Massachusetts Loading Dock Worker Dies in Explosion of Beer Truck

MASSACHUSETTS 94-MA-12
DATE: June 8, 1994

SUMMARY:

On January 26, 1994, a 33 year old, male, loading dock worker was fatally injured when a 40 foot trailer full of bottled beer exploded. The victim was employed by a Massachusetts commercial motor carrier. Due to a several week stretch of below freezing temperatures, the employer had rented propane heaters to place inside the trailers to keep the beer from freezing. The heaters were left on inside the trailers for several days, and then removed just a few days prior to the incident. When the explosion occurred, the victim was placing a methanol heater inside one of the trailers. He was the only worker on the loading docks. Immediately after the explosion, the manager of the company and several co-workers rushed outside and found the victim laying on the ground, covered with beer bottles and debris from the walls of the trailer, and suffering from burns and major trauma. The front and sides of the trailer were blown off. Fire fighters and EMTs were immediately summoned. They arrived, treated the victim for his injuries, and transported him to a metropolitan hospital where he died 6 days later.

In order to prevent future similar occurrences the Massachusetts FACE Project recommends that employers:

- prohibit the storage and use of propane containers inside of commercial vehicles
- prohibit the use of propane appliances inside of enclosed areas
- ensure that all gas fired heating systems are equipped with an approved automatic shut-off device designed to stop the flow of gas to the main burner and the pilot in the event the pilot flame is extinguished
- develop, implement, and enforce a comprehensive safety program, that covers ALL workers
- arrange for trailers containing perishable goods to be stored inside heated warehouses during sub-zero temperatures.

INTRODUCTION:

The Massachusetts FACE Project was informed of this death on February 24, 1994 through its news clipping service. On March 16, 1994 the FACE Investigator and Director met with the city fire officials who had investigated the incident. They reviewed the fire fighters' photos of the incident site, and spoke with the State Fire Marshall assigned to the case. The employer was interviewed on March 23, 1994. The police report, state fire marshall report, OSHA report, newspaper clippings, and death certificate were collected throughout the course of the investigation.

The employer was a contract motor carrier specializing in intermodal operations (transport of trailers via rail car). The company had been in business for four years, and employed 15 workers, 3 of whom worked on the loading docks. An additional 25 owner/operators were hired on a contract basis. The owner/operators were truck drivers who owned their own cabs and hauled the trailers for the employer.

Although the employer had a safety program for the drivers, it did not have a safety program for the other employees. A consultant was hired to work two days a week on the driver safety program.

The victim, who was the manager's brother, had been employed by the company as a loading dock worker for three weeks. His usual occupation was sheet metal worker.

INVESTIGATION:

The employer had contracted with a beer manufacturer to pick up and deliver a shipment of beer which came in to Massachusetts by boat. About a week before the incident, company drivers picked up the beer in uninsulated, 40 foot, metal trailers. The employer kept the beer in storage at his facility until specialty refrigerated units (insulated trailers) were available to ship the beer to its out of town destination. The employer did not own any insulated trailers, and routinely rented them from a supplier.

Because there was an extended period of below freezing temperatures at the end of January, the beer inside the trailers froze, and many bottles burst. To mitigate the problem, the employer rented propane heaters and tanks. The propane heaters were placed inside the trailers on January 20th, and were left running through January 23rd. From January 24th through the 26th the heaters were not run, but they were left on the trailers.

The heaters had a BTU capacity of 50,000 to 250,000, and were rented from a local company. One of the dock workers and the victim picked them up. The rental company reportedly showed the two how to use the heaters, but did not give them any written instructions. The employer also obtained a permit from the city fire department for the use of ten 100 pound propane tanks. The local fire official granting the permit visited the site, and reportedly warned the dock workers of the dangers of using propane gas. According to the fire official, he specifically warned the employees not to leave the heaters unattended, or use them in an enclosed space (e.g. inside the trailers with the doors closed). He also warned them not to place the propane tanks inside the trailers. The written permit, however, only specified that the heaters were not to be used unattended.

On the morning of January 26, the victim removed the heaters from the trailers, and returned them to the rental company. Later in the day he was instructed to place methanol heaters inside three of the trailers. The victim was apparently instructed to light the heater on the loading dock, approximately ten feet away from the trailer doors, and then place it inside the trailer.

