

TRUCK LOADING RACK LOSSES CASE HISTORIES

CONTROL OF STATIC GENERATION

Terminal

A diesel-powered tractor and 8600 gal (32.5 m³) aluminum trailer pulled into the rack. After the driver loaded 6379 gal (24.1 m³) of No. 2 fuel oil, an explosion and subsequent fire occurred. The yard man shut down the nozzle. The foreman called the fire department, threw the pump disconnect switch, and actuated the emergency valves. The fire chief and foreman checked the truck and found the ground wire was in use and the ignition key was in the "off" position.

Fast loading created static electricity which appears to have been the source of ignition. All equipment on the rack had to be dismantled, parts tested and replacements made where necessary. The platform and staging had to be replaced.

SWITCH LOADING

Product Being Loaded - Distillate

A tank truck which had formerly carried gasoline was being switch loaded with a distillate. Positive ground indicators on the rack showed the truck was properly bonded. Wired, brass coupled rubber hose extended about 2 ft (0.6 m) into the compartment. The loading rate through this hose was about 18 fps (5.5 m/s); the product was also being filtered. Several minutes after loading began, an explosion occurred.

Apparently the difference in electrostatic potential between the liquid surface and the rubber loading hose caused an incendiary spark which ignited the flammable atmosphere.

Product Being Loaded - High Purity Kerosene

A tank truck that previously contained aviation fuel was being switch loaded with high purity kerosene. The end of the loading tube was not touching the bottom of the tank and a filter was installed in the kerosene line a few feet from the spout. An operator had flushed the truck compartment with about 5 gal (19 L) of the kerosene product.

Between 400 and 500 gal (1.5 and 1.9 m³) of kerosene had been loaded when an explosion severely damaged several trucks and the loading rack. The filter was a viscose rayon covered with polished cotton and copper-tin coating. The loading rate at the time of the explosion was about 14 fps (4.3 m/s).

Static electricity generated by the product flowing through pipe and filter and discharging from the loading tube produced an incendiary spark between the liquid surface level and the loading tube. The spark ignited the flammable vapor space in the truck. A header line on the manually controlled water spray system was broken during the initial explosion and therefore was not used to fight the fire.

Asphalt Terminal - Product Being Loaded - JP4

A tank truck that contained naphtha was being loaded with JP4 fuel. The truck had been in the plant with open hatches for one week. The spout was extended into the tank some 1.5 ft (0.5 m), which allowed the jet fuel to fall about 4 ft (1.2 m). When an employee lowered a glass bottle on the string into the tank to take a sample, an explosion occurred.

Terminal - Product Being Loaded - High Grade Kerosene

A tank truck was being loaded with a high grade kerosene when an explosion and fire occurred which destroyed the loading rack and three trucks. The tanker, which previously contained gasoline was grounded; the filling spout did not extend to the bottom of the tank. Temperature was 31°F (-1°C).

Refinery - Product Being Loaded - No. 2 Fuel

An explosion and fire occurred while No. 2 fuel oil was being loaded into a tank truck compartment which had previously contained gasoline. The truck had been properly grounded. Temperature, 30°F (-1°C).

Refinery - Product Being Loaded - No. 2 Fuel

An explosion and fire occurred while a tank truck, which previously held gasoline, was being loaded with No. 2 fuel oil. The filling spout was not extended to the tank bottom. Temperature, 20°F (-6°C).

HUMAN FAILURE

Bulk Plant

A tank truck was being loaded with two grades of gasoline simultaneously when the front compartment overflowed and ran down the sides of the truck onto the ground. The spill ignited, probably due to static electricity.

An employee failed to connect the ground cable. The fire totally destroyed the tank truck and the loading rack, and damaged a storage platform and warehouse. Nearby fire departments extinguished the fire.

Terminal

Two gasoline semi-trailer tank trucks were being filled at a large loading rack. An employee left the diesel engine of one truck running. While the loading spout was being raised from one compartment to load another, it caught on a wire control for the valve on a gasoline loading line. The valve operated, dumping 127 gal (0.5 m³) of gasoline over the employee and the truck. Ignition most likely originated from the diesel engine and resulted in a massive fire which was soon followed by a severe explosion in the 6000 gal (22.7 m³) aluminum trailer. The rocketing tank truck set a nearby fire truck on fire and deactivated the terminal foam supply system.

