

1323308 January 2001

Source : CNN.COM, JANUARY 8, 2001

Location : Truth or Consequences, NEW MEXICO

Injured : 17    Dead : 0

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**Abstract**

An explosion and fire occurred injuring seventeen people when a vehicle rolled onto a gasoline station and collided with an 18,000-gallon propane tank that was 85% full. Nearby residents were evacuated. A second tank holding 2,000 gallons of the flammable gas exploded as a result of the first explosion.  
[fire - consequence, evacuation, road vehicle, gas - flammable]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 13, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Colonie, New York, USA

**Injured :** 0      **Dead :** 0

**Abstract**

A fire occurred at a repair facility causing severe structural damage to the building and equipment. Several explosions resulted from the fire. The remains of two tanks were found approximately 2,000 yards away. Fortunately no one was injured in the incident.

An investigation is underway into the cause of the fire.

[fire - consequence, damage to equipment]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 11, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Nitro, USA

**Injured :** 7      **Dead :** 0

**Abstract**

A fire occurred in a tank containing bleach at a chemical plant. Seven people were injured in the incident. An investigation into the incident is being carried out.

[fire - consequence, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 7, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Jal, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

An explosion occurred on a gas pipeline at a gas plant setting fire to two chemical tanks containing methanol and glycol. The fire was contained within two hours and fortunately no one was injured in the incident. Fire fighters used water to cool the tanks and foam on the flaming liquid. An investigation into the incident is underway.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, NOVEMBER 21, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Washington DC, USA

**Injured :** 2      **Dead :** 0

**Abstract**

Two pupils were injured at a high school when a two-gallon container of methyl alcohol exploded in a chemistry laboratory. The building was evacuated in the incident.

An investigation into the incident is being carried out.

[explosion, laboratory work, evacuation]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, NOVEMBER 17, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Johannesburg, SOUTH AFRICA

**Injured :** -      **Dead :** 11

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**Abstract**

A fire and explosion occurred at a chemical factory killing eleven workers and injuring many more.

The incident occurred when fire reached gas containers, which then exploded. It is thought that the fire started when flammable chemical spilled onto a gas burner.

An investigation into the incident is underway.

[burns, fire - consequence, chemical - flammable, hot surface, injury, fatality]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, NOVEMBER 5, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Sonora, Texas, USA

**Injured :** 6      **Dead :** 0

**Abstract**

A fire and several explosions occurred at a chemical warehouse when lightning struck an electrical transformer during a thunderstorm. The warehouse stored methanol, cleaning solvents and other hazardous chemicals. Nearby residents were evacuated as a precaution from toxic smoke being released to atmosphere. The building was completely destroyed in the fire.

[fire - consequence, warehousing, evacuation, gas / vapour release, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 22, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Downey, USA

**Injured :** 6      **Dead :** 0

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**Abstract**

An explosion occurred at a bottling plant injuring six workers. The incident occurred due to leak on a 1,100-gallon tank containing propane, which is thought to have been ignited by a water heater. The fire was extinguished in forty-five minutes. Nearby buildings within half a mile were damaged by the blast.  
[hot surface, damage to equipment, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 6, 2000, (<http://www.chemsafety.gov>).

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**Location :** Soda Springs, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A fertiliser plant was shutdown after a phosphoric tank was found to be leaking. The cause of the leak is not known. An investigation is being carried out into the cause. No one was injured in the incident.

[plant shutdown]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL WEEK, OCTOBER 11, 2000.

**Location :** Conda, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A phosphates plant was shutdown due to a spillage of acid and slurry. The incident occurred due to the failure of a wall of the phosphoric acid digester tank. Fortunately no one was injured and no environmental damage occurred as a result. An investigation into the incident is underway.  
[material of construction failure]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 2, 2000, (<http://www.chemsafety.gov>).

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**Location :** Madison, USA

**Injured :** 1      **Dead :** 0

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**Abstract**

An explosion and fire occurred at a recycling plant. The building was destroyed in the incident.

It is reported that several explosions occurred from propane tanks that were nearby.

One fire fighter was injured in the incident.

An estimated \$3 million (2000) worth of damage occurred.

[fire - consequence, damage to equipment, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 2, 2000, (<http://www.chemsafety.gov>).

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**Location :** Bonita, Los Angeles, USA

**Injured :** 4      **Dead :** 0

**Abstract**

Noxious clouds were released from a cotton gin when a leak occurred on a 30,000-gallon tank containing anhydrous ammonia. Approximately 150 people were evacuated. The fumes affected four people.

[gas / vapour release, evacuation, people]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, SEPTEMBER 14, 2000, (<http://www.chemsafety.gov>).

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**Location :** Salamanca, MEXICO

**Injured :** 170 **Dead :** 0

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**Abstract**

An explosion occurred in a warehouse at a pesticide factory. Yellow clouds were released as a result. Chemical involved: malathion pesticide. Over a thousand people were evacuated.

It is reported that approximately one hundred and seventy people were injured in the incident.

The explosion occurred when pressure rose in tanks containing the chemical. The resultant pressure automatically opened the emergency valves. No workers were injured in the incident.

[gas / vapour release, evacuation, warehousing, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, AUGUST 22, 2000, (<http://www.chemsafety.gov>).

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**Location :** Prudhoe Bay, Alaska, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

Approximately 29,400 gallons of mixed crude oil and water overflowed a setting tank. Fortunately the spill was contained in lined cells and the surrounding area was not contaminated.

The incident occurred at a processing facility where oil, water and gas are separated from the crude after it comes out of the ground.

In addition to the crude oil mixed with water, ethylene glycol was spilled inside the processing facility. This was also contained in a lined cell and did not contaminate the ground. No one was injured in the incident.

An investigation into the two spills is being carried out.

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**Lessons**

[None Reported]

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**1300817 August 2000**

**Source** : BBC NEWS, 17 AUGUST, 2000, (<http://www.bbc.co.uk>); YAHOO NEWS, AUGUST 17, 2000, (<http://www.yahoo.co.uk>).

**Location** : Southampton, UK

**Injured** : 0      **Dead** : 1

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**Abstract**

A contract worker was killed during cleaning operations when he fell into a tank containing chemicals. The worker was rescued and taken to hospital where he died.

An investigation into the incident is being carried out.

[fall, fatality, unknown chemicals]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 9, 2000, (<http://www.chemsafety.gov>).

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**Location :** Gebze, TURKEY

**Injured :** 0      **Dead :** 0

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**Abstract**

A fire occurred at a refinery. It is reported that the fire apparently occurred due to an overheated tank. A series of explosions followed sending several barrels of oil flying into the air. Fortunately no injuries occurred.

[fire - consequence, refining, overheating]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 9, 2000, (<http://www.chemsafety.gov>).

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**Location :** Samut Prakarn, THAILAND

**Injured :** 54    **Dead :** 0

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**Abstract**

A gas leak occurred on an old chemical tank at a scrap yard. Fifty-four people were taken to hospital for treatment of gas inhalation. The incident occurred as workers opened the tank for cleaning operations.

[people, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 9, 2000, (<http://www.chemsafety.gov>).

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**Location :** Glenrock, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A dust explosion occurred at a power plant. The incident occurred when coal dust was ignited inside an inactive silo. It is thought that the coal inside the silo shifted, resulting in an air-dust mixture hot enough to ignite. The explosion could have been a lot worse as the silo contained 60 tonnes of coal compared to its 1,000 tonnes capacity. The incident occurred even though the plant had been blanketing the silo with carbon dioxide as a precaution measure.

[silo/hopper]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 8, 2000, (<http://www.chemsafety.gov>).

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**Location :** Temple, Texas, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A fire occurred at a warehouse causing serious damage and the evacuation of the surrounding area due to hazardous smoke being emitted. The fire destroyed several power transformers leaving nearby businesses without power.

An estimated forty million gallons of runoff spilled into a nearby creek and was reported to have killed a number of fish.

[fire - consequence, damage to equipment, warehousing, gas / vapour release, ecological damage]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 7, 2000, (<http://www.chemsafety.gov>).

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**Location :** Pheonix, USA

**Injured :** 5      **Dead :** 0

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**Abstract**

A fire occurred at a chemical supply warehouse releasing clouds of toxic smoke. Approximately 100 people were evacuated from the surrounding area. The warehouse stored pesticides, fertilisers, and plastics and possibly cyanide. Five fire fighters were taken to hospital for treatment for exhaustion and smoke inhalation. The fire damaged other businesses in the area. Damage to the warehouse is to be estimated at \$100 million (2000).

[fire - consequence, warehousing, damage to equipment, injury, gas / vapour release]

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**Lessons**

[None Reported]

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**1292102 August 2000**

**Source** : BBC NEWS, 2 AUGUST, 2000, (<http://www.bbc.co.uk>).

**Location** : Northern England, UK

**Injured** : 0      **Dead** : 0

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**Abstract**

A rail transportation incident. A freight train carrying nuclear waste derailed. The train was carrying four containers of low-level waste when it came off the track.

Fortunately no one was injured and no structural damage to the containers occurred in the incident.

Rail services in the area were disrupted.

[derailment - consequence, radioactive]

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**Lessons**

[None Reported]

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**Source** : BBC NEWS, 2 AUGUST, 2000, (<http://www.bbc.co.uk>).

**Location** : Taketoyo, JAPAN

**Injured** : 56    **Dead** : 0

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**Abstract**

An explosion occurred in a gunpowder warehouse of a chemical factory injuring fifty-six people. The warehouse was completely destroyed and damage occurred to the surrounding residential area.

The explosion occurred in a store room containing several tonnes of gunpowder.

An investigation is being carried out into the cause of the explosion.

[black powder (gunpowder), warehousing, damage to equipment, fatality, people, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 25, 2000. (<http://www.chemsafety.gov>).

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**Location :** Chicago, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

Nitric acid was found to be leaking from a tank at factory. The acid formed an orange cloud that hung over the area for more than an hour. An area of half a mile was evacuated in all directions. Trains nearby were also stopped.

Firefighters were able to quickly contain the leak.

Inhaling nitric acid fumes can cause shortness of breath, abdominal pain and dizziness, prolonged exposure can cause damage to the mouth, throat and stomach.

[gas / vapour release, evacuation]

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**Lessons**

[None Reported]

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1286923 July 2000

**Source** : BBC NEWS, 24 JULY, 2000, (<http://www.bbc.co.uk>).

**Location** : Staffordshire, UK

**Injured** : 0      **Dead** : 0

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**Abstract**

A fire occurred at a warehouse containing a number of canisters of potentially explosive substance. Approximately 1000 nearby residents have been evacuated.

[fire - consequence, evacuation, warehousing]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 20, 2000. (<http://www.chemsafety.gov>).

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**Location :** Oklahoma City, USA

**Injured :** 1      **Dead :** 0

**Abstract**

A fire occurred at a propane warehouse completely destroying the building and threatened a storage tank containing 4,000 gallons of fuel. One worker was injured in the incident.

[fire - consequence, warehousing, damage to equipment, storage tanks, cylinder, burns, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 21, 2000. (<http://www.chemsafety.gov>).

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**Location :** Willoughby, USA

**Injured :** 1      **Dead :** 0

**Abstract**

A series of explosions and fires occurred at a plant. The explosion was caused by a spark or static electricity, which ignited gas leaking from overfilled cylinders. One person was injured in the incident.

An investigation found that an estimated 900 of 1,1000 cylinders were leaking from safety relief valves. The building was evacuated.

[burns, fire - consequence, overflow, evacuation, injury]

**Lessons**

[None Reported]

1286619 July 2000

Source : CNN.COM, U.S. NEWS, JULY 19, 2000, (<http://www.cnn.com>).

Location : Los Angeles, USA

Injured : 1      Dead : 0

---

**Abstract**

A worker fell into a silo operated by a cement company. The incident occurred as the worker was carrying out cleaning operations inside the silo, he fell 30 feet. Fire rescue units rescued the worker.

[fall, silo/hopper, injury]

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**Lessons**

[None Reported]

---

1282610 July 2000

**Source** : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 12, 2000, (<http://www.chemsafety.gov>).

**Location** : Halifax, CANADA

**Injured** : 2      **Dead** : 0

---

**Abstract**

An explosion occurred in a laboratory at a brewery. The incident occurred when a mixture of glycol and sulphuric acid exploded in a beaker. Two workers were injured in the incident.

