SP-20
Log R-508C

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: SEP 20 1985

Forwarded to:

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

SAFETY RECOMMENDATION(S)

R-85-99

About 4:45 a.m., c.s.t., December 31, 1984, a switchman discovered ethylene oxide leaking from a tank car at the Missouri Pacific Railroad Company's (MOPAC) automatic retarder classification railroad yard at North Little Rock, Arkansas. Railroad officials, fearing an explosion, evacuated the yard and formulated plans to transfer the remaining ethylene oxide to an empty rail tank car. At 3:15 p.m., in anticipation of the arrival of the equipment to transfer the ethylene oxide and concern about the tank car rocketing should ignition occur, the evacuation was expanded to include an estimated 2,500 persons within a 1-mile radius of the leaking car. All rail and highway traffic within the evacuated area was stopped with the exception of traffic using Route 67-167 located in the extreme northwest quadrant of the evacuated area. After the transfer, the residual ethylene oxide was purged from the tank car with nitrogen, and the evacuation was terminated at 11:25 a.m., January 1, 1985. There were no injuries or fire. 1/

All parties to the Safety Board's investigation agreed that the anti-shift bracket on tank car RAIX 7033 was not installed in accordance with Federal requirements and that old cracks existed in the tank shell; however, there was disagreement as to the cause of the final failure of the tank shell. One view is that the failure was caused by a single event, such as an overspeed coupling; however, the fact that other tank cars had cracks of varying depths which had not yet propagated through the tank wall discounts the single event theory. The Safety Board believes that it is more likely that the failure developed over a period of time in routine railroad operations, which may have included overspeed couplings, resulting in progressive cracking. Because of the way the anti-shift brackets were installed, tank car RAIX 7033 and others so designed were prone to failure as a result of forces by normal operations dependent primarily upon the type and extent of service for which they were used.

1/ For more detailed information, read Hazardous Materials Special Investigation Report--"Hazardous Materials Release, Missouri Pacific Railroad Company's North Little Rock, Arkansas, Railroad Yard, December 31, 1984" (NTSB/SIR-85/03).

At the request of the Safety Board, General American Transportation Corporation (GATX) reviewed its records of tank cars constructed using its anti-shift brackets design. GATX reported that since 1971 more than 9,810 tank cars have been constructed with the anti-shift bracket welded directly to the tank shell. GATX estimated that 50 percent of the 9,180 tank cars to be retrofitted were in hazardous materials service. On April 9, 1985, GATX received approval from the Association of American Railroads' (AAR) Tank Car Committee to retrofit the tank cars to comply with 49 CFR Section 179.200-19(b), and the tank car owners were notified. The retrofit program includes (1) cutting off the bracket, (2) grinding smooth the area on the shell where the existing bracket was attached, (3) installing a new bracket so that it is welded directly to the tank shell, (4) inspecting the area where the old bracket was located using a dye penetrant, and (5) correcting any defects found in the tank shell. GATX estimates that 280 cars will be retrofitted each week until the program is complete.

Because it believed that an independent evaluation should be made of the adequacy of the proposed modification to tank cars with non-complying anti-shift devices, the Safety Board recommended on May 17, 1985, that the Federal Railroad Administration (FRA):

> Require inspection of all jacketed 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. (R-85-59)
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> 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. (R-85-60)

On August 8, 1985, the FRA responded to Safety Recommendations R-85-59 and -60, that on June 12, 1985, it issued an order requiring that the DOT specification stenciling be removed from all tank cars constructed by GATX which have the anti-shift bracket welded directly to the tank shell. Also, it directed that the cars be removed from hazardous materials service and not returned to hazardous materials service until action has been taken to bring the cars into compliance with Federal regulations. Further, the FRA advised that it is monitoring the retrofit program at approximately 50 AAR certified shops to ensure that repairs being performed are in compliance with DOT and AAR requirements. As of August 1, 1985, GATX had inspected 3,000 of the 9,810 tank cars; 824 were found to be defective.

While its prompt action to remove these tank cars from service is commendable, the FRA has yet to address the adequacy of the method of repair for these tank cars as proposed by GATX and approved by the AAR, and it is not monitoring the adequacy of field repairs made on these tank cars. The State of Louisiana furnished information to the Safety Board based on its inspection of field modifications being made to replace non-complying anti-shift bracket attachments. The inspections indicate that the procedure being used for retrofitting these tank cars may destroy the integrity of the tank shell. For example, heat and/or mechanical damage may occur to the tank shell during removal of the existing bracket with a cutting torch or hammer. Also, the tank shell thickness may be reduced to less than that required by DOT tank car specifications as a result of grinding out surface cracks. Because more than 280 tank cars per week are being inspected, retrofitted, and returned to service using the AAR approved method, the Safety Board urges the FRA to institute, without further delay, the action earlier called for in Safety Recommendation R-85-60.