Loading Rack

A new employee forgot to disconnect the hoses from a gasoline transport. When loading was completed, the transport pulled out and broke the hose. The gasoline spilled and ignited, probably from a stove pilot light. The loading rack was seriously damaged.

Terminal

A tank truck was overloaded and gasoline spilled out. While an employee washed the side of the truck, the driver started the truck which backfired and gasoline vapors flashed. Before firemen extinguished the fire, the loading rack was completely destroyed and the truck was badly damaged.

Gangway

A gangway was left in position on a truck after loading had been completed. The driver remained in his truck during the loading. The loader signaled that he was free to pull out. The gangway ripped off as the truck pulled away.

EQUIPMENT FAILURE

Refinery

While a tank truck was being loaded with aviation gasoline, a leak developed in the swivel joint. The leak was not large so loading was continued until the truck was full, and then the platform was thoroughly washed down with water before the truck was started. A spark from the truck's ignition system started a fire which lasted for 15 minutes, and either destroyed or severely damaged the roof of the loading rack, filters, piping, electrical conduit, and gauges. The loading rack drain was not operating properly at the time, which accounts for the vapors remaining in the area.

Refinery

A fire loss occurred at 3:12 a.m. A short time prior to this, a tank trailer was placed into position under the loading rack to load propane. The truck was connected to the loading hose and grounded. After loading began, the truck driver and an employee went to the rack shack. Several minutes before the fire, the employee left the shack to check on a leak. About 5 to 8 minutes later, an explosion and a ball of fire enveloped the rack area.

The alarm sounded, and the insured's foam truck and four trucks from the fire department responded. The fire was confined to an area in and around the rack and was extinguished about 5:00 a.m.

Tank Truck

Gasoline was being unloaded from a tank truck when a hose coupling broke. The truck driver shut off the fuel supply to the unloading pump, but the pump continued to run, presumably on the fumes or off the gasoline itself. The gasoline was being sprayed on the unit through the air intake. The source of ignition is not known.

Butane Transport

While a butane transport was being unloaded, the loading hose broke. The system check valve operated properly, but the excess flow valve on the transport failed and released butane. The butane ignited from a street repair flare nearby.

Apparently, someone removed a pin on the transport's excess flow valve to speed up the unloading. The hose had been pressure tested about six weeks before.

Bulk Plant

LPG highway transport driver was unloading at this bulk plant when the unloading hose or pipe failed or disconnected and the released LPG ignited.

A highway transport and two plant tanks were destroyed. Nine other plant tanks damaged. Pump, piping valves, fittings, etc., of the plant were also destroyed. A forest ranger fire department extinguished the fire.

ELECTRICAL IGNITION

Bulk Plant

A fire of undetermined cause destroyed a tank truck and part of the loading rack where it was being filled. Faulty wiring in the truck may have ignited the 247 gal (0.9 m³) of fuel oil which spilled over the sides of the truck. The driver had miscalculated how much fuel he had left in the tank before filling it.

Pump Switch

When a pump switch was thrown, it arced and ignited vapors from a tank truck. The loading rack and an adjacent warehouse were damaged.

Loader

A loader raised a fill pipe to insert it into a tank truck compartment. The top of the arm struck an overhead power line, creating a short circuit, which ignited gasoline vapors. Quick fire department response substantially limited the loss.

VEHICLE DAMAGE**Petrochem Plant**

A truck hit and bent two 3 in. (7.6 cm) diameter galvanized exterior loading lines at an alcohol storage plant. The truck also bent the "I" beam frame support and brackets which had to be replaced.

Truck Collision

A truck hit an unattended loading rack, damaging the loading rack structure and the dog house.

Terminal

A truck hit the No. 1 pump at the loading station, setting fire to the pump and truck.

Ramp

A hydraulic ramp failed to hold when raised after loading. It lowered back onto the truck as the truck pulled away. The ramp was damaged.

WIND AND LIGHTNING**Terminal**

Rain and windstorms in the general area ripped about half the aluminum roof sheeting and damaged a rotary vent.

Terminal

Lightning damaged wiring of the controls at the loading ramp.

PROTECTION OF LOADING RACKS**Pipeline Terminal**

A fire, which may have started from static electricity, ignited at the open dome of a transport truck while the truck was loading. Possibly the truck was not properly grounded while being filled. The detection system immediately detected the fire and dry chemical from the automatic overhead extinguisher system doused the fire. There was no actual fire damage to the loading rack. Cleaning the rack removed the smoke damage.