



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

ACTION
is assigned to
<i>ESPA</i>
CONTROL NO.
980520-008
SIMS
S-10

Date: May 18, 1998

In reply refer to: H-98-27

Honorable Rodney E. Slater
Secretary
U.S. Department of Transportation
Washington, D.C. 20590

On October 9, 1997, about 12:10 a.m., a 1994 Mack truck tractor pulling a 1994 Fruehauf MC-306 cargo tank semitrailer was heading south on Central Park Avenue in Yonkers, New York. The truck, which was loaded with 8,800 gallons of gasoline, was just going under an overpass of the New York State Thruway (Thruway) when it was struck by a southbound 1990 Eagle Premier sedan. The car hit the right side of the cargo tank in the area of the tank's external loading unloading lines (loading lines), releasing the gasoline they contained. The ensuing fire destroyed both vehicles and the overpass of the Thruway; the Thruway remained closed for approximately 6 months. The driver of the car was killed; the driver of the truck was not injured. The damage was estimated to cost \$7 million. At the time of the accident, the weather was clear and dry with no overcast.¹

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the car driver to (1) stop for the red light or (2) reduce his speed or (3) apply his brakes soon enough to avoid the collision. Contributing to the severity of the accident was the fire resulting from the release of gasoline that the cargo tank's loading lines were carrying, as permitted by the DOT.

While investigating the accident, the Safety Board found that the accident's most significant element was not its cause, but its severity. A similar error on the part of a car driver might have had far less serious consequences—such as some damage to the car and truck, slight injuries, or both. In this case, however, one person died and the property damage was substantial. The crucial difference was the presence of gasoline in the loading lines.

Most MC-306 and DOT-406 cargo tanks used to transport petroleum distillate fuels are loaded through bottom loading lines and then operated on the roads with cargo in these lines.

¹For more information, read Highway Accident Report—*Collision of Tractor/Cargo Tank Semitrailer and Passenger Vehicle and Subsequent Fire, Yonkers, New York, October 9, 1997* (NTSB/HAR-98/01/SUM).



However, because of their design, location, and vulnerability to being hit by other vehicles on the road, the practice of transporting hazardous materials in loading lines significantly increases the potential seriousness of any accident because cargo may be released from the damaged lines.

Safety Board investigators demonstrated the vulnerability of loading lines by placing 12 passenger vehicles (varying in type and size) near the loading lines of a cargo tank that was similar to the accident cargo tank. Each vehicle was placed so that the angle between it and the truck was approximately the same as the angle between the accident car and the accident truck. The investigators found that each of the 12 vehicles would have struck the loading lines of the truck had the vehicle moved forward. Therefore, the Safety Board believes that most vehicles currently in use are capable of striking the loading lines of cargo tanks.

In 1978, a FHWA memorandum established the FHWA policy of allowing gasoline to be carried in loading lines because of "economic and practicality considerations."

When RSPA published its final rule in 1989, which allowed the transportation of gasoline in loading lines, RSPA noted that loading lines are not appropriate packaging for hazardous materials:

Bottom loading and unloading outlets on cargo tanks, although very useful, present the inherent risk that if damaged the entire contents of the tank may be released....piping attached to the outlet valve is provided with a sacrificial device that is designed to break under accident loads.... Because such piping under the current regulation is not specifically a part of the product containment vessel and is designed to fail in an accident, RSPA's position is that piping between the tank outlet valve and any loading valves is not an appropriate packaging for the transportation of hazardous materials.

As a part of the implementation of the Clean Air Act (CAA), the Environmental Protection Agency (EPA) required that cargo tanks used in areas operating under EPA's State Implementation Plan for the CAA must be equipped with a vapor recovery system. The petroleum industry chose to use bottom loading in conjunction with tank top vapor recovery as their method of compliance with the CAA. All motor fuels must be metered for tax purposes. Unfortunately, in implementing this system the industry did not provide for a way to drain product from the cargo tank piping back into the loading facility and maintain proper accounting for tax purposes. As a result, cargo tanks are currently operated with gasoline in external piping that is designed to fail in an accident. The operation of cargo tanks with lading retained in external piping is generally limited to petroleum distillate fuels metered for road fuel tax purposes and transported in bottom loaded MC-306 type cargo tanks. The scope of these operations encompasses the vast majority of all gasoline transported.