The plant was shut down and evacuated.

An investigation into the cause of the explosion is underway.

[laboratory work, evacuation, burns, container, injury]

---

**Lessons**

[None Reported]

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Source : HAZARDOUS CARGO BULLETIN, NOVEMBER 2000.

Location : , GERMANY

Injured : 0      Dead : 0

---

**Abstract**

A road transportation incident. A truck carrying 130 drums of di-n-butylamine collided with an articulated lorry causing sixty-four drums to fall, three of which fell into a 60m valley and six leaked onto the road.

[collision, spill]

---

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 10, 2000. (<http://www.chemsafety.gov>).

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**Location :** Hadtings, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred at a agricultural chemical warehouse that stored farm products, pesticide and herbicide chemicals. A dike was dug round the building to stop any chemicals spilling.

The warehouse was completely destroyed in the fire. There are no reports of injuries.

[fire - consequence, storage, damage to equipment]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 5, 2000, (<http://www.chemsafety.gov>).  
(<http://www.chemsafety.gov>).

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**Location :** Columbia, USA

**Injured :** 3      **Dead :** 0

**Abstract**

A worker was covered with formaldehyde solution whilst loading the chemical on a shelf with a skip loader when the formaldehyde box hit the side of the shelf and broke the containers in side.

Three people were affected by the incident and all involved were decontaminated.

Formaldehyde is used generally as a disinfectant, germicide and preservative.

In large doses, the fumes can become overwhelm and cause eye irritation, coughing, upper respiratory problems, headaches, stuffy nose, nausea and fatigue.  
[operation inadequate, contamination, people, spill, injury]

**Lessons**

[None Reported]

1275729 June 2000

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.; CHEM. MARK. REP., 3 APR 2000, (<http://www.chemexpo.com/cmronline>).

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Personnel were evacuated from a plant and surrounding plants in the vicinity when a 250,000-gallon tank containing 80,000 gallons of acrylic acid overheated.  
[evacuation, overheating]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 23, 2000, (<http://www.chemsafety.gov>).

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**Location :** Waimairi, NEWZEALAND

**Injured :** 0      **Dead :** 0

**Abstract**

A chemical fire occurred at a yarn factory when a worker added water to a chlorine substance, which caused it to ignite. Fort-five people were evacuated from the factory along with businesses within a 150-metre radius of the factory. The fire was quickly extinguished using carbon dioxide fire extinguishers and the smoke was dispersed using the ventilation system.  
[fire - consequence, mixing, drums, evacuation]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 15, 2000, (<http://www.chemsafety.gov>).

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**Location :** Smyrna, Georgia, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An explosion occurred on a tank containing benzoyl peroxide at a chemical plant. No one was injured in the incident. Damage to the building is estimated at \$100,000 (2000).

[damage to equipment]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 31, 2000, (<http://www.chemsafety.gov>)

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**Location :** Milwaukee, USA

**Injured :** 0      **Dead :** 0

**Abstract**

A fire occurred at a fuel plant when a 2,000-gallon fuel tank exploded. The fire was brought under control in about one and a half hours.

No injuries were reported.

An investigation is underway into the cause of the explosion.

[fire - consequence]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 30, 2000, (<http://www.chemsafety.gov>)

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**Location :** Taizihe, Liaoning Province, CHINA

**Injured :** 17+ **Dead :** 1

**Abstract**

An explosion occurred at a chemical plant killing one and injuring seventeen others. The incident occurred when a chemical filled barrel exploded. A leak of nitric acid and sulphuric acid resulted from the explosion.

It is thought the incident was caused by workers who were adding chemicals to a barrel with a broken temperature gauge.

The explosion caused electric outages at nearby factories and a chemical leak which was contained in a nearby field.

[container, spill, material transfer, fatality, mechanical equipment failure, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL & ENGINEERING NEWS, JUNE 5, 2000.; CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 24 MAY, 2000, (<http://www.chemsafety.gov>)

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**Location :** Donaldsonville, USA

**Injured :** 10    **Dead :** 1

**Abstract**

An explosion and fire occurred in an ammonia processing unit at a fertilizer plant killing one worker and injuring eleven others. The incident occurred as workers were cleaning an empty mixing tank.

The fire was brought under control in about twenty minutes, no chemical leaks occurred.

An investigation into the cause of the explosion is underway.

[fire - consequence, fatality, burns, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 26, 2000, (<http://www.chemsafety.gov>)

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**Location :** Phoenix, Arizona, USA**Injured :** 2      **Dead :** 0**Abstract**

A hazardous chemical leak occurred at a plastics company forcing the evacuation of 150 people from the building and nearby businesses.

Approximately 75 gallons of 2-ethyl-2-oxoline, a highly flammable chemical used in the production of plastics that can cause respiratory and skin irritation, leaked on to the floor. The material has a flash point of 84 degrees C.

The incident occurred as employees were transferring the chemical from one tank to another when a valve stuck open. Due to the tank having a retention base around it, the leak was contained.

The chemical was absorbed with a product called vermiculite and transferred to other drums.

Fumes affected two employees.

[processing, gas / vapour release, material transfer, valve failure, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 25 MAY, 2000, (<http://www.chemsafety.gov>)

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**Location :** Dacatur, USA

**Injured :** 2      **Dead :** 0

**Abstract**

Approximately 1 million gallons of a fermenting corn and water mixture spilled from two 500,000-gallon ethanol processing tanks. Two workers were injured in the incident. The two tanks ruptured causing the liquid to spill.

A dike system was built and the liquid was pumped into holding containers.

The liquid was approximately 99 percent water and contained corn mash as part of the early ethanol process.

An investigation into the cause of the rupture is being carried out.

[material of construction failure, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MAY, 2000, (<http://www.chemsafety.gov>)

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**Location :** Summit, USA

**Injured :** 4      **Dead :** 0

**Abstract**

A fire occurred at a chemical warehouse injuring four fire fighters. It is not known what caused the fire but fire fighters believe that the point of ignition was some cotton bales stored in the warehouse.

The warehouse also stored 55-gallon drums containing chemical solvents.

[fire - consequence, warehousing, burns, injury]

**Lessons**

[None Reported]



9293 13 May 2000

**Source** : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 15 MAY, 2000, (<http://www.chemsafety.gov>)

**Location** : Enschede, NETHERLANDS

**Injured** : 600+ **Dead** : 20

---

#### **Abstract**

An explosion occurred at a fireworks warehouse killing at least 20 people and injuring 601. 13 people are still missing.

The incident occurred when fire fighters were on what they thought was a routine operation when a blaze ignited in the fireworks warehouse. But soon after, approximately 100 tonnes of explosives ignited.

Residents within the vicinity of the warehouse were evacuated.

Total damage has been estimated at more than euros 100 million (US\$89,400,600) (2000).

The Dutch authorities have announced a full enquiry into the incident.

[warehousing, fire - consequence, fatality, evacuation, injury]

---

#### **Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 8 MAY, 2000, (<http://www.chemsafety.gov>)

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**Location :** South Bend, USA

**Injured :** 3      **Dead :** 1

**Abstract**

An explosion occurred at a chemical plant killing a worker and injuring three others. The explosion occurred when workers were transferring a brake cleaning fluid from a large drum to eight 55-gallon tanks, the fumes ignited.

[material transfer, drums, fatality, burns, injury]

**Lessons**

[None Reported]

1290105 May 2000

**Source** : HAZARDOUS CARGO BULLETIN, JULY 2000,; IRISH TIMES.

**Location** : Westport, IRELAND

**Injured** : 0      **Dead** : 0

---

**Abstract**

The walls of a slurry tank collapsed spilling approximately 110m<sup>3</sup> of slurry into a nearby river and lake. It is reported that 300 dead fish have been cleared from the area.

[spill, environmental, material of construction failure]

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**Lessons**

[None Reported]

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1276001 May 2000

**Source** : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000,; SAFETY ONLINE, 2 MAR 2000, (<http://www.safetyonline.com>).

**Location** : Blainville, USA

**Injured** : 0      **Dead** : 3

---

**Abstract**

An explosion occurred whilst workers were carrying out a vehicle safety test when a 500 kg tank of compressed air exploded killing three workers. The cause of the incident is not known.

[fatality]

---

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 27 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Charlotte, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical leak occurred at a water treatment plant killing over 5,000 fish. A leak of sodium hydroxide occurred from a tank used in the wastewater treatment process at the plant.

The chemical leaked into a concrete containment area filled with rainwater. When a utility worker pumped out the area, the sodium hydroxide in the rainwater spilled from the ground into a nearby storm drain that empties out into a nearby creek.

[ecological damage, design or procedure error]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 25 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** , USA

**Injured :** 2      **Dead :** 1

---

**Abstract**

An explosion occurred at a liquid petroleum gas plant killing one worker and injuring two others. The incident occurred in a gas bottle storage building at the plant whilst a gas tanker was being loaded.

A cylinder was gassing off at the time of the explosion.

An investigation into the cause of the incident is being carried out.

[loading, fatality, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 18 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Edmonton, Alberta, CANADA

**Injured :** 0      **Dead :** 1

**Abstract**

An explosion occurred during cutting operations at a drywall facility. The incident occurred when a worker burned a hole in the top a 45-gallon drum he was using as a worktable whilst cutting a piece of steel.

[drums, hot work, safety procedures inadequate, fatality, fire - consequence]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 16 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** San Jose, USA

**Injured :** 17    **Dead :** 0

---

**Abstract**

More than two hundred people were evacuated from a works facility when nitric acid spilled from a barrel. Seventeen people were affected by an acid cloud, which developed from the spillage. They were taken to hospital for treatment.

[evacuation, gas / vapour release, container, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 14 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Grand Rapids, USA

**Injured :** 2      **Dead :** 0

---

**Abstract**

Approximately 20,000 gallons of petroleum products including hydraulic oils, starting fluids, automobile carburettor cleaners and racing fuel was spilled during a fire at a warehouse.

55-gallons drums and cases of petroleum products fuelled the fire.

Property damaged was estimated at \$1 million (2000). Two fire fighters were treated for smoke inhalation.

[environmental, warehousing, fire - consequence, injury, damage to equipment]

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**Lessons**

[None Reported]

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**Source** : CNN.COM, U.S. NEWS, APRIL 11, 2000, (www.cnn.com);; CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 11 APRIL, 2000, (http://www.chemsafety.gov),

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**Location** : Dothan, Alabama, USA

**Injured** : 33    **Dead** : 0

---

**Abstract**

Approximately four hundred nearby residents were evacuated after ammonia gas leaked from a fertilizer plant. Thirty-three people were taken to hospital for treatment of minor respiratory problems.

The leak occurred from an 18,000-gallon tank at a food plant. It is thought that the cause of the leak was due to mechanical valve failure.

Diluted ammonia solutions are used for household cleaning; concentrated ammonia can cause suffocation and death.

[evacuation, mechanical equipment failure, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 7 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Winterset, USA

**Injured :** 9      **Dead :** 2

---

**Abstract**

A fire and explosion occurred on a fuel tank. The explosion occurred when fire broke out during cutting operations on a rusty fuel tank. Two people were killed and nine others injured in the blast.

[fire - consequence, hot work, fatality, hot surface, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 7 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Anchorage, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred on a tank at a tank farm. The tank contained 2,000 gallons of jet fuel, which caught fire during cleaning operations. Chemical foam was used to extinguish the fire.

No one was injured in the incident.

[fire - consequence]

---

**Lessons**

[None Reported]

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Source : HAZARDOUS CARGO BULLETIN, JULY 2000,; LLOYDS LIST.

Location : , UK OFFSHORE

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. A Ro-ro lost four containers overboard in heavy seas, one contained p-cresol and another contained epichlorohydrin.  
[environmental]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 3 APRIL, 2000, (<http://www.chemsafety.gov>).

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**Location :** Fullerton, California, USA

**Injured :** 0      **Dead :** 0

**Abstract**

An explosion occurred in a university laboratory. The incident occurred when a lab student mixed a small amount of alcohol into a gallon tub of acid waste. It shattered beakers and caused a cabinet to burst open.

Property damage was estimated to be approximately \$100 (2000).