Immediately after the explosion, the manager of the company and several co-workers rushed outside and found the victim laying on the ground, suffering from burns and major trauma, and covered with beer bottles and debris from the walls of the trailer. The front and sides of the trailer had been blown off, and the garage doors on the loading dock and several windows in the building had also been blown out. Fire fighters and EMTs were immediately summoned. They arrived, treated the victim for his injuries, and transported him to a metropolitan hospital where he died 6 days later.

It is impossible to determine the exact sequence of events leading to the explosion because there were no witnesses. Fire officials speculated that when the victim opened the trailer doors the propane gas enveloped the methanol heater on the dock. When the concentration of gas came within the flammable range of 2-8%, the methanol heater flame ignited the propane. It is unclear whether the explosion occurred as the victim lit the flame on the methanol heater, or whether it occurred after the flame was already lit. Most likely the victim had already lit the heater when the explosion occurred.

Both the city and state fire officials who investigated the incident concluded that the explosion occurred when propane gas inside the truck was ignited by the methanol heater on the loading dock. Propane gas could have built up inside the truck either due to a leak in the connection between the tank and the heater, or because the flame of the heater went out. The flame may have gone out if the truck had become an oxygen deficient environment, due to the carbon monoxide exhaust emitted by the heater. If the heater did not have a properly functioning safety valve, the propane gas would not have shut off. Because propane is heavier than air, the gas would not have dissipated through the vents at the top of the truck.

The fire officials were unable to examine the heaters for possible defects since they had been returned to the rental company that morning. When the fire officials attempted to inspect the heaters at the rental company, the company informed them that the heaters had already been rented to another employer. The company further claimed that the all heaters contained a safety fuel shut-off valve, and that the heaters were serviced between jobs.

CAUSE OF DEATH: The medical examiner listed the cause of death as multiple traumatic injuries.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Employers should prohibit the storage and use of propane containers inside of commercial vehicles.

Discussion: The 1992 NFPA National Fire Code, Part 58, Section 3-8 prohibits the storage of propane cylinders and other containers, for any purpose, inside of trucks, semi-trailers and trailers. In this case, not only were the propane cylinders stored inside the trailers, but they were placed inside the trailers while they were fueling the heaters. Employers should prohibit the storage of propane containers inside of commercial vehicles, particularly when the containers are being used to fuel heating appliances also inside of the vehicles. Had the propane cylinders been stored outside of the trailers, propane gas may not have accumulated in the trailer, and the explosion may not have occurred.

Recommendation #2: Employers should prohibit the use of propane appliances inside of enclosed areas.

Recommendation #3: Employers should ensure that all gas fired heating systems are equipped with an approved automatic shut-off device designed to stop the flow of gas to the main burner and the pilot in the event the pilot flame is extinguished.

Discussion: Although the distributor of the propane heaters claimed that all his appliances were equipped with shut-off valves, it is not known for certain whether the heater which was involved in the incident was indeed equipped with an approved shut-off valve. Although it can not be determined whether the propane build-up occurred due to a leak in the system or because the main burner was extinguished and the gas did not shut-off, this incident may have been prevented if the employer had ensured that the rented heaters were equipped with approved safety shut-off valves, as required by OSHA regulation 29 CFR 1910.110 (g)(11)(v).

Recommendation #4: Employers should develop, implement, and enforce a comprehensive safety program, that covers ALL workers.

Discussion: The employer did not have a comprehensive safety program, nor did it provide safety training for the dock workers at the facility. Comprehensive safety programs should include, but not be limited to, training workers in the recognition and avoidance of safety hazards, routine job site safety surveys, written safety rules and procedures, and the provision of personal protective equipment. Furthermore, daily, weekly, and/or monthly jobsite safety meetings, conducted by a designated safety person, are essential. Such meetings remind employees of the dangers associated with their occupation(s) and how best to deal with them. If the dock workers had received hazard awareness training, they may have identified the hazards from the use of propane heaters inside the trailers, and this incident may have been prevented.

Recommendation #5: Employers should arrange for trailers to be stored inside heated warehouses during sub-zero temperatures.

Discussion: If the employer had a heated facility for storing its trailers during the winter months, it would not have had to use the propane heaters. Carriers in northern climates who routinely transport perishable goods should have access to heated indoor facilities for storing uninsulated trailers when necessary. Employers who do not have this capability on site should seek to rent such space from another company.

REFERENCES

Code of Federal Regulations, Title 29 Part 1910, Section 110 (g)(11)(ii), (g)(11)(iv), and (g)(11)(v), July 1, 1993.

National Fire Protection Association, National Fire Code, Part 58, Section 3-8, 1992.

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