RSPA strongly believes the practice of transporting hazardous materials in exposed unprotected piping designed to fail, if impacted in an accident, is an unnecessary risk....Accordingly, RSPA proposed in the Notice for Proposed

Rulemaking a prohibition on the transportation of hazardous materials in external piping unless the piping is protected by very substantial guards.

Commenters for the petroleum industry, represented by the American Petroleum Institute and several large petroleum companies, argued that the need for bottom damage protection structures to protect piping containing lading is not justified. They argued that, based on statistical data showing the infrequency of accidents involving these lines, the relatively small amounts of product exposed, and the integrity and operation of current self-closing valves, the loss of lading from piping is not a significant problem.

RSPA agrees that accidents resulting in damage to unprotected external piping carrying lading are infrequent, but the consequences of such accidents can be substantial, particularly if the material released has inherent hazards greater than that of gasoline....with the exception of gasoline, the transportation of hazardous materials in external unprotected piping is prohibited. For hazardous materials other than gasoline, transportation in external unprotected piping is less common and thus the prohibition of such transportation will have a much lower cost impact. However, if the transportation of gasoline in external unprotected piping were prohibited, the impact on the petroleum industry could be substantial.

Although we have very serious concerns with the practice of transporting gasoline in external unprotected piping, we do not have sufficient data regarding incidents that can be attributed to the dislodging of piping to justify prohibiting the practice for gasoline at this time. Nor do we have adequate information concerning possible alternative procedures or equipment for accomplishing vapor recovery and road fuel tax metering and the costs associated with these alternatives. Many of the potential cost effective ways to eliminate the risk associated with the transportation of gasoline in external unprotected line may entail alterations to the cargo tank piping, fixed loading and unloading equipment, or both. For these reasons we are excepting gasoline from the prohibition on the transportation of hazardous materials in external unprotected piping. However, we encourage the petroleum industry to consider the risk they accept in employing this practice, and work to eliminate it. We believe the petroleum industry is best positioned to consider and evaluate all the possible ways to eliminate this risk in the most cost effective manner.

Subsequently, in 1990, after being petitioned by industry, RSPA amended the regulations to require bottom damage protection only for loading lines used to transport poison B liquids, oxidizer liquids, liquid organic peroxides, and liquids corrosive to the skin. The rulemaking permitted carriers to continue to transport petroleum products and other hazardous materials in loading lines without bottom damage protection.

The Safety Board concludes that transporting hazardous materials in loading lines creates a hazardous condition. Consequently, the Safety Board believes that the DOT should prohibit carrying hazardous materials in vulnerable piping, such as loading lines, of cargo tanks.

Therefore the National Transportation Safety Board issues the following recommendation to the U.S. Secretary of Transportation:

Prohibit the carrying of hazardous materials in external piping of cargo tanks, such as loading lines, that may be vulnerable to failure in an accident. (H-98-27)

Please refer to Safety Recommendation H-98-27 in your reply. If you need additional information, you may call (202) 314-6445.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:



Jim Hall
Chairman



National Transportation Safety Board

Washington, D.C. 20594

May 18, 1998

Office of the Chairman

Ms. Kelley S. Coyner
Acting Administrator
Research and Special Programs Administration
Washington, D.C. 20590

Dear Ms. Coyner:

On October 9, 1997, about 12:10 a.m., a 1994 Mack truck tractor pulling a 1994 Fruehauf MC-306 cargo tank semitrailer was heading south on Central Park Avenue in Yonkers, New York. The truck, which was loaded with 8,800 gallons of gasoline, was just going under an overpass of the New York State Thruway (Thruway) when it was struck by a southbound 1990 Eagle Premier sedan. The car hit the right side of the cargo tank in the area of the tank's external loading unloading lines (loading lines), releasing the gasoline they contained. The ensuing fire destroyed both vehicles and the overpass of the Thruway; the Thruway remained closed for approximately 6 months. The driver of the car was killed; the driver of the truck was not injured. The damage was estimated to cost \$7 million. At the time of the accident, the weather was clear and dry with no overcast.¹

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the car driver to (1) stop for the red light or (2) reduce his speed or (3) apply his brakes soon enough to avoid the collision. Contributing to the severity of the accident was the fire resulting from the release of gasoline that the cargo tank's loading lines were carrying, as permitted by the DOT.