[laboratory work, mixing, unwanted chemical reaction, damage to equipment, container]

**Lessons**

[None Reported]

Source : CNI NEWS, 31 MARCH, 2000, (<http://www.cnionline.com>)

Location : Houston, Texas, USA

Injured : 2      Dead : 0

---

**Abstract**

A fire occurred at a paint factory where two warehouses containing hazardous waste were destroyed.

Nearby residents were evacuated.

Two fire fighters were slightly injured in an effort to control the blaze that was eventually extinguished four hours later.

An investigation into the cause of the incident is being carried out.

[fire - consequence, warehousing, evacuation, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Deer Park, Texas, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A tank containing 80,000 gallons of crude acrylic acid began overheating at a chemical plant forcing the evacuation of several other chemical plants in the surrounding area. The evacuation was forced as a precaution due to the dimer reaction raising a threat of an explosion.

Minimal amount of acrylic acid was released through the tank venting process, which was dissipated by water spray used for cooling the tanks.

The 250,000-gallon tank was sprayed with water in an attempt to cool it down.

Acrylic acid is a flammable liquid that can cause irritation to skin, eyes and throat and is used in numerous products ranging from paint to diapers.

The report stated that the incident did not have any potential to harm neighbouring plants or community.

[near miss]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 26 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Jackson, Mississippi, USA

**Injured :** 20    **Dead :** 0

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**Abstract**

Anhydrous ammonia fumes escaped from an agricultural tank. Approximately 20 people were treated at hospital after being affected by the toxic gas leak.

The gas causes shortness of breath and respiratory irritation. Prolonged exposure can be fatal.

The incident occurred when thieves left open a valve on the tank causing the leak.

[gas / vapour release, deliberate acts, people, toxic fumes, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Farmington, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

Two drums of highly toxic trichloroethylene were found dumped by the side of a reservoir. One of the drums was found to be leaking.

The area surrounding the drums was cordoned off.

Trichloroethylene is a colourless liquid known as TCE and is used by many industries.

An investigation is being carried out.

[spill, human causes]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 22 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Muncie, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire and several explosions occurred at a plant causing severe damage.

The fire was made even worse by exploding chemical tanks.

Water from the fire bypassed the plant's wastewater treatment plant and spilled directly into the nearby river.

It is feared that runoff water from the fire may be contaminated.

An investigation into the incident determined that the blaze started in the storage area.

[fire - consequence, damage to equipment, contamination, design or procedure error, unknown chemicals]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 22 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Albuquerque, USA

**Injured :** 0      **Dead :** 0

**Abstract**

A fire occurred in a warehouse at a packaging plant. Concern has been raised by nearby residents that half a million gallon of runoff water from the fire may be contaminated.

An investigation into the cause of the fire is being carried out.

[fire - consequence, contamination, warehousing]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 20 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** North Salt Lake City, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred as an employee was checking equipment while a tank truck was being filled at a loading dock at a refinery. Nearby fuel tanks were damaged in the blaze fortunately they did not explode.

The incident occurred when surplus gas from fuel hoses was being emptied into a steel bucket, which apparently built up static electricity and burst into flames. The operator threw the bucket away from his body causing an explosion.

The refinery offices were evacuated and underground pipes transferring petroleum products were shut-off.

[fire - consequence, road transport, damage to equipment, evacuation]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 20 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Albany, Kentucky, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred at a chemical storage forcing the evacuation of the surrounding area. At the time of the report a building fire had been extinguished but four tanks each containing approximately 2,000 gallons of gasoline continued to burn.

The plant stores gasoline, oil and toluene.

[fire - consequence]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 16 MARCH, 2000, (<http://www.chemsafety.gov>)

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**Location :** Rosepine, Los Angeles, USA

**Injured :** 2      **Dead :** 0

**Abstract**

Two workers were injured during welding operations when an explosion occurred. The incident occurred when the workers were loading diesel tanks and a gasoline air compressor on a logging truck.

An investigation into the incident is being carried out.

[road transport, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 15 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** New Brunswick, CANADA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical spill at a science centre forced the evacuation of approximately 800 people.

The incident occurred when a cooler unit used to store volatile chemicals malfunctioned, causing a chemical reaction.

The refrigeration unit contained 30 to 35 containers of chemicals. The chemicals included a styrene monomer, a special alcohol used in the production of plastics and approximately 11 kilograms of initiator.

[unwanted chemical reaction, storage]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 14 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Rock Hill, USA

**Injured :** 2      **Dead :** 2

**Abstract**

Two workers were killed and two injured when turpentine fumes ignited during welding operations on a tank at a paper plant.

The tank was used to collect liquid product during the papermaking process.

Approximately fifty workers were evacuated.

[evacuation, fire - consequence, fatality, safety procedures inadequate, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 13 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Austin, Texas, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transportation incident. An 18-wheeler carrying chemicals overturned on a highway. The truck was carrying three drums of sulphuric acid and two drums of a cleaning agent when the incident occurred.

One of the 330-gallon drums of sulphuric acid was punctured in the incident causing half of its contents to spill into a storm drain, which runs into a nearby creek.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 10 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Tampico, MEXICO

**Injured :** 31    **Dead :** 0

**Abstract**

A propane tank exploded injuring 31 people and causing damage to equipment. The injured suffered burns.

The cause of the explosion was due to an electrical short near to the tank, which was leaking at the time.

[explosion, short circuit, fire - consequence, injury]

**Lessons**

[None Reported]

1224208 March 2000

**Source** : BBC NEWS, 8 MARCH, 2000, (<http://www.bbc.co.uk>); CNI NEWS, 8 MARCH, 2000, (<http://www.cnionline.com>); CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.

**Location** : Cheshire, UK

**Injured** : 7      **Dead** : 0

---

**Abstract**

A major gas leak occurred at a chemical plant after an explosion. Approximately half a tonne of hydrogen chloride gas was released from a storage container. It is thought that the cause of the incident was due to the failure of a set of bellows.

Fire crews used a curtain of water jets to minimise the amount of gas spreading.

Nearby residents were advised to keep windows and doors closed until further notice.

A report stated seven minor casualties.

[gas / vapour release, mechanical equipment failure, injury]

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**Lessons**

[None Reported]

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Source : BBC NEWS, 8 MARCH, 2000, (<http://www.bbc.co.uk>)

Location : Basingstoke, M3, UK

Injured : 1      Dead : 1

---

**Abstract**

A road transportation incident. A lorry carrying gas canisters was hit by another vehicle while on the hard shoulder after breaking down. Approximately three other vehicles were involved in the incident.

The collision caused 20 to 30 exploding gas canisters to be thrown up to 400 metres.

The blaze was so intense it damaged the road surface.

The driver of the propane lorry was taken to hospital.

[container, explosion, fire - consequence, fatality, injury]

---

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 9 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Lake Alfred, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred at a fertilizer plant. The incident occurred whilst plant workers were welding a metal bin, which was still containing chemicals. The fire occurred inside a 12-foot by 30-foot hopper containing a mixture of sludge, or sewage, and ammonium nitrate used to make the fertilizer. Fifteen workers were evacuated and fire fighters eventually brought the fire under control. Sand was placed around a nearby storm drain to contain the chemicals.

The plant was closed down for repairs and clean up.

No injuries were reported.

[fire - consequence, evacuation, plant shutdown, design or procedure error]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 5 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Newport, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical plant was ordered to shut down as a precaution due to the potential of an explosion occurring and the possibility of contamination of a well. The company was ordered to shut down after inspectors found corroded and leaking containers and decaying chemicals.

[plant shutdown, human causes, unknown chemicals]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 6, 2000,  
(<http://www.chemsafety.gov>).

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**Location :** Morral, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical spill forced the evacuation of an entire town when two small tanks containing fertiliser collapsed. A dike surrounding the facility successfully contained the spill.

The tank contained non-toxic farm fertiliser, but there was cause for concern that the fertiliser could mix with other chemicals creating a toxic substance.  
[mechanical equipment failure, storage]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 2, 2000. (<http://www.chemsafety.gov>).

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**Location :** Clifton, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

A chemical reaction occurred inside a 5-gallon container creating fumes forcing workers to be evacuated. One person was injured in the incident.

The incident occurred whilst a worker was mixing epoxy sealant for use on a floor being laid.

An investigation into the cause of the chemical reaction is being carried out.

[unwanted chemical reaction, gas / vapour release, injury, evacuation]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 6, 2000. (<http://www.chemsafety.gov>).

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**Location :** Bristol, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

A fire and explosion occurred at a hazardous materials recycling plant. One person was taken to hospital and a nearby store was evacuated.

A nearby 500-pound propane tank located in the building was of concern to the fire fighters.

[fire - consequence, evacuation, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 29, 2000, (<http://www.chemsafety.gov>).

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**Location :** Bellefonte, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A 300-gallon barrel of sulphuric acid fell off a forklift truck, releasing approximately 75 to 100 gallons of the chemical into a storm sewer leading directly into a stream.

The spill impacted a mile-long stretch of the waterway.

The company contained some of the spill by adding lime to the acid in order to neutralize it.

[ecological damage, container, design or procedure error, spill, transportation]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 29, 2000, (<http://www.chemsafety.gov>).

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**Location :** Gulgong, AUSTRALIA

**Injured :** 3      **Dead :** 0

---

**Abstract**

A pesticide leak occurred when an excavator ran over three chemical cylinders. The substance was identified as aluminium phosphide, which is potentially lethal and can cause environmental damage.

The spill was cordoned off and a nearby school evacuated. Three fire fighters were taken to hospital for observation.

[excavation damage, evacuation, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 23, 2000. (<http://www.chemsafety.gov>).

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**Location :** Savannah, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transportation incident. A truck carrying plastic containers containing 41,000 pounds of ferric chloride buckled under the weight. Three containers ruptured as a result and it is thought that they started to leak from the top. A hazardous response team used granulated absorbent material to soak up diesel fuel that spilled and a baby pool was used to catch diesel fuel still leaking.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 20, 2000. (<http://www.chemsafety.gov>).

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**Location :** British Columbia, CANADA

**Injured :** 0      **Dead :** 0

**Abstract**

A marine transportation and road transportation incident. A semi-trailer tanker aboard a cargo ferry ruptured a tank and spilled its contents of gasoline onto the deck and into the sea.

The dispersment of the gasoline was a priority as concentrated vapours become explosive.

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 20, 2000. (<http://www.chemsafety.gov>).

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**Location :** Anchorage, USA

**Injured :** 0     **Dead :** 1

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**Abstract**

An explosion caused a 20-foot by 15-foot hole in the roof of a tank and sent several large steel support beams into the air. At the time of the incident a worker was welding a ventline on top of the large wastewater tank when it exploded. The worker was blown through the roof of the building and killed instantly. It is thought that the tank was contaminated with combustible or flammable fumes, which may have caused the blast.

[contamination, fatality]

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**Lessons**

[None Reported]

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1219511 February 2000

Source : BBC NEWS, 11 FEBUARY, 2000, (<http://www.bbc.co.uk>).

Location : Cheshire, UK

Injured : -      Dead : 3

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**Abstract**

A road transportation incident. An eight wheel mobile crane collided with an articulated lorry then ploughed through the central reservation and landed on top of an on coming car, which was then struck from behind by a lorry carrying oil drums.

The driver of the crane, the car and the lorry were killed.

Oil drums were scattered over the motorway.

The motorway was closed to allow rescue and recover vehicles to the scene.

[collision, fatality]

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**Lessons**

[None Reported]

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1219811 February 2000

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** Zhangshu City, CHINA

**Injured :** 2      **Dead :** 6

**Abstract**

A tanker truck exploded whilst unloading oil at a gas station. The explosion killed six and injured two and totally destroyed a nearby three-storey building. The gas station included five large oil tanks and unknown amount of oil barrels. The cause of the explosion is still under investigation.

[fire - consequence, road transport, explosion, fatality, injury]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** Nova Scotia, CANADA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transportation and marine transportation incident. A truck carrying approximately 26 tonnes of sodium hydrosulphide started to leak whilst on board a freighter ferry.

The leak was discovered when an employee of the freighter ferry detected fumes.

A small spill was later found in the top of one of nine containers of the chemical in the truck. The spill was quickly cleaned up and the all clear given.

