank car, manufactured in January 1976 by the General American Transportation Corporation (GATX), was designed specifically to transport ethylene oxide. The tank car was equipped with full head shields that are a part of the insulation jacket. Following the accident, the car was moved to a Union Carbide plant in Taft, Louisiana, where it was purged, cleaned, and inspected. Two fractures were found in the center of the bottom of the tank shell. The car was moved to Texarkana, Arkansas, where a section of the car that included the tank shell containing the fractures, the jacket anti-shift bracket, and a part of the jacket was removed. Metallurgical examination of the tank car section revealed that the fractures were located at each end of the weld which attached the jacket anti-shift bracket to the tank shell.

The jacket anti-shift bracket is a 1/2-inch by 6-inch by 12-inch, vertical steel plate, which is welded directly to the tank shell and is designed to prevent the jacket from shifting. The anti-shift device, as applied, is a stress concentrator and restricts the flexion of the tank shell that is inherent to stub-sill tank cars. Routine railroad operations such as coupling, train dynamics, and moving over track irregularities subject stub-sill tank car shells to distorting forces. The relative motion between the tank and the tank car jacket also creates stresses at the anti-shift bracket.

Union Carbide operates 29 tank cars in ethylene oxide service manufactured to the same design specifications as the accident tank car. This design does not comply with existing U.S. Department of Transportation (DOT) regulations or Association of American Railroads (AAR) standards for tank cars. After this accident, Union Carbide removed the remaining 28 ethylene oxide tank cars from service. Subsequent inspections revealed that similar fractures were forming in at least one other tank car.

Information obtained by the Safety Board from GATX after the accident indicated that a total of 7,600 tank cars were manufactured with the anti-shift bracket welded directly to the tank shell. Approximately 3,800 of these cars carry commodities that are classified as hazardous materials.


GATX has proposed a repair program to remove the existing anti-shift bracket on all 7,600 tank cars and to replace it with a bracket that will not be applied directly to the tank shell. Additionally, GATX proposed to inspect the area surrounding the existing bracket for cracks and to effect repairs as required. The proposed repair program would proceed at the rate of 100 cars per week.

The Safety Board is concerned that there may be tank cars in hazardous materials service of this design and manufacture that can pose a high risk and should be removed from service immediately. Therefore, the National Transportation Safety Board recommends that the Federal Railroad Administration:

Require inspection of all jacketed tank cars in hazardous materials service that have tank car anti-shift brackets protruding outside the tank jackets for indications of jacket shifting or product seepage in the anti-shift bracket area, and remove from service all cars that exhibit symptoms of such distress until approved repairs are made. (Class I, Urgent Action) (R-85-59)

Evaluate for adequacy and timeliness, directing changes as necessary, the General American Transportation Corporation's proposed inspection and repair program for bringing tank cars on which anti-shift brackets are welded directly to the tank shell into regulatory compliance, and monitor the completion of the program. (Class I, Urgent Action) (R-85-60)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.


By: Jim Burnett
Chairman