Most MC-306 and DOT-406 cargo tanks used to transport petroleum distillate fuels are loaded through bottom loading lines and then operated on the roads with cargo in these lines. However, because of their design, location, and vulnerability to being hit by other vehicles on the road, the practice of transporting hazardous materials in loading lines significantly increases the potential seriousness of any accident because cargo may be released from the damaged lines.

The Safety Board is unable to determine the number of MC-306 and DOT-406 cargo tanks currently in use. None of the government agencies or industry associations, including the

¹ For more information, read Highway Accident Report—*Collision of Tractor/Cargo Tank Semitrailer and Passenger Vehicle and Subsequent Fire, Yonkers, New York, October 9, 1997* (NTSB/HAR-98/01/SUM).

Federal Highway Administration (FHWA), RSPA, the American Petroleum Institute, the Truck Trailer Manufacturers Association, and the National Tank Truck Carriers, are able to provide an accurate count. In 1984, Dynamic Sciences estimated for the DOT that the MC-306 cargo tank population was approximately 57,900. However, based on comments from the industry during this investigation, the Safety Board believes that the current number of MC-306 and DOT-406 cargo tanks is larger than the 1984 estimate suggests.

The Safety Board in its *Cargo Tank Rollover Protection Special Investigation Report* dated February 4, 1992, noted, "In addition to the underreporting of accidents, inadequately reported and recorded information can also mask trends or a specific pattern of performance." The Yonkers accident is an example of an inadequately reported and recorded accident. The incident was reported to RSPA, but the Hazardous Materials Incident Report did not identify the incident as a loading line packaging failure. Instead, the motor carrier marked "other" on the report. In the description of events, the motor carrier stated, "motorist collided with tanker." The Safety Board's *Cargo Tank Rollover Protection Special Investigation Report* concluded, "The FHWA and RSPA accident databases are not adequate to identify important trends or potential problems related to the design and construction of bulk, liquid cargo tanks." Therefore, the Safety Board believes that the number of loading line accidents may be underrepresented in the Hazardous Materials Information System database, which is managed by the DOT's Office of Hazardous Materials Safety.

In its *Cargo Tank Rollover Protection Special Investigation Report* the Safety Board recommended that RSPA:

H-92-6

Implement, in cooperation with the FHWA, a program to collect information necessary to identify patterns of cargo tank equipment failures, including the reporting of all accidents involving a DOT specification cargo tank.

On January 21, 1998, the FHWA responded that it and RSPA agreed with the Safety Board and were pursuing methods to improve the data collection and analysis. The FHWA said the two agencies were (1) revising the *Hazardous Materials Incident Reports* to identify patterns of cargo tank failures; (2) developing a commercial motor vehicle crash reconstruction course that included a segment designed to educate investigators about documenting damage to cargo tanks; and (3) requiring their field staffs to report significant crashes involving fatalities, multiple injuries, road closures in excess of 4 hours, fire, explosions, evacuations, and other significant occurrences involving cargo tanks. The FHWA stated that it ultimately expected these efforts to identify unsafe trends and to measure the success of their safety programs.

The Safety Board is disappointed that after 6 years action has not been completed to identify and collect information needed to evaluate cargo tanks and include this information on their reports. The Safety Board urges RSPA to expedite action on this recommendation. Safety Recommendation H-92-6 is classified "Open—Unacceptable Response." The Safety Board reiterates Safety Recommendation H-92-6.

Also, the Safety Board issued Safety Recommendation H-98-27 to the U.S. Secretary of Transportation. If you need additional information, please call (202) 314-6445.

Sincerely,



Jim Hall
Chairman