Sodium hydrosulphide is used in papermaking and normally presents minimal risk when properly packaged. However, its fumes are toxic and it can explode and burn in extreme temperatures.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** Fargo, USA

**Injured :** 1      **Dead :** 0

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**Abstract**

A worker welding a pipe onto a 55-gallon drum was seriously injured when oil vapours from the drum ignited causing an explosion. The drum had been used to store waste oil.

[drums, leak, storage, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 9, 2000. (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 2      **Dead :** 0

---

**Abstract**

An explosion occurred when two acids were mixed, injuring two graduate students.

The incident occurred when the two students were mixing nitric acid and hydrochloric acid in a glass container when the chemicals exploded.

An investigation is underway into the possibility that another chemical may have been in the container.

The students were treated for minor injuries.

[mixing, contamination, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 6, 2000. (<http://www.chemsafety.gov>).

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**Location :** Mineapolis, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A hydrochloric acid spill occurred at a printing plant. Approximately 1,000 gallons of the acid spilled in the plant forcing the evacuation of the entire building.

A 1-inch pipe is thought to have broken on a 4,700-gallon tank, spilling the acid. The spill was contained in the building.

The buildings air system was shut down to keep vapours from being emitted from ducts.

Hydrochloric acid is considered poisonous if inhaled as vapours or absorbed through the skin.

[mechanical equipment failure, normal operations]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 4, 2000. (<http://www.chemsafety.gov>).

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**Location :** Salt Lake City, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A 55-gallon drum of sodium hydroxide started to leak forcing the evacuation of six workers.

Approximately 6-gallons is thought to have leaked from the drum.

The chemical if inhaled can cause respiratory problems and is corrosive to the skin.

[drums]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 29, 2000, (<http://www.chemsafety.gov>).

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**Location :** Flora Vista, USA

**Injured :** 1      **Dead :** 1

---

**Abstract**

An explosion occurred on a gas tank killing one and injuring another. It is thought that a lighter being thrown into the tank caused the explosion. The incident occurred when two boys were playing on top of the tank. One boy was thrown approximately 90 ft and killed the other suffered serious burns.  
[human causes, fatality, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 28, 2000, (<http://www.chemsafety.gov>).

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**Location :** Sowa, JAPAN

**Injured :** 1      **Dead :** 1

---

**Abstract**

A drum containing 200 litres of acrylic acid exploded at a factory, killing one worker and burning another.

The explosion blew off a steel door and part of the ceiling of the factory.

Just before the incident, the two workers noticed a strong acidic smell in part of the factory where detergents are made, they then went to a room that stores acrylic acid when the explosion occurred.

[drums, explosion, burns, fatality, leak, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 21, 2000, MARCH 20 2000,  
(<http://www.chemsafety.gov>).

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**Location :** Los Alamos, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Approximately 500 to 1,000 gallons of waste water thought to be contaminated with high explosives was accidentally released from holding tanks onto 200 square feet of soil surrounding the tanks.

An investigation into the incident found that the water did not contain concentrations of explosives residue.

Analysis of the water found it contained trace amounts of solvents and other chemicals.

[spill, contamination]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 24, 2000, (<http://www.chemsafety.gov>).

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**Location :** Garrison, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

An acetylene tank exploded as a plumber was carrying out welding work on pipes at a hospital.

The plumber was involved in maintenance work in a tunnel system under the building at the time of the accident. The plumber suffered minor burn injuries.

[explosion, burns, injury]

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**Lessons**

[None Reported]

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Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : Wales, UK

Injured : 0      Dead : 0

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**Abstract**

A firelighter manufacturer's tank overflowed. The resulting discharge spilled into the surface water drains and an interceptor into a nearby watercourse. The company was fined £7,000 and £150 costs (2000).

[pollution]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 14, 2000, (<http://www.chemsafety.gov>).

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**Location :** Texas, USA**Injured :** 0      **Dead :** 0**Abstract**

A potentially toxic chemical reaction at a tire and rubber company caused the evacuation of plant personnel and a nearby highway. The incident occurred when workers noticed an elevated temperature in a tank holding two chemicals used in the production of antioxidants used in plastics. The tank was hosed down to keep it cool and disaster specialists were put on alert and the road closed. It was reported that no leakage occurred when a stabilising agent was added to the tank to stop any possible reaction. An investigation found the tank used to mix the two chemicals, mercaptan and methylacrylate, was not the one normally used. A full investigation into the incident is being carried out.

[unwanted chemical reaction, mixing]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 14, 2000, (<http://www.chemsafety.gov>).

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**Location :** La Guaira, VENEZUELA

**Injured :** 0      **Dead :** 0

**Abstract**

Cargo containers were found to be leaking a toxic mix of chemicals after the containers were battered by massive floods. As a result of this, residents of the area were evacuated and access to the area was restricted.

Chemicals leaking from some containers were identified as toxic and posed a threat to public health.

Authorities stated, the chemicals could contaminate the ground and sea, emit dangerous gases and cause an explosion.

Health officials issued public warnings that any survivors from the floods suffering from skin rashes, respiratory ailments or other health problems are to seek medical attention.

The flooding killed between 5,000 and 30,000 people, making it the worst natural disaster in the country this past century.

[evacuation, storage, toxic chemical]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 12, 2000, (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 0      **Dead :** 0

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**Abstract**

An explosion and fire occurred on a building under construction. The incident occurred when a propane tank rusted through and leaked propane into a heating unit used to dry drywall. Nearby, approximately 20 propane tanks were in danger of exploding. Damage was estimated at \$35,000 to \$40,000 (2000).

[fire - consequence, damage to equipment, spill, corrosion, heating equipment]

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**Lessons**

[None Reported]

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121662000

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 25, 2000, (<http://www.chemsafety.gov>).

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**Location :** Masury, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

Six propane tanks exploded at an industrial park causing approximately \$500,000 (2000) in damage. The cause was due to a leak of propane from a space heater, which ignited and caused the 50-pound cylindrical tanks to explode.

At the time of the incident workers were using the heaters for warmth as they carried out sand blasting work on a large tank inside a gas turbine.

A worker suffered second degrees burns and third degree burns in the incident.

An investigation into the explosions is being carried out.

[damage to equipment, explosion, maintenance, injury]

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**Lessons**

[None Reported]

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132232000

**Source** : EUROPEAN CHEMICAL NEWS, 18 DECEMBER 2000 - 7 JANUARY 2001.

**Location** : Ludwigshafen, GERMANY

**Injured** : 0      **Dead** : 0

---

**Abstract**

A chemical spill occurred at a chemical plant. The incident occurred when a drum of isopropanol and methyl vinyl ketone burst injuring a worker and affecting several others including visitors at the site.

It is thought that a drum containing residue of caustic soda was accidentally filled with the mixture causing the drum to rupture.

[accidental mixing, drums]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 28, 2000, (<http://www.chemsafety.gov>).

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**Location :** Pascagoula, USA

**Injured :** 2      **Dead :** 0

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**Abstract**

Two workers were seriously injured in an explosion at a chemical plant during pump testing.

The incident occurred when the workers were pressure testing a newly installed vacuum pump in a hydraulic tank. The tank was not in production at the time of the incident.

No release occurred and production at the plant was not effected.

[people, injury]

---

**Lessons**

[None Reported]

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Source : BBC NEWS, DECEMBER 4, 1999.

Location : Guatemala, SOUTH AMERICA

Injured : 80+ Dead : 15+

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**Abstract**

A road transportation incident. An explosion occurred at a chemical warehouse when two lorries collided.

A fire occurred from spilled petrol which then spread to the warehouse. It is thought that the explosion was caused by a spontaneous ignition of fertilisers stored in the warehouse.

The explosion was felt up to 5 km away, destroying cars and shattering windows in nearby buildings.

Hundreds of people including emergency services, helped to combat the flames in a bid to stop them spreading to a nearby refinery.

At least 15 people were killed and 80 injured.

[fire - consequence, collision, fatality, gasoline, injury]

---

**Lessons**

[None Reported]

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**Source** : BBC NEWS, DECEMBER 3, 1999, (<http://www.bbc.co.uk>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 4, 2000, (<http://www.chemsafety.gov>).

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**Location** : , THAILAND

**Injured** : 15    **Dead** : 7

**Abstract**

A fire occurred after an explosion at an oil refinery which killed two people and injured fifteen.

The explosion and fire caused between US\$23m-27m (1999) damage.

Four out of the nine oil tanks exploded. The force of the explosion was felt in nearby towns and several kilometres away.

Thirty million litres of petrol stored in the four burned-out tanks was destroyed in the blaze.

It is thought that the explosion occurred after the storage tanks were overfilled and that a spark may have ignited the vapour.

[burns, fire - consequence, refining, damage to equipment, fatality, injury]

**Lessons**

[None Reported]

Source : ICHEME

Location : , THAILAND

Injured : 13    Dead : 8

---

**Abstract**

A fire occurred on a tank farm at a refinery killing eight people and injuring thirteen others.

The incident occurred when a gasoline tank overflowed releasing vapours, which entered several nearby buildings.

Two operators went to investigate and it is thought that the vehicle they were driving ignited the vapours causing a number of explosions, starting fire on a tank containing 1.5 million litres gasoline which quickly spread to four other larger tanks.

A large quantity of foam was used in extinguishing the fire.

An investigation into the incident is underway.

[fire - consequence, gas / vapour release, refining, fatality, injury]

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**Lessons**

[None Reported]

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1207021 October 1999

Source : BBC NEWS, OCTOBER 25, 1999, (<http://www.bbc.co.uk>).

Location : Hebron, MIDDLE EAST

Injured : -      Dead : 14

---

**Abstract**

A fire occurred at a factory, destroying the whole building. The fire was started by an explosion, it is thought this was caused by a canister containing gas which fell on the ground and exploded. Fourteen people were killed.  
[fire - consequence, container, fatality]

---

**Lessons**

[None Reported]

---

1195110 October 1999

Source : THE SUN, OCTOBER 11, 1999.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A leak of hazardous chemicals occurred in an airport cargo area when a package fell from a baggage trailer. Fire crews were put on stand-by whilst the package which had just been unloaded, was examined.

An area of half a mile from the main runway and terminal was sealed off.

The substance was found to be a low-grade hazardous chemical.

[leak, spill, unloading, near miss, container, chemicals unknown]

---

**Lessons**

---

Source : BBC NEWS, SEPTEMBER 27, 1999, (<http://www.bbc.co.uk>).

Location : Celaya, MEXICO

Injured : 348+ Dead : 50+

---

**Abstract**

Huge explosions ripped through a crowded market in a town of Central Mexico. It is thought that the first explosion occurred in a fireworks warehouse.

Emergency services were attempting to extinguish the fire when further explosions hit the area.

The fire is thought to have caused cooking gas tanks in restaurants to ignite.

Electricity supplies were cut off and the sale of petrol was banned throughout the city until the fire had been extinguished.

[fire - consequence, storage, fatality]

---

**Lessons**

[None Reported]

---

Source : CNN.COM, U.S. NEWS, SEPTEMBER 21, 1999, (<http://www.cnn.com>).

Location : New Jersey, North Carolina, USA

Injured : -      Dead : -

---

**Abstract**

People were told to boil their tap water after fears of contamination caused by Hurricane Floyd.

Drinking water was found to have been contaminated by overflow from sewage plants and animal waste lagoons.

Floodwaters were contaminated by fuel, farm chemicals and manure. Flooding also swept at least 1,000 containers of explosive and toxic materials into waterways. Officials warned people not to come into contact with any drums, cylinders or other unfamiliar objects. The biggest danger comes from flammable materials like gasoline, cleaning solvents and propane gas.

More than a million gallons of waste water thought to contain chromium, spilled at a chemical plant during the hurricane.

[toxic chemical]

---

**Lessons**

Water contaminated by sewage and animal waste could cause a host of gastrointestinal illnesses.

---



Source : BBC NEWS, SEPTEMBER 19, 1999, (<http://www.bbc.co.uk>).

Location : , THAILAND

Injured : 120+ Dead : 23+

---

**Abstract**

An explosion occurred at a fruit processing factory, killing 23 and injuring 120 people. The explosion was so powerful that it completely destroyed the factory and flattened 30 nearby buildings. It is thought that sacks of potassium nitrate were involved with the cause of the explosion. (Potassium nitrate, a chemical used both as a fertiliser, food preservative and an ingredient in gun powder).

