



National Transportation Safety Board
Washington, D.C. 20594

Hazardous Materials Accident Brief

Accident No.: DCA-09-FZ-001
Transportation Mode: Highway
Location: Upper Pittsgrove Township, New Jersey
Date: July 1, 2009
Time: 1:46 a.m., eastern daylight time¹
Carrier: Ross Fogg Gas Company
Shipper: Ross Fogg Fuel Oil Company
Vehicles: 2002 Kenworth tractor; 1989 Fruehauf MC-306 cargo tank semitrailer
2002 Mitsubishi Diamante
Fatalities: 1
Injuries: None
Property Damage: About \$27,000
Materials Involved: Gasoline, a flammable liquid
Type of Accident: Vehicle collision and fire

The Accident

On July 1, 2009, about 1:46 a.m., a 2002 Kenworth tractor pulling a 1989 Fruehauf MC-306 cargo tank semitrailer (the cargo tank truck) was traveling eastbound on U.S. Route 40 in Upper Pittsgrove Township, New Jersey, when it was struck by a 2002 Mitsubishi Diamante (the automobile) traveling northbound on Commissioners Pike. The automobile driver failed to obey a stop sign equipped with flashing red lights and collided with the external loading lines² on the passenger side of the cargo tank truck. Loading line 4 was ruptured and about 13 gallons of gasoline were released as the automobile became wedged beneath the cargo tank truck and was dragged about 500 feet. (See figure 1.) A postcrash fire consumed the automobile, killing the driver; the cargo tank truck also was damaged. The Daretown Volunteer Fire Department arrived within 15 minutes and extinguished the fire. Property damage was about \$27,000.

At the time of the accident, it was dark, and the temperature was 67° F. There were light winds and clear skies. Rain had been observed in the hour before the collision; however, it was not a factor in the accident.

¹ All times in this brief are eastern daylight time.

² *Loading lines* are used to both load and unload product. For the purposes of this brief, the term loading lines will be used in lieu of loading/unloading lines.