On June 6, 1985, the Safety Board requested that the AAR and the FRA provide the following information pertaining to inspection activities from November 6, 1971, through the end of 1984 at GATX's manufacturing facilities:

1. The scope of each type of inspection.
2. The deficiencies determined by type.
3. The number of inspections by year from 1971 through 1984.

In a letter dated, July 2, 1985, the AAR stated, in part:

> Under the DOT scheme of regulations, neither the AAR nor any other institution is charged with third party responsibility for making inspections of construction or manufacturing of specific tank cars.
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> The AAR does inspect facilities of car builders and others for a variety of reasons. With specific reference to tank car construction, the AAR has a program under which it inspects and certifies the facilities of tank car builders. These certification procedures and detailed requirements for AAR approval of facilities for fabrication, assembly, alteration, conversion, repair and associated testing of tank car tanks are contained in Appendix B of the AAR Specifications M-1002, Specification for Tank Cars.
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> A company applies for certification by submitting the data required in Appendix B, and if the data is found to be in good order, a task group from the AAR Tank Car Committee is assigned to perform an inspection of the facility. This certification inspection is designed to verify the submitted data with respect to welding procedures and qualifications, supervision, quality control, radiography, postweld heat treatment, and other equipment and/or practices employed at the facility. The purpose of the inspection is to provide assurance that the facility has the ability to manufacture tank cars in accordance with published AAR and DOT specifications. Given a recommendation by the task force and subsequent approval by the Tank Car Committee, a facility becomes certified for a period of 5 years, after which time recertification is required.
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> The Sharon, Pennsylvania (a.k.a. Masury, Ohio) facility of General American Transportation Corporation was certified by the AAR to perform fabrication, repair, conversion, alteration and assembly of tank car tanks in accord with AAR and DOT requirements. The facility, which is no longer in operation, was inspected for recertification purposes on July 7, 1972, June 20, 1977, and September 1, 1982.
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> During the 1977 inspection it was noted that some welding equipment inventory control numbers were in error, a minor defect that was judged to have no influence on quality levels.
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> No other deficiencies were reported during any of the inspections. The facility was permanently closed on April 30, 1984.

In a letter dated July 30, 1985, the FRA responded that it performed no inspections on the actual construction of tank cars and that "the functions of Part 179 of 49 C.F.R., are delegated to the AAR's Tank Car Committee."

Although the FRA is the agency mandated to perform the oversight responsibility of tank car construction, neither it nor its delegated agent, the AAR, inspect tank car manufacturer's facilities to determine if the individual tanks are being constructed in compliance with DOT regulations and AAR Tank Car Specifications. Consequently, the construction of tank cars in compliance with approved tank car safety standards rests solely with tank car manufacturers. The Safety Board believes that an AAR committee, which is composed of industry representatives, such as tank car owners, is not an appropriate group to monitor compliance with Federal standards because conflicts of interest could develop. Therefore, the Safety Board believes that the FRA should inspect a representative sample of tank cars as they are manufactured to assure that the manufacturer complies with DOT standards.

The fact that the FRA was unaware that GATX had been installing anti-shift brackets improperly between 1971 and 1984 reinforces the need for it to inspect tank car construction. Had the FRA monitored the manufacture of tank cars employing anti-shift devices, visual inspection at the GATX facilities could have detected in 1971 or early 1972 GATX's failure to modify the attachment of the anti-shift device when attachment directly to the tank shell became unlawful, and corrective action could have been taken. Furthermore, had the FRA monitored periodically the modifications of tank cars in service, additional opportunities would have been available for early discovery of this non-complying anti-shift device.

The Safety Board is concerned that the FRA has no involvement in reviewing and approving modifications to tank cars that may affect the continued safety of the tank cars. In this specific case, a committee of the AAR composed of persons with a vested interest in the continued operations of these tank cars performed the only assessment of the modification proposed by the tank car manufacturer to correct an established flaw. For that matter, the FRA was not required to be notified of the modification as it had delegated its approval authority to the AAR.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the Federal Railroad Administration:

> Institute an inspection program to verify that tank cars intended to be used in hazardous materials service are manufactured in compliance with Department of Transportation standards. (Class II, Priority Action) (R-85-99)

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

By: Jim Burnett
Chairman