A report stated that fire fighters were called to prevent a fire from spreading to a 5000 litre fuel tank in the factory grounds.

The factory was used for processing and drying longans, a tropical fruit.

[fire - consequence, container, fatality, damage to equipment, injury]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; SAFETY ONLINE, 7 SEP 1999, <http://www.safetyon-line.com/>

Location : , NORTHERN RUSSIA

Injured : 3      Dead : 4

---

**Abstract**

An explosion occurred at an ore processing plant killing four workers and injuring three others. The incident occurred when three oxygen cylinders exploded during welding operations. An investigation into the incident is being carried out. It is thought that the cause was due to a breach of company safety rules. [safety procedures inadequate, fatality, injury]

---

**Lessons**

[None Reported]

---

**Source :** U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, (<http://www.chemsafety.gov>).

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**Location :** Quebec, CANADA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transport incident. An explosion and fire occurred at a distribution centre whilst propane was being transferred from a truck to a larger tank. No injuries were reported.

[fire - consequence, material transfer]

---

**Lessons**

[None Reported]

---

1175208 September 1999

**Source** : BBC NEWS, SEPTEMBER 8, 1999, (<http://www.bbc.co.uk>).

**Location** : Bristol, M5, UK

**Injured** : 0      **Dead** : 4

---

**Abstract**

Four construction workers fell 80 ft from a motorway viaduct. They were working on a bridge when the platform on which they were standing gave way. A large part of the gantry, about 35 ft long and 12 ft wide, ended up dangling underneath the bridge. Workers on a nearby industrial estate were evacuated after gas bottles fell off the gantry.

No-one else was hurt in the accident.

Two of the workers were welders and two were specialist steel platers.

An investigation is underway into the cause of the accident.

[fall, fatality, evacuation]

---

**Lessons**

[None Reported]

---

Source : CNN.COM, U.S. NEWS, SEPTEMBER 8, 1999, (<http://www.cnn.com>).

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. 2,000 gallons of oil leaked into a Bay from a dredging vessel. The oil leaked from a ruptured fuel tank after rough seas apparently threw part of the dredging apparatus against the vessel. Part of the equipment punctured through the hull, opening a 6 inch to 8 inch wide hole in the tank.

A small amount of oil washed ashore were work crews collected a bag full of oil coated rocks and plants, and 14 birds were also recovered, thick with oil.

[heavy seas, spill, ecological damage]

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSRTY, FEBRUARY 2000,; HAZARDOUS CARGO BULLETIN, NOVEMBER 1999.

**Location** : Humboldt Bay, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Approximately 9000 litres of oil spilled into a bay when a fuel tank onboard a dredger ruptured. The spillage occurred during heavy seas, which apparently caused part of the dredging equipment to smash into the hull of the vessel.

---

**Lessons**

[None Reported]

---

Source : YAHOO NEWS UK & IRELAND, SEPTEMBER 3, 1999, (<http://www.yahoo.co.uk>).

Location : , UK

Injured : 31    Dead : 0

---

**Abstract**

Thirty one workers were sent to hospital suffering breathing problems and nausea after a chemical leak at a warehouse. The workers were under observation after formaldehyde escapes from a container at the warehouse.

It is thought that a forklift truck punctured a container in a chemical handling area.

[gas / vapour release, warehousing, fracture, operator error, people]

---

**Lessons**

[None Reported]

---

12093September 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; BUISINESS DAY, 28 SEP 1999, <http://bday.net>

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

Approximately 600 and 700 drums in a warehouse caught fire. Chemicals involved in the incident included glycol ethers, acrylics, epoxy resins, plasticizers, polyurethane and surfactants. Fortunately no one was injured. An investigation into the cause of the incident is being carried out.  
[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---



12094September 1999

**Source** : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; CHEM. WEEK, 29 SEP 1999, 161(36).

**Location** : Moscow, RUSSIA

**Injured** : 4      **Dead** : 9

---

**Abstract**

A fire occurred at a plastics warehouse killing nine workers and causing serious burns to four others. It is thought that the cause of the incident was due to a spark from faulty welding equipment.

[fire - consequence, fatality, injury]

---

**Lessons**

[None Reported]

---

11872September 1999

Source : BBC NEWS, SEPTEMBER 15, 1999, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A toxic chemical used as a sealant for glass jars of baby food was found to have been seeping into the product. A test carried out found that 66 of 137 samples of baby food from glass bottles contained the chemical, epoxidised soya bean oil, ESBO.

ESBO is used on jars to prevent contamination from bacteria or anything else by creating an airtight seal, and also helps make signs of tampering more obvious. [contamination, container]

---

**Lessons**

ESBO is only dangerous in large quantities.

---

1175024 August 1999

Source : YAHOO NEWS UK & IRELAND, SEPTEMBER 3, 1999, (<http://www.yahoo.co.uk>).

Location : , ENGLISH CHANNEL

Injured : 20+ Dead : 0

---

#### Abstract

A marine transportation incident. A cargo vessel collided with a cruise liner with more than 2,000 people on board.

Fortunately, the cruise liner was able to reach a nearby port safely despite severe damage to its bow.

The 52,000 tonne container ship, caught fire after the collision. More than 40 of the ships 3,092 containers held hazardous materials two of which carrying cyanide, these were stowed in the centre of the vessel and there was no danger of them being lost overboard. Some of the containers fell into the sea during the impact.

Coast guards reported no sign of trouble before the collision and that no radio message had been taken from either vessel.

[container ship, passenger ship, collision, fire - consequence, near miss, spill, damage to equipment, cyanide product]

---

#### Lessons

[None Reported]

---

1164717 August 1999

Source : BBC NEWS, AUGUST 19, 1999, (<http://www.bbc.co.uk>); HAZARDOUS CARGO BULLETIN, NOVEMBER 1999.

Location : , TURKEY

Injured : -      Dead : -

---

**Abstract**

A fire occurred at an oil refinery complex when a fatal earthquake struck the country.

The earthquake struck Turkey's populous north west, an area that accounts for a third of the country's economic output. Many large companies were badly hit.

[fire - consequence, refining, oil, tank, fatality, damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : FIRE PREVENTION 323, AUGUST 1999.

**Location** : Dorset, UK

**Injured** : 6      **Dead** : 0

---

**Abstract**

Several containers of dry cleaning mixture tetrachloroethaline were spilled. Six people were treated for the effects of inhaling chemical fumes. The spill was quickly contained and there was no danger to the environment.

[cleaning fluid, people, gas / vapour release]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location** : Quebec, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred during welding activities at a PVC pellet storage warehouse. Nearby residents were evacuated. The building was totally destroyed.  
[fire - consequence, evacuation]

---

**Lessons**

[None Reported]

---

Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £1,500 and costs of £600 (2000) for polluting a creek. The company cleans and jet washes heavy equipment taken from the factory floor. The operation was being undertaken from outside where the yard's concrete surface was heavily polluted with cutting oil and de-greasant. A storage container nearby was also found to be leaking oil from an open tap at the bottom.

Both effluents were found to be draining into a gutter that connected with a public surface water system.

[cleaning, pollution, container, design or procedure error]

---

**Lessons**

[None Reported]

---

1105627 May 1999

**Source** : CHEMICAL WEEK, JUNE 9, 1999.

**Location** : Pasadena, Texas, USA

**Injured** : 1      **Dead** : 0

---

**Abstract**

An explosion occurred at a chemical plant critically injuring a worker who was cleaning a 10,000 gallon tank containing a ferric sulphate compound. The explosion was caused by water being mixed with residue inside the tank. The worker suffered second degree burns to the face, neck and hands. An investigation into the incident is being carried out.  
[accidental mixing, injury]

---

**Lessons**

[None Reported]

---



1102313 May 1999

Source : EUROPEAN CHEMICAL NEWS, 7-13 JUNE, 1999, PAGE 5.

Location : , INDIA

Injured : -      Dead : 44

---

**Abstract**

An explosion and fire which started in a chemical warehouse claimed the lives of 44 people and injured many others.

The broke out in a two storey warehouse thought to house unlicensed flammable chemicals. The subsequent fire swept through shops in a densely populated area, fanned by a dust storm passing through the city.

[fire - consequence, warehousing, fatality, injury]

---

**Lessons**

[None Reported]

---

1208504 May 1999

**Source** : CHEMICAL HAZARDS IN INDUSTRY, JULY 1999.

**Location** : Guadalajara, MEXICO

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred on a production facility for polystyrene cups and containers. The whole building was destroyed by the fire. Prior to the fire, 300,000 boxes containing 1000 polystyrene cups were being produced each month.

[fire - consequence, processing, damage to equipment]

---

**Lessons**

[None Reported]

---

11876May 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred at a plant causing damage of £1 million (1999). The incident occurred whilst toluene was being transferred from a 10,000 gallon tank to a 55 gallon drum. A spark caused a flash fire. Approximately 1000 gallons of toluene were spilled.  
[fire - consequence, damage to equipment, drums, material transfer]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; ENDS REP., SEP 1999, 1999(296), 48.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £9,000 (1999) plus costs for causing polluting matter to enter controlled waters. High levels of ammonia discharging from a surface drain were traced to an ice cream manufacturing plant, which was being dismantled. The plant contained 1.5 tonnes of ammonia.

A tanker due to collect the refrigerant failed to arrive, so it was decided to dissolve the gas in water filled drums, but there was insufficient drums available. A trough filled with running water was then used but this overflowed into a drain leading to a tributary of a river. The discharge killed 11,000 fish and caused sore throats and stinging eyes to local residents. Clean-up costs amounted to approximately £14,000 (1999).

[pollution, demolition, leak, ecological damage, people, environmental]

---

**Lessons**

[None Reported]

---

Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : Kent, UK

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £8,000 and costs of £600 (2000) when it was found that one of their tanks was leaking oil, which spilled into a surface water system and entered a lake.

Engine and gearbox waste oil had passed by filters into a number of pump units which transferred the oil to the holding tank outside. The holding tank was full and needed emptying. Indications that the holding tank was full and needed emptying was supplied by the pumps in the workshop but they were not working.

The tank was not visible, it was possible for it to leak and not trigger off the disposal pumps.

[environmental, ecological damage, leak, design or procedure error]

---

**Lessons**

[None Reported]

---

Source : FIRE PREVENTION 331, APRIL 2000.

Location : Oxfordshire, UK

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred at a factory. The fire started in two large waste containers, which then spread to the plastic windows of the main roller shutter door. Hanging plastic strips located behind the door were also ignited causing the fire throughout the contents of the factory.

The factory contained electrical components packed in polystyrene and cylinders of compressed gas containing nitrogen, oxygen, helium, halon or hydrogen. One cylinder started to vent forcing all personnel to evacuate the building. Eventually the venting stopped and crews were able to isolate and begin damping down procedures.

An investigation into the incident found it unlikely that hot or burning materials were placed in the containers accidentally.

It is thought that the most likely cause was due to deliberate ignition. Estimated loss is thought to be £1,176,000 (1999).

[fire - consequence, evacuation, damage to equipment, storage]

---

**Lessons**

[None Reported]

---

**Source** : LOSS PREVENTION BULLETIN 145, 24.

**Location** : Arkansas, USA

**Injured** : 3      **Dead** : 3

---

**Abstract**

An explosion occurred at an oil refinery killing three people and injuring three others. The explosion occurred as cleaning crew from an independent contractor was working on a valve on a naphtha tank.

All runoff from the foam used to extinguish the fire and water to cool down other tanks had been contained. No harm came to the environment.

[fire - consequence, injury]

---

**Lessons**

[None Reported]

---

128771999

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Lightning struck two open-top floating roof tanks containing crude oil causing extensive rim seal fires.

The fire was eventually extinguished by using foam and water.

No injuries occurred in the incident.

Damage is estimated at approximately US\$1 million (1999) and cost of foam US\$114,600 (1999).

[fire - consequence, storage tanks]

---

**Lessons**

[None Reported]

---



128871999

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a vacuum bottoms tank when the roof weld joint failed spilling hot oil in the surrounding dike/bund.