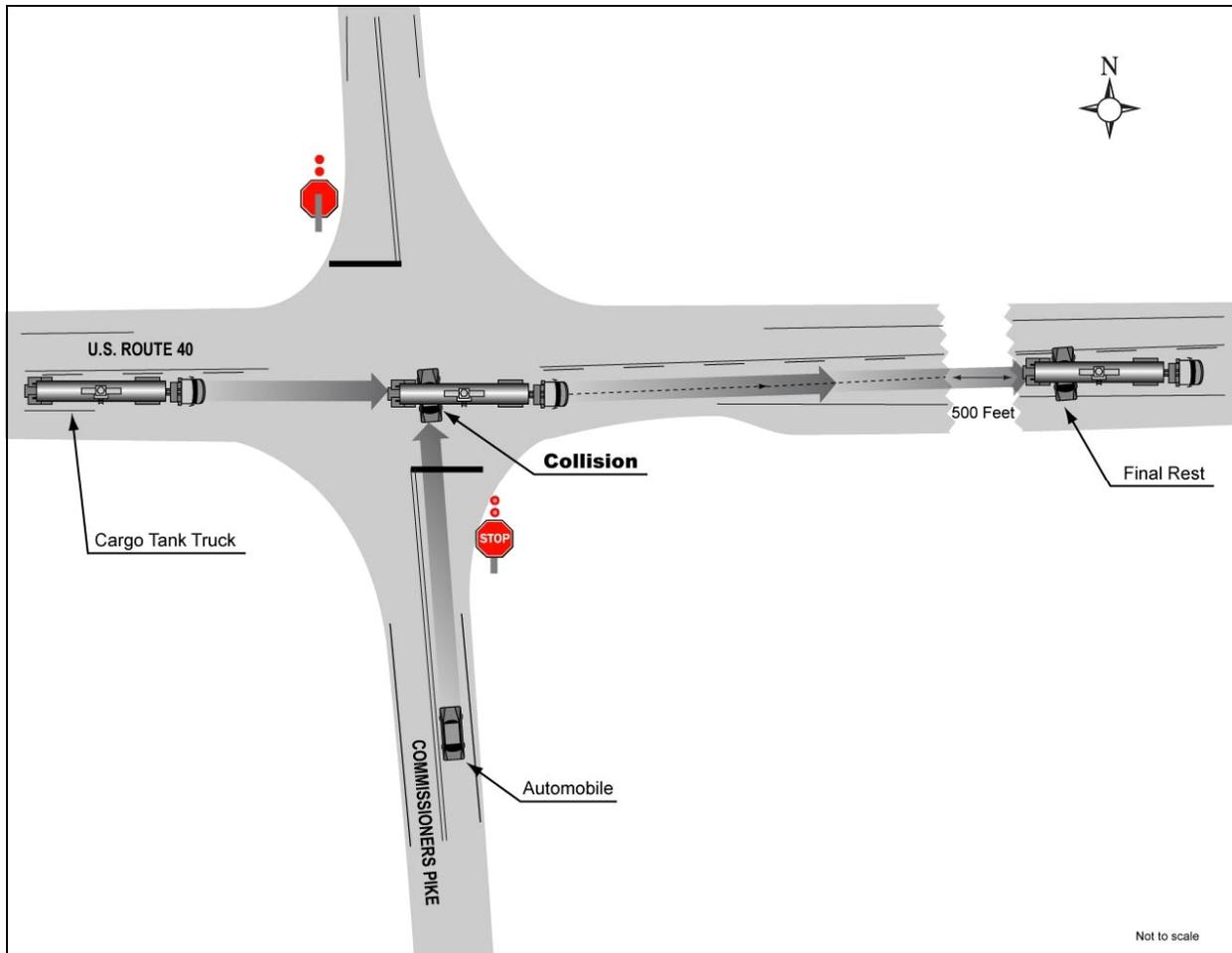


Figure 1. Schematic of accident scene.

Events Preceding the Accident

About 12:08 a.m. on the day of the accident, the cargo tank truck was loaded with 8,999 gallons of gasoline. The driver delivered 6,000 gallons of the gasoline about 1:00 a.m. and was en route to deliver the remaining 2,999 gallons when the collision occurred. During the same work shift (which began about 1:00 p.m. on June 30), the driver had delivered three other similar loads of fuel.

Hazardous Materials Information

The U.S. Department of Transportation (DOT) classifies gasoline as a class 3 flammable liquid. Gasoline has a flash point of -40° F, an auto ignition temperature of 500° F, and a flammable range of 1.3 to 7.1 percent in air. It is extremely flammable and explosive in the presence of open flames, sparks, or static discharge.

Cargo Tank Information

The accident cargo tank, serial number 4LK023501, was a DOT specification MC-306 cargo tank built in 1989 by the Fruehauf Corporation in Detroit, Michigan. The tank was made of aluminum and was elliptical in shape, measuring 80 inches in height by 96 inches in width by 533 inches in length. It had a total water capacity of 10,000 gallons distributed among four internal compartments. The first compartment had a capacity of 3,000 gallons; the second compartment, 2,000 gallons; the third compartment, 2,000 gallons; and the fourth compartment, 3,000 gallons. The maximum allowable working pressure of the cargo tank was 1 pound per square inch, gauge, at 150° F. The cargo tank was equipped with four 4-inch-diameter aluminum pressure relief devices, one on each compartment, manufactured by Betts Industries in Warren, Pennsylvania. An external loading line constructed of 4-inch-diameter aluminum piping connected an inlet valve on the loading rack to the external bottom outlet valve of each compartment. The total length of the loading lines for all of the compartments was about 49 feet; the length of loading line 4 was about 18 feet. Each compartment was equipped with an internal self-closing stop valve that prevented product from releasing from the cargo compartment in the event that the loading lines and the bottom of the cargo tank were damaged in an accident.

The cargo tank was owned and operated by the Ross Fogg Gas Company (the motor carrier). Ross Fogg Gas Company was registered with both the Federal Motor Carrier Safety Administration and the Pipeline and Hazardous Materials Safety Administration (PHMSA) as a private carrier of liquids and gases. Ross Fogg Gas Company handles the delivery of gasoline and diesel fuel to various retail dealers in New Jersey, Delaware, and Pennsylvania. About 85 percent of the company's business involves operating as a transporter for the Ross Fogg Fuel Oil Company (the shipper), as was the case in this accident. The remaining 15 percent involves transporting petroleum products shipped by other companies to their respective retail outlets.

Postaccident Examination

Cargo Tank Truck

Postaccident examination of the cargo tank truck revealed that the cargo tank did not sustain any mechanical damage. Black soot was visible toward the rear of the tank on both sides and underneath it, where the automobile had been lodged and the fire occurred.

Various components external to the cargo tank, including the aluminum fenders, hose shelf, storage containers, and tires on the rear passenger side were destroyed as a result of the impact and fire. Additionally, the loading rack on the passenger side at the bottom center of the tank was twisted and bent. The rear section of the rack nearest to loading line 4 was pushed inward and shifted forward, and the aluminum angle mount connecting the rack to the tank was sheared off the tank at this point. Loading lines 1, 2, and 3 were not visibly damaged as a result of the impact, and each of these lines remained connected to the tank. However, lines 1 and 3 had separated from the couplings, just behind the loading rack, as a result of the rack's shifting.

