

Log H-561C



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: October 15, 1991

In reply refer to: H-91-36

Honorable Pete Wilson
Governor of California
State Capitol
First Floor
Sacramento, California 95814

About 3 a.m. Pacific standard time on February 13, 1991, a tractor-semitrailer (cargo tank) overturned as the vehicle was traveling on a main urban roadway in Carmichael, California.¹ At the time of the accident, the cargo tank contained about 8,800 gallons of automotive gasoline that was being transported by intrastate delivery to a service station. Gasoline from the cargo tank spilled into a nearby drainage ditch and entered the underground drainage system. Gasoline vapors ignited from an undetermined ignition source, and the fire flashed back and engulfed the overturned cargo tank. In addition to the total loss of the tank truck, its cargo, and two parked cars, four homes and their contents were destroyed or heavily damaged by fire, and the residents from a 2-mile-square area were evacuated. Total property damage and cleanup costs were estimated at nearly \$1 million. There were three minor injuries.

Based on its investigation of the accident, the Safety Board concluded that the gasoline was released through an opening in the manhole cover for the front compartment of the cargo tank, most likely after a liquid-level sensor was dislodged by a dynamic surge of the gasoline cargo. Further, the failure of the sensor to remain secured contributed to the severity of the accident.

At the time of the accident, the vehicle was involved with the intrastate transportation of a hazardous material within the State of California. State regulations governing the transportation of hazardous materials are found in Title 13, California Code of Regulations (CCR), Article 3. Section 1160.2(a) of Article 3 incorporates by reference portions of the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations "to the extent specified." This section further stipulates that unless otherwise specified, all references to Title 49 CFR in Article 3 are those DOT regulations that were in effect on October 1, 1988.

¹ The accident report contains more detailed information: "Overturn of a Tractor-Semitrailer (Cargo Tank) With the Release of Automotive Gasoline and Fire, Carmichael, California, February 13, 1991," Hazardous Materials Accident Report NTSB/HZM-91/01.

The cargo tank involved in the accident was a DOT specification MC 306. Under the DOT's Hazardous Materials Regulations that were in effect on October 1, 1988, MC 306 cargo tanks were authorized containers for the highway transportation of automotive gasoline. General design and construction standards for MC 306 cargo tanks were provided in 49 CFR Part 178. Section 178.341-3 required the manhole and fill-opening covers for each compartment of a cargo tank to be designed and constructed to withstand internal fluid pressures of 9 psig without permanent deformation. As part of its investigation of the Carmichael accident, the Safety Board calculated the dynamic force² on the forward manhole compartment of the cargo tank. The dynamic force was calculated to be between 20 and 50 psia, which greatly exceeds the static design pressure of 9 psig specified in the Federal regulations in effect on October 1, 1988, and allowed by California State regulations.

In June 1989, the Research and Special Programs Administration (RSPA) amended the regulations pertaining to the design, manufacture, operation, and maintenance of all DOT specification highway cargo tanks.³ RSPA noted in the preamble published with the final rules that the amendments fundamentally changed the design and construction for new bulk liquid cargo tanks. Bulk liquid cargo tanks constructed under the new rules will be designated as specification DOT 406, DOT 407, and DOT 412 and will replace the existing MC 306, MC 307, and MC 312 cargo tank specifications. Consequently, the design and construction standards for the MC 306, 307 and 312 cargo tanks were superseded by the 1989 amendments. In response to petitions for reconsideration filed as a result of the June 1989 amendments, RSPA published a subsequent final rule in September 1990⁴ to address these petitions for reconsideration. The 1990 amendments delayed the effective date of the 1989 amendments, which establish standards for the new DOT 400 series cargo tanks, and all subsequent amendments until December 31, 1990. Further, the 1990 amendments, under Section 49 CFR 180.405, provide a transition period during which the continued construction of new MC 306, 307, and 312 cargo tanks is authorized between December 31, 1990, and August 31, 1993; these newly constructed tanks must meet the specifications for the MC 306, 307, and 312 cargo tanks that were in effect just prior to the effective date of the 1989 amendments.

The 1989 amendments included design standards for manhole covers for DOT 406, 407, and 412 cargo tanks. Under 49 CFR 178.345-5, each manhole cover must be: (1) capable of withstanding, without leakage or permanent deformation that would affect its structural integrity, a static internal

² Calculations of the dynamic forces provide a reasonable estimate of the forces that can be generated on the manhole covers. More detailed explanation of the calculations is provided in the accident report (NTSB/HZM-91/01).

³ Federal Register, Vol. 54, No. 111, dated June 12, 1989, page 24982.

⁴ Federal Register, Vol. 55, No. 174, dated December 7, 1990, page 37028.

fluid pressure of at least 36 psig, or cargo tank pressure, whichever is greater; (2) fitted with a safety device that prevents the cover from opening fully when internal pressure is present; and (3) secured with fastenings that will prevent opening of the covers as a result of vibration under normal transportation or shock impact during a rollover accident on the roadway when the fill cover is not struck by a substantial obstacle.

Under these new regulations, manhole covers on all MC 306, 307, 312, and older MC series bulk liquid cargo tanks⁵ must be upgraded to meet the 36 psig standard by August 31, 1995. Under 49 CFR 180.405(g), owners of any MC series bulk liquid cargo tank must equip their cargo tanks with manhole covers that conform with 49 CFR 178.345-5.

The recent revisions of the cargo tank design standards in 49 CFR are a major improvement in the standards. Because the State of California has not adopted Federal regulations beyond those in effect as of October 1, 1988, intrastate shipments of all hazardous materials can be made indefinitely in liquid bulk tank trucks that do not meet the improved Federal standards. Consequently, potential improvements in public safety within California will be precluded so long as cargo tanks that fail to meet improved standards remain in intrastate service. There is also an increased likelihood that cargo tanks that fail to meet Federal standards will be removed from interstate service and placed in intrastate service within California. Therefore, the Safety Board believes that the State of California should adopt design standards for bulk liquid cargo tanks that are equivalent to the current standards in 49 CFR Parts 171 through 180.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the State of California:

Adopt design standards for highway bulk liquid cargo tanks that are at least equivalent to current Federal standards in 49 CFR Part 171 through 180. (Class II, Priority Action) (H-91-36)

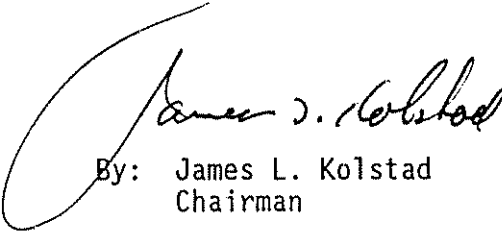
Also as a result of its investigation, the Safety Board issued recommendations to the Federal Highway Administration, the Research and Special Programs Administration, and the National Highway Traffic Safety Administration of the U.S. Department of Transportation; other States and U.S. Territories; and to Calzona Tankways, Inc.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety

⁵ MC 300, 102, 302, 303, and 305 cargo tanks were the precursors of the MC 306 tanks. MC 310 and 311 cargo tanks were the precursors of the MC 312. Although tanks of these specifications are no longer produced, many may still be in hazardous materials service.

recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-91-36 in your reply.

Chairman KOLSTAD, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in this recommendation.



By: James L. Kolstad
Chairman