The most probably cause of the weld failure was due to a minor internal explosion or overpressure due to the ignition of flammable vapour by pyrophoric deposits. The tank contents were at an unusually high temperature at the time.

[fire - consequence, overpressurisation, oil - hot]

---

**Lessons**

[None Reported]

---

114981999

**Source :** CHEMICAL HAZARDS IN INDUSTRY, JUNE 1999.

**Location :** , GERMANY

**Injured :** 39    **Dead :** 0

---

**Abstract**

Thirty nine employees were treated for eye irritation after a liquid spill of a mixture containing mainly propin acid ethyl ester from a residue container. The spill was caused by pressure build-up.

[high pressure, people]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : -

---

**Abstract**

A barge exploded whilst docked. Residual jet fuel was being vacuumed from the tanks and being emptied into a petroleum road tanker on a pier at the time of the explosion. The vessel had just delivered aviation fuel and the tank was being cleaned out for an new load of heating oil.

Investigations into the incident found three prime possibilities for the explosions.

Matches, which were found near the body of a crewman may have ignited the fuel vapours. Or one of the barge workers may have dropped and broken a flashlight, causing the blast. Another cause may have been due to the plastic hose which is used to vacuum the fuel accumulated enough static electricity to exploded the fumes.

Traces of alcohol were found in two of the crew members.

[river transport, cleaning, human causes]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 JULY, 1999. (<http://www.chemsafety.gov>).

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**Location :** Port Comfort, Texas, USA

**Injured :** 35+ **Dead :** 0

---

**Abstract**

An explosion and fire occurred at a chemical plant, injuring at least 35 people. The incident occurred when a processing tank exploded for unknown reason.

An investigation is being carried out.

[fire - consequence, injury, unidentified cause]

---

**Lessons**

[None Reported]

---

1044414 November 1998

Source : BBC ONLINE NETWORK, 1998, (<http://www.bbc.co.uk>).

Location : , HONG KONG

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. Two oil tankers collided causing a major oil slick.

There are fears the spillage will pose a serious threat to marine life in the area, including the endangered white dolphin.

The diesel oil poured into an area near the mouth of a river. Both the tankers were carrying thousands of tonnes of oil. Two tanks on one vessel were badly damaged, each with a capacity of 1,000 tonnes of oil.

The oil formed a slick reported to be about 10km long and five metres to 50 metres wide.

[collision, spill, environmental, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A storage sphere partially collapsed due to vacuum. The incident occurred during blending operations. Blending was immediately stopped and the sphere blocked in, the area was evacuated and nitrogen was introduced into the sphere to relieve the vacuum. The material in the sphere was transferred to a crude tank.

An investigation into the cause revealed that introduction and removal of flow natural gasoline to and from the sphere, which was not designed for a vacuum. [evacuation, design or procedure error]

---

**Lessons**

The following lessons were learned:

1. Vessels designed for a low pressure may not withstand a vacuum.
  2. Vacuum may be created by a number of factors including a high pumping out rate, lower ambient temperature, lower vapour pressure of the liquid in the vessel.
-

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 JULY, 1999. (<http://www.chemsafety.gov>).

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**Location :** Trainer, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 55-foot tank containing approximately 16,000 barrels of jet fuel exploded and burned at a refinery. Approximately 700,000 gallons of fuel burned for more than four hours before being brought under control. No deaths or serious injuries were reported.

[explosion, fire - consequence, refining]

---

**Lessons**

[None Reported]

---

**Source** : FIRE PREVENTION 325, OCTOBER 1999.

**Location** : Northamptonshire, UK

**Injured** : 6      **Dead** : 0

---

**Abstract**

A fire occurred at a plastics factory. The purpose built factory manufactured and stored plastic bottles for the food industry.

The building was evacuated and six people were taken to hospital, suffering from the effects of smoke inhalation.

It is thought that the fire was started deliberately by an unknown person.

[fire - consequence, deliberate acts, processing, storage, evacuation, injury]

---

**Lessons**

[None Reported]

---



Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Jet oil was seen to be shooting from a stationary tank in a continuous stream. The incident occurred due to valves on the tank being opened by vandals.

Approximately 150,000 litres of oil was released into the environment.

The valve designed to drain rainwater out and keep the bund at full capacity, had been left open and the oil was therefore able to run out and enter the ground.

The company was fined £10,000 and costs of £4,000 (2000).

[vandalism, spill]

---

**Lessons**

[None Reported]

---

Source : BBC NEWS, 7 SEP, 1998, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Up to half a million litres of diesel was spilt into a harbour when fuel escaped after vandals tampered with a tank. Around 600,000 litres were released. Much of the diesel was contained within a protective concrete barrier but some spilled into the harbour and a large quantity has soaked into the soil and drainage pipes.

About 24 fire fighters with four tenders and the fire brigade dinghy were on the scene to prevent anymore fuel from leaking into the water.

Two 100m booms were being used to contain the diesel in the harbour while absorbent mats were used to mop up on land.

No wildlife was thought to have been harmed as yet, but efforts were being concentrated on stopping any oil reaching a nearby beach and river.

[spill, ecological damage, vandalism]

---

**Lessons**

[None Reported]

---

10334September 1998

Source : BBC ONLINE NETWORK, INTERNET, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 6      Dead : 0

---

**Abstract**

Six workers were taken to hospital after a 100,000 gallon water tank collapsed and badly damaged a whisky plant.

Contractors were carrying out routine maintenance on the tank at a bottling plant when the accident happened.

The tank ruptured and flooded the whisky plant with thousands of gallons of water.

Considerable damage occurred, the pump room was destroyed completely and there was structural damage to some other buildings. The cause of the incident is not yet known.

[damage to equipment, processing]

---

**Lessons**

[None Reported]

---

10243September 1998

Source : BBC NEWS ONLINE NETWORK, 1998, (<http://www.bbc.co.uk>).

Location : , SPAIN

Injured : 50    Dead : 0

---

**Abstract**

Fifty people were injured when gas explosion occurred wrecking a café. Nearly 200 people were crowded into the café, when a propane gas tank exploded bringing down the roof and walls. Shards of glass and pieces of concrete were blown across the room, fortunately there were no fatalities. It is not clear what caused the gas tank to explode.

[near miss, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, JUNE 1999.

**Location :** , UK

**Injured :** 2      **Dead :** 0

---

**Abstract**

An explosion occurred at a plant when nitric acid leaked from a valve as it was being transferred from one container to another, and mixed with cleaning fluid to create an explosion which blew workers of their feet. Workers from a nearby petroleum plant were evacuated due to the formation of a gas cloud.

The company were fined more than £25,000 (1999).

[accidental mixing, contamination, evacuation, gas / vapour release, material transfer]

---

**Lessons**

[None Reported]

---

**Source** : FIRE PREVENTION 331, APRIL 2000.

**Location** : Gilberdyke, Humberside, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred in a factory warehouse where waste rubber was processed and remoulded into tyres.

At the time of the incident a worker was welding a bracket in a metal container and had burned through the container's metal wall, which resulted in sparks and molten metal falling onto the floor. The sparks and molten metal ignited diesel residue under an adjacent tank. The building was destroyed in the fire.

Estimated loss is thought to be £810,000.

[fire - consequence, damage to equipment, metal - molten]

---

**Lessons**

[None Reported]

---

12226 July 1998

**Source** : CHEMICAL HAZARDS IN INDUSRTY, FEBRUARY 2000.

**Location** : Oxfordshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An ink and varnish company was fined £10,000 (1999), for polluting a pond linked to a river with linseed oil.

An investigation into the incident found that the company's drainage system was full. A large volume of oil had collected in a bund protecting oil tanks.  
[pollution, human causes, processing]

---

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 16, 2000. (<http://www.chemsafety.gov>).

Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Harrisburg, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An ammonium hydroxide tank collapsed releasing an unknown quantity of the chemical. The cause is not known.

[spill, unidentified cause]

---

**Lessons**

[None Reported]

---



**Source** : HAZARDOUS CARGO BULLETIN, FEBRUARY 2000.

**Location** : Kalgoorie, AUSTRALIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A leak of sodium cyanide occurred from a tank container.

The incident occurred due to poor design and location of a pressure test nozzle, which led to the leakage of cyanide liquor from a tank container unloading liquid sodium cyanide.

The end frames of the container normally protect such nozzles but in this case the nozzle protruded over the top of the end frames. It is thought that the nozzle had been damaged when another tank container was lifted over this unit.

[spill, design inadequate]

---

**Lessons**

The owner of the tank container has subsequently redesigned the unit and all similar containers so that the pressure test nozzle does not protrude outside the body of the tank.

The company concerned has prohibited the practice of lifting containers over the top of tank containers.

---

10398May 1998

**Source** : BBC NEWS, INTERNET, 1998,  
(<http://www.bbc.co.uk>).

**Location** : Lake Issyk-kul, KYRGYZSTAN

**Injured** : 70+ **Dead** : -

---

**Abstract**

A road transportation incident. More than 70 people were taken to hospital with suspected cyanide poisoning, after nearly 2,000 kg of the chemical spilled into a river.

An emergency committee was set up to cope with the disaster as several hundred other people complained of feeling unwell. Around four thousand people were evacuated from the nearby village.

The sodium cyanide was being transported in cylinders to a gold mine when a truck carrying it crashed spilling its cargo.

The cyanide leaked into the river, which feeds the country's largest lake.

Sodium cyanide is used extensively in Central Asia as a separating agent in gold mines.

[evacuation, road incidents]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 JULY, 1999. (<http://www.chemsafety.gov>).

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**Location :** Clairton, USA

**Injured :** 2      **Dead :** 2

**Abstract**

An explosion occurred at a coal tar distillation plant killing two workers and injuring another two.

The explosion occurred during welding work on a pipe connected to a one million gallon coal tar distillation tank, which was out of service at the time of the incident.

[fatality, injury]

**Lessons**

[None Reported]

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A diesel fire occurred on a production platform as operators were filling the diesel tank for the essential generator. The operator noticed that it was taking too long to fill the diesel tank and began to check for a problem. He found that the float indicator on the diesel tank cover was reading three quarter full. He removed the level gauge to determine the exact fuel level which resulted in fuel spraying into the generator enclosure. The diesel oil contacted the generator exhaust which ignited the fuel.

The cause of this incident is related to the design of the fuel tank and filling system. The safe filling procedure relied entirely on the mechanical level gauge and the operators ability to judge when the tank was full. The design faults are as follows:

1. Inadequate level indication on the tank.
2. No high level alarm or switch.
3. No overfill protection to shut-off pump.
4. Gauge connection located inside enclosure.

[fire - consequence, material transfer, design inadequate, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , SINGAPORE

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred in a let down tank during installation work of a disperser and platform. Apparently, contractors were carrying out welding work to secure the position of the let down tank. After the intended welds an explosion occurred inside the tank, blowing off the manway cover and blowing a hole in the roof. There were no injuries.

An investigation found that:

1. The let down tank had been cleaned but not gas freed.
2. No welding work was anticipated by the supervising engineer and a hot works permit was not requested by the contractor.

[cleaning procedure incorrect, permit to work system inadequate, contractor error]

---

**Lessons**

[None Reported]

---

1041404 March 1998

Source : LOSS PREVENTION BULLETIN, 140, 23.; CONGLETON CHRONICLE, 6 MARCH 1998.; CONGLETON CRONICLE, 5 MARCH 1998.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred in a grain hopper, located within a mill building. The employees working in the mill at the time of the explosion all escaped without injury. Witnesses reported flames and clouds of blue-black smoke being emitted from the mill building after the explosion, which sent debris over a wide area around the mill, including the railway line, which was temporarily closed while checked for any damage caused to the track by flying debris.  
[silo/hopper, damage to equipment, milling, fire - consequence, solids processing equipment]

---

**Lessons**

[None Reported]

---

1109908 January 1998

Source : EAST ANGLIAN DAILY NEWS, 9 JANUARY, 1998.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred over four floors in a grain mill. Workers were evacuated and traffic held up as fire-fighters tackled the blaze.

When fire-fighters arrived they found about two tonnes of grain well alight in a silo. They had problems getting at the fire, and had to cut away sections of the silo and remove quantities of grain.

[fire - consequence, evacuation, silo/hopper]

---

**Lessons**

[None Reported]

---

1040408 January 1998

Source : LOSS PREVENTION BULLETIN, 139, 22.; THE CHEMICAL ENGINEER, 15 JANUARY 1998.

Location : Glasgow, UK

Injured : 14    Dead : 0

---

**Abstract**

Fourteen workers were injured by hot metal and chemicals after a tank exploded. Two suffered fractured ribs while others were showered with shrapnel from the ruptured tank sustaining cuts and burns. The incident occurred when the workers were repairing the six-foot high tank. A hairline fracture was suspected to have caused the failure following the pressurisation of the vessel.

[explosion, tank failure, material of construction failure, unknown chemicals, injury]

---

**Lessons**

[None Reported]

---



Source : LOSS PREVENTION BULLETIN, 139, 22.; THE CHEMICAL ENGINEER, 15 JANUARY 1998.

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

One fire fighter was injured and 3000 people evacuated following a fire at a fertiliser plant. The fire burned for over sixteen hours before being brought under control. The cause is still unknown, however the two explosions which rocked the plant are thought to have involved propane gas tanks.

Fire fighters chose not to douse the flames due to the fear that runoff water would pollute the nearby river. The site contained chemicals including, methyl bromide, ammonium nitrate, paraquat, endosulphan and carbofuran and 400 tonnes of ammonia nitrate bagged on-site. A decision was made to let the fire burn out most of the pollutants before finally being extinguished.

[injury, unidentified cause]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : Wales, UK

Injured : 12    Dead : 0

---

**Abstract**

An explosion and fire ball injured 12 workers at a plant. Contractors were working on roof trusses above the steel plant and steel production was being carried out when the incident occurred. A load of scrap metal was added to the process vessel when an explosion occurred. A fireball reached the men working on the roof. Two workers received 40% and 62% burns. It is thought that the cause of the incident was due to a bottle of liquid petroleum gas being included in the scrap bundle.

[fire - consequence, operation inadequate, processing, injury]

---

**Lessons**

[[None Reported]]

---

123791998

Source : CHEMICAL HAZARDS IN INDUSTRY, MARCH 2000.; RESPONSIBLE CARE REPORTS, DEC 1999, (17), 5.

Location : , USA

Injured : 0      Dead : 1

---

**Abstract**

A process plant operator was killed after falling 10m through the fragile roof of the tank area of a site's distillation plant.

The incident occurred when the operator walked onto the roof from an extension recently added to a scaffold on the inside of the plant. The extension to the scaffold, through a nearby window, had been added as possible means of access to both the roof and vent pipe.

Erection of the scaffold and its extension were not included in the permit to work system.

The operator was showing an engineer the arrangement for measuring fumes from the vent pipe, which opens to atmosphere 40 cm outside the plant wall.

It is not known why the operator approached the vent via the roof, rather than from the scaffold inside the distillation plant as intended.

[fatality, scaffolding, permit to work system inadequate, fatality]

---

**Lessons**

[None Reported]

---

104151998

Source : LOSS PREVENTION BULLETIN, 140, 23.; CNN.COM, U.S. NEWS, 15 FEBRUARY 1998.

Location :

Injured : 150 Dead : 0

---

**Abstract**

A rail transportation incident. More than 150 people suffered burns, 120 critically, after huge flames swept through a crowd of people following the collision of two petroleum tanker trains.

Most of the people were soaked in petrol because, prior to the explosion, they were carrying buckets laden with petrol to and from their houses. Some witnesses suggested the source of ignition was a cigarette from one of the crowd.

The cause of the collision of the two trains is not immediately clear.

[fire - consequence, gasoline]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A large oil spill (approximately 175 m<sup>3</sup>) occurred in a crude oil tank farm from two failed joints/gaskets. The failed joints/gaskets were at pipeline flanges on a 10 bar/150 psig section of the crude oil transfer line from the offshore production platform to crude tank at the refinery.

The flange joints/gaskets failed due to the transfer line being overpressured. The motorised inlet valve to the tank automatically closed following a spurious extra high tank level trip and this subjected the line to the maximum full discharge pressure of the offshore platform's main oil line pump. The line was not designed for the shut-in pressure.

The resultant spill of crude oil in the pipe trench was recovered using water and vacuum trucks.

The crude oil on the pig receiver slab was recovered in the oily/water sewer systems.

[joint failure, gasket failure, material transfer, refining]

---

**Lessons**

The report stated:

The implementation and continued integrity of process safety management systems must be assured through auditing and planned inspections

---

1040725 December 1997

Source : LOSS PREVENTION BULLETIN, 139, 23.; THE CHEMICAL ENGINEER, 15 JANUARY 1998.

Location : Bintulu, Sarawak, MALAYSIA

Injured : 12    Dead : 0

---

#### Abstract

An explosion occurred in an air separation unit on a distillate plant. Several major pieces of plant equipment were found approximately 1.3 kilometres from the site of the explosion.

This explosion was consistent with airburst energy of approximately 36GJ, one of the largest ever land-based industrial explosions.

The explosion occurred in a cryogenic distillation column, which generates gaseous oxygen and was not related to the distillate synthesis process technology.

The explosive rupture of the column was caused by the massive runaway combustion of sections of the aluminium plate fin type main vaporiser, which is located in the bottom of the low-pressure column above a large inventory of liquid oxygen.

The aluminium is presumed to have been ignited by combustible material, probably formed from hydrocarbons originating from the inlet air, which are assumed to have accumulated undetected on the aluminium surface from the liquid oxygen circulation through the closed sections of the main vaporiser.

The exact mechanism by which the combustion was triggered is at present unknown, and is under detailed investigation.

The fire occurred in two of fourteen product tanks, which contained naphtha and kerosene.

[distillation, fire - consequence, cryogenic equipment]

---

#### Lessons

[None Reported]

---

Source : LLOYDS LIST, 15 DEC, 1997.

Location : , USA

Injured : 1      Dead : 1

---

**Abstract**

A flash explosion occurred on a 6,000 gallon underground gasoline tank, which was being prepared for lining with fibreglass. One person was inside the tank and another by the 3ft by 3 ft manhole.

[storage tanks, fatality, entry into confined space, underground storage, injury]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Leaking chemical drums on an industrial site had triggered a fire on a lorry on which they were stored.

The police sealed off the area around the industrial estate and fire fighters were alerted. Two 25 litre drums, stored on the lorry parked overnight at the industrial estate, containing benzene and phosphorus oxydichloride had leaked. The chemical gives off toxic fumes when it is in contact with air and especially water.

The fire service, using special absorbent material which acts as an oil and chemical binder, transferred the leaking drums to larger drums which had been sealed.

It was confirmed that the spillage had been contained and that there was no threat to the environment.

[storage, fire - consequence]

---

**Lessons**

[None Reported]

---



8837 01 October 1997

**Source** : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

**Location** : , ENGLISH CHANNEL

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. 800-900 tonnes of palm oil leaked from a tank following a collision with a cargo ship in fog.  
[spill]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

Location : Alberta, CANADA

Injured : 0      Dead : 0

---

**Abstract**

A split of a weld joint led to the rupture of a 64,000 litter tank, a cloud of hydrochloric acid spread over 30 km, residents sealed up homes and stayed in doors.  
[material of construction failure]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, NOV. UPI.

**Location** : Illinois, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred due to an explosion of a forklift truck LPG tank. The fire swept through the warehouse which was storing cardboard and paper. Fire fighters prevented the fire from reaching the store.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

---

**Source :** ICHEME**Location :** ,**Injured :** 1      **Dead :** 0

---

**Abstract**

An ammonia tank was taken out of service in the July for its scheduled 3-year inspection and hydraulic pressure test. At that time, the opportunity was taken to replace valves A and B (part of a block and bleed system) on the steaming-out line to the tank. On August 13, during the first discharge of ammonia from a truck, an operator discovered valve B was leaking. He identified this valve as type suitable for steam but unsuitable for ammonia service. As a precautionary measure the tank was taken out of service with the ammonia depressured through a water drum to absorb the gas. At 09:00 hrs. on September 11, three contractors (including the supervisor) arrived to get their work permit signed and issued. The work to replace valves A and B involved the dismantling of the small diameter pipe that was fixed to the ammonia tank at flange 2. The Operator (Issuing Authority for the work permit) wrote on the permit form that the tank still contained ammonia vapours. He also informed the contractors that it would be necessary for them to wear breathing apparatus for all the work associated with the piping/valves to the tank. He did not, however, write this requirement on the permit form. At 14:00 hours, two of the three contractors (excluding the supervisor who was busy on another job) returned to disconnect flange 1. The contractor working on the flange wore breathing apparatus while the other stood by the breathing air gas bottle. While working on flange 2, the contractor's supervisor returned, put on breathing apparatus and assisted his colleague in removal of the pipe. The contractor's supervisor then decided to remove the leaded joint and clean it by scraping. At that moment he decided to remove his breathing apparatus (presumably to see more clearly) because he considered the atmosphere to be safe. As he bent down near the flange opening he was exposed to ammonia vapour. He was driven to the first aid station by one of his colleagues and transferred to hospital.

[unloading, gas / vapour release, safety procedures inadequate, permit to work system inadequate, asphyxiation]

---

**Lessons**

The issue of a work permit which, after all, is only a piece of paper does not by itself make a maintenance job safe. This is dependent upon the care and attention given by the Issuing Authority in the removal of known hazards and making certain that those performing the work are made fully knowledgeable of any remaining potential hazards and precautionary measures to be followed.

During any maintenance/repair work, replaced equipment or parts thereof must have exactly the same specification unless the modification is authorized under the Management of Change procedure.

Those who issue permits-to-work must be formally trained and certified as a competent Issuing Authority for a specific process area/unit.

Contractor's supervisors who act as a Performing Authority by accepting permits and the conditions for the work must be trained in this responsibility.

---

Source : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

Location : , THAILAND

Injured : 2      Dead : 3

---

**Abstract**

An explosion occurred on a small tanker during transfer of diesel oil from an unidentified tanker.

[material transfer, fatality]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

Location : , ARGENTINA

Injured : 12    Dead : 0

---

**Abstract**

An explosion occurred in a tank of non-gas free marine tanker in a dock for maintenance, the deck plating was ripped off.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, NOV, LLOYDS LIST.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion and fire occurred in a No.1 cargo tank of a barge loading toluene. The fire was extinguished in 15 minutes using foam agent.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

1137820 August 1997

**Source :** BLAYE DISASTER: SOME FACTS AND INTERIM CONCLUSIONS. SEBTI CHAABANE H&S UNIVERSITY OF BORDEAUX.

**Location :** , FRANCE

**Injured :** 0      **Dead :** 10

---

**Abstract**

A dust explosion occurred on the cereal plant when the 30 metre high, 54,000 tonne grain silo collapsed and buried everything on the ground under tonnes of grain and concrete. The cost to restart the plant is estimated at 7 to 8 million French francs (1997).  
[silo/hopper, fatality, operational activities]

---

**Lessons**

[None Reported]

---



**Source :** HAZARDOUS CARGO BULLETIN, 1997, SEP. IRISH TIMES.

**Location :** Mullagh, IRELAND

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire destroyed two plastics warehouses. The water used to extinguish the fire contained contaminants which killed 1,000 fish in a nearby river. Water supply was suspended.

[fire - consequence, ecological damage, warehousing]

---

**Lessons**

[None Reported]

---

7964 20 July 1997

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , INDIA

Injured : 0      Dead : 0

---

**Abstract**

A crude oil floating roof tank, which had not been in operation since 13 July 1997, was struck by lightning. Only a portion of the seal of the tank was damaged by a fire.

[fire - consequence, damage to equipment, storage]

---

**Lessons**

[None Reported]

---

8925 19 July 1997

**Source** : HAZARDOUS CARGO BULLETIN, 1997, SEP. OGJ.

**Location** : , PHILIPPINES

**Injured** : 0      **Dead** : 3

---

**Abstract**

An explosion occurred in an empty, unclean cargo tank of a product tanker.

[fatality, marine transport]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, SEP. LLOYDS LIST.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire destroyed a chemical storage tank containing a gasoline blending component, the cause was due to a lightning strike. At the time the tank was being emptied for maintenance. There were no injuries.

[fire - consequence]

---

**Lessons**

[None Reported]

---

1060016 July 1997

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

#### Abstract

Fuel oil spill from failed pipe. A routine transfer of heavy fuel oil was initiated. This was to move product from one tank to the utilities bunker tank. The pumping rate was approximately 1500 bbls/hr and the system was checked prior to shift change by the area operator.

During routine surveillance (after shift change) the area operator noticed a quantity of product within the drainage ditches inside the bunded area. Further investigations identified a leak from pipework underneath a road crossing. The transfer was immediately stopped and the system isolated.

Using tank dips it was estimated the spill was approximately 1000 bbls.

The area is bunded and penstocks have been fitted to protect the refinery surface water system from contamination should an incident like this occur. The vulnerability, particularly with

the age of some of the pipework, had already been recognised. The protection system worked well and the spill was contained within the drainage system inside the bund. There was no

product escape into any other area. Initially, a bowser was organised to recover product. This was replaced by a steam driven pump to speed up the operation. All oil was recovered back into the fuel oil component tankage.

It has been concluded that the pipework failure occurred due to external corrosion and that initial construction specification offered inadequate protection for the local environment.

[material transfer, design or procedure error]

---

#### Lessons

[None Reported]

---

8795 11 July 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location : , CANADA

Injured : 8      Dead : 0

---

**Abstract**

Hundreds of residents were evacuated when a fire occurred at a plastics recycling centre released dangerous levels of hydrogen chloride and benzene into the air. Eight fire fighters were injured. The fire started in a 71,000 sq. ft warehouse. It was estimated that about 1 M lbs of scrap plastic were stored in the warehouse.

[fire - consequence, evacuation, warehousing, injury]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location : , WALES

Injured : 5      Dead : 0

---

**Abstract**

A release of up to two tonnes of bromine occurred injuring five people and kept local residents confined indoors. Cloud of corrosive orange brown bromine fumes drifted across the nearby village and residents were warned to stay indoors and close their windows.

Fire fighters wearing protective suits and breathing apparatus took 90 minutes to bring the incident under control. Four staff suffered burns and one fireman was treated in hospital the next day. The release occurred when bromide entered a heated acid tank, vaporised and escaped through a vent, but why this happened is not yet known.

[leak, injury]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, AUG. REUTER.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 2

---

**Abstract**

A marine transportation incident. Two crew were found dead in a partially filled tank on a chemical ship, protective clothing inadequate.  
[safety procedures inadequate, fatality]

---

**Lessons**

[None Reported]

---



1135912 June 1997

Source : LLOYDS LIST, 13 JUNE, 1997,; CHEMISTRY IN BRITAIN AUGUST, 1997.

Location : , UK

Injured : 4      Dead : 0

---

**Abstract**

A fire occurred at an ink blending factory.

Hundreds of people were evacuated after a massive fire at a chemical plant when drums of printing inks exploded sending black clouds over the town. All 3 production units destroyed.

An investigation into the incident found that the probable cause of the fire was due to a faulty heater.

The fire destroyed 50% of the building and approximately 100 tonnes of printing ink, 90 tonnes of varnish and 30 tonnes of solvent.

A loss of £1.17 M (1997) was estimated.

[fire - consequence, explosion, evacuation, damage to equipment, mechanical equipment failure, normal operations, injury]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, AUG. TRADE WINDS.

Location : , TURKEY

Injured : 0      Dead : 4

---

**Abstract**

A marine transportation incident. An explosion occurred in a tank on a marine tanker the cause was due to welding operations during repairs on a "gas free ship" at anchorage.

[hot surface, fatality]

---

**Lessons**

[None Reported]

---

1198124 May 1997

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

Cleaning operations were being carried out on an acetyl chloride drum. Residual acetyl chloride reacted with the water releasing hydrogen chloride and acetic acid. The drum exploded across the yard, puncturing a drum of ethyl acetate. No ethyl acetate was lost. A worker was injured in the incident, receiving burns.

[drums, explosion, unwanted chemical reaction, injury]

---

**Lessons**

[None Reported]

---

**Source :** HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

**Location :** , SINGAPORE

**Injured :** 0      **Dead :** 0

---

**Abstract**

A large part of a waste treatment and tank cleaning depot was destroyed by fire due to a burst incinerator exhaust pipe igniting vapours.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source :** HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

**Location :** , SOUTH KOREA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A marine transportation incident. A container ship collided with a 2,850 gt cargo ship and then sank with 48 containers on board.

[sinking]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

**Location** : Karachi, PAKISTAN

**Injured** : 0      **Dead** : 10

---

**Abstract**

An air transportation incident. An explosion occurred when a plane jettisoned two laden fuel tanks over a populated area, the plane had engine trouble.  
[fatality, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

Location : , CANADA

Injured : 0      Dead : 0

---

**Abstract**

A rail transportation incident. A fuel tank of a locomotive punctured by part of a swing bridge mechanism while crossing the bridge, 12,000 l of diesel oil spilt into the river.

[spill, collision]

---

**Lessons**

[None Reported]

---

8988 06 May 1997

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

**Location** : Houston, USA

**Injured** : 7      **Dead** : 0

---

**Abstract**

An anhydrous ammonia release occurred. The incident occurred when a 150 lb cylinder of anhydrous ammonia ruptured.

[spill, injury]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a powder degassing bin on a petrochemical plant. This resulted in shut-down of production for 12 days and extensive damage to the bin. This was despite correct operation of the bursting discs protecting the system following an initial explosion. The damage was caused by the subsequent fire. The decision was made not to recommission the damaged bin and only operate with the remaining units in the medium term. No evidence was found for abnormal operation prior to the incident or for production of increased quantities of powder fines. The investigation blamed a weak powder explosion caused by an incendive discharge. It was found that some of the socks fitted to the degassing bin bag filters were of the wrong material. These were specified as containing 5% of conductive threads. Examples were found with both 0% and 2%. The material had been changed by the supplier without notification. There were also weaknesses in the earthing arrangements of the damaged bin. Some internals were also found to be missing from valves on the discharge side of the degassing blower. Finally some inadequacies were found in the emergency standing orders which led to nitrogen not being used to quench the fire. There was also some delay in alerting the site Emergency Response Team.

[fire - consequence, plant shutdown, damage to equipment, operation inadequate, design or procedure error, normal operations, container

---

**Lessons**

1. Purchasing arrangements were inadequate to ensure supply of technically correct material and should be improved.
  2. The reliance on conductive content, even if it had been adhered to, was not enough to ensure performance. A standard measure of resistivity was needed.
  3. The emergency standing instructions should be improved to cover fires.
  4. The bursting discs operated correctly.
  5. The response of the operating team and respective fire services was satisfactory.
  6. There was some confusion in alerting the site Emergency Response Team.
-

Source : HAZARDOUS CARGO BULLETIN, 1997, AUG. UPI.

Location : , INDIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred at a dye factory, forensic experts are investigating bomb reports, the explosion is believed to have been caused by a cooking gas cylinder.  
[terrorism]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , CHINA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An explosion occurred when unauthorised welding set fire to a vat of paint. A large tank of chemically polluted water also exploded.  
[fire - consequence, human causes]

---

**Lessons**

[None Reported]

---

**Source** : CNN INTERACTIVE, US NEWS STORY PAGE, JULY, 1997. THE ASSOCIATED PRESS, (<http://www.cnn.com>).

**Location** : Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion occurred at a refinery causing at least two tank fires. No injuries were reported.

It was not known what was burning so nearby residents were warned to stay in doors because of smoke from the blaze.

[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

Location :

Injured : 0      Dead : 0

---

**Abstract**

Three propane gas cylinders exploded on a rooftop scattering debris into the street below. No one was injured.  
[explosion]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

Location :

Injured : 0      Dead : 0

---

**Abstract**

A gas cylinder exploded in a van taking the roof off. The incident happened when bitumen which was being heated for road repair work overflowed and set the van alight. The workers had placed a drum containing bitumen on a gas ring to heat while they carried out road resurfacing work.

[explosion]

---

**Lessons**

[None Reported]

---

11665May 1997

Source : TANKER CASUALTY REPORT NO. 21, TANKER CASUALTY DATA EXCHANGE SCHEME, INTERNATIONAL CHAMBER OF SHIPPING, LONDON.

Location : ,

Injured : 0      Dead : 0

---

#### Abstract

A marine transportation incident. An explosion occurred on a ship at sea whilst it was transferring dirty ballast. No one was injured.

The ship was proceeding in ballast after having discharged a cargo of crude oil. Four holds contained dirty ballast, two holds clean ballast and the remaining empty holds had been cleaned. Dirty ballast was being discharged from a hold which was three-quarters full when an explosion occurred which blew the open hatch covers overboard and caused slight damage to the hatch conning. There was a force 6 wind blowing with rough seas and the ship rolling at the time of explosion (0702 hours).

No definite cause for the explosion was apparent. The possibility of a spark generated by steel to steel friction was discounted. It was concluded that a charged mist and charged water slugs may have formed which on discharge could have caused a spark.

The accepted approach regarding gas concentrations in tanks was that an overrich atmosphere was safe because it was not within the flammable range.

Overrich atmospheres are, however, difficult to maintain with any reliability in tanks. Accurate gas measurements now indicate that this assumption may be erroneous and consequently the atmosphere in the tank at the time of the explosion was probably within the flammable range and therefore adequate to propagate an explosion.

[material transfer]

---

#### Lessons

1. The operational procedures for the discharge of ballast and tank cleaning were changed following the accident. The assumption that an overrich atmosphere is safe is not now accepted and tanks are now kept gas free during operations. This is achieved by ventilating with fans throughout the discharging and cleaning operations. Measurements are taken at regular intervals to ensure that the atmosphere is below the lower explosive limit.

2. Following the accident, a recommendation was issued by the International Chamber of Shipping to the effect that OBO type ships should be operated in such a manner as to avoid slack tanks, thus obviating the possibility of ignition by compression or by static electricity.

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, JUL.

**Location** : Renfrewshire, UK

**Injured** : 1      **Dead** : 2

---

**Abstract**

An explosion and fire occurred killing two workers and seriously injured a third. Investigation suggests that a metal part of a test-probe, which was being inserted into a ring main unit, possibly to check for a fault on an 11kV cable, became detached and fell into live busbars at the bottom of the oil tank within the unit. This could have caused an internal short circuit leading to the explosion and fire.

[fire - consequence, fatality, injury]

---

**Lessons**

Users of oil filled ring main units are advised to ensure that the test probes are verified and maintained at all times.

---



**Source** : HAZARDOUS CARGO BULLETIN, 1997, AUG. OSIR.

**Location** : Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A storage barge at a production facility spilled 55,000 litres of crude when the flow valve to an adjoining tank was shutdown. Cleanup recovered 47,000 litres.  
[container, crude oil]

---

**Lessons**

[None Reported]

---

9003 01 April 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location :

Injured : 12    Dead : 0

---

**Abstract**

A road transportation incident. Two road transport trucks collided, spilling 200 litres of caustic soda from three drums. Twelve people were treated for burns.  
[collision]

---

**Lessons**

[None Reported]

---

8998 25 March 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location : New Jersey, USA

Injured : 2      Dead : 0

---

**Abstract**

An explosion occurred in the facility plant. A container of diazidostilbene disodium sulphonate, a photographic chemical exploded.

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, FEB, 1997.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Six hundred litres of hydrofluoric acid, sulphuric acid and phosphoric acid was spilt from a tank. A drain to the local water supply had to be blocked off as a result of the incident.

[spill, pollution, operational activities]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , FRANCE

Injured : 1      Dead : 0

### Abstract

A mechanic was exposed to H<sub>2</sub>S (hydrogen sulphide) during maintenance work on a slops/drain tank at a de-sulfurizer unit. The maintenance work involved the removal of a submerged pump followed by the installation of a full face flange cover at the pump entry nozzle on the top of the vessel. The nozzle is 27 inch diameter and the blind flange contained 28 bolts. Four out of the 28 bolts had been fitted to the full face blind/cover when plant operations agreed with a mechanic to recommission the vessel. However, in order to engage the remaining 24 bolts, the flange seal had to be adjusted which required the loosening/unfastening of the existing four bolts. It was during this task that the mechanic who was assisting others on the