Loading line 4 and the vapor recovery line were destroyed as a result of both the impact and fire. The impact of the collision ruptured loading line 4 and also sheared the rear vapor recovery line and valve from the loading rack. (See figure 2.) As a result, the estimated

13 gallons of gasoline contained inside loading line 4 were released onto the automobile below. The gasoline was ignited, most likely by an unknown ignition source from the automobile, and a fire engulfed the automobile, loading line 4, and the vapor recovery line. The self-closing stop valve on the fourth compartment of the cargo tank functioned properly, and the 2,999 gallons of fuel contained in the compartment prior to the accident were safely offloaded after the fire was extinguished. Consequently, the release of gasoline and the subsequent fire likely would not have occurred if the cargo tank's loading lines had been empty.

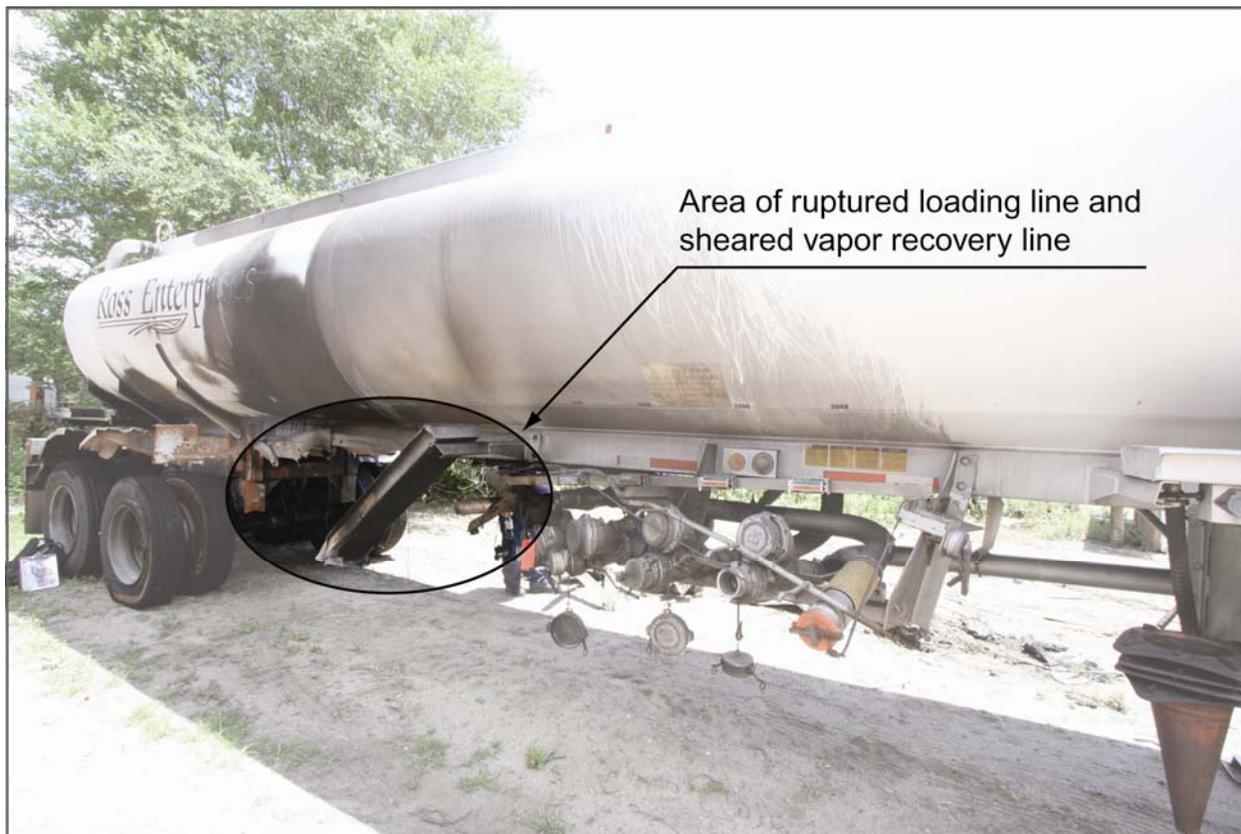


Figure 2. Rear passenger side of accident cargo tank truck showing external damage from collision and fire.

Automobile

The automobile was destroyed by the impact and fire. (See figure 3.) Postaccident examination revealed that the most severe fire damage was concentrated toward the rear of the automobile. With the exception of some foam from the passenger seat behind the driver, all of the combustibles in the back seat area were consumed. Large portions of foam from the driver seat and the adjacent passenger seat remained. Heavy char was present on all of the remaining combustible materials.



Figure 3. Left side view of automobile showing damage from collision and fire.

Several samples were collected from the remaining combustible materials³ and sent to the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) to determine whether petroleum products were present. ATF positively identified gasoline in a sample taken from the rear seat cushion, confirming that gasoline entered the automobile.

Injuries

The driver of the automobile was killed. The Gloucester County Medical Examiner's Office postmortem report indicated that the cause of death was smoke and soot inhalation and severe thermal burns. The medical examination did not reveal any evidence of blunt trauma or fractures.

³ The remaining combustible materials included the driver seat, passenger seat, and rear seat cushions; the driver and passenger floor mats; dashboard foam; and clothing scraps from the automobile driver.

Safety of Loading Lines

Previous Accidents

On October 9, 1997, a cargo tank truck loaded with 8,800 gallons of gasoline was traveling south on Central Park Avenue under an overpass in Yonkers, New York, when it was struck by a southbound automobile. A subsequent fire destroyed both vehicles and a thruway overpass; the automobile driver died from burns and smoke inhalation. The National Transportation Safety Board (NTSB) concluded that the automobile struck and fractured one or more of the loading lines of the cargo tank, thus releasing up to 28 gallons of gasoline, and that had the loading lines been empty, the fire would likely not have occurred.⁴ On February 15, 1998, a cargo tank truck carrying 8,900 gallons of gasoline was traveling across a bridge on Interstate 495 in Wilmington, Delaware, when it struck a parked automobile on the shoulder of the road. A fire ensued after the collision that destroyed the automobile and moderately damaged the cargo tank truck; the driver of the automobile was killed.

Recommendations and Regulations

In its report on the Yonkers, New York, accident,⁵ the NTSB expressed concern about the potential loss of life and possible injuries associated with transporting flammable liquids in cargo tank loading lines. In 1997, when the accident occurred, federal regulations did not prohibit the transportation of flammable liquids in the external piping of cargo tanks. As a result of the Yonkers investigation, the NTSB issued the following recommendation to the U.S. Secretary of Transportation (DOT):

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)

On December 30, 2004, the Research and Special Programs Administration (RSPA) published a notice of proposed rulemaking (NPRM) titled “Safety Requirements for External Product Piping on Cargo Tanks Transporting Flammable Liquids.”⁶ The NPRM proposed to amend the *Hazardous Materials Regulations* (Title 49 *Code of Federal Regulations* 173.33) to prohibit flammable liquids from being transported in *unprotected* external piping on all newly constructed and existing DOT specification cargo tank trucks. However, on June 7, 2006, PHMSA⁷ published a notice withdrawing the NPRM and terminating the rulemaking proceeding.

In July 2007, PHMSA informed the NTSB that it was working with the cargo tank industry and major emergency response organizations to develop a comprehensive national wet

⁴ For more information, see *Collision of Tractor/Cargo Tank Semitrailer and Passenger Vehicle and Subsequent Fire, Yonkers, New York, October 9, 1997*, Highway/Hazardous Materials Accident Summary Report NTSB/HAR-98/02/SUM (Washington, DC: National Transportation Safety Board, 1998).

⁵ NTSB/HAR-98/02/SUM.

⁶ *Federal Register*, vol. 69, no. 250 (December 30, 2004), p. 78375.

⁷ As part of a DOT reorganization, PHMSA was established in 2005 and assumed regulatory responsibility for RSPA’s hazardous materials safety program.

lines (loading lines) outreach awareness program to enhance public safety and assist those who respond to transportation emergencies. The NTSB responded by clarifying to PHMSA that the intent of Safety Recommendation H-98-27 was to prohibit the unsafe practice of transporting flammable liquids in loading lines, and that these actions did not address or satisfy the intent of the recommendation. In a letter dated October 16, 2009, PHMSA stated that it was completing an in-depth, comprehensive review of incident reports and other safety data to determine whether rulemaking action regarding wet lines is necessary.

The NTSB remains concerned about this safety issue. This accident illustrates once again why the NTSB strongly believes that PHMSA should prohibit the unsafe practice of transporting flammable materials in the external loading lines of cargo tanks.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the July 1, 2009, vehicle collision and fire in Upper Pittsgrove Township, New Jersey, was the failure of the automobile driver to obey a stop sign equipped with flashing red lights. Contributing to the severity of the accident was a fire that resulted from the release of gasoline from a cargo tank loading line that was ruptured during the collision.

Adopted: November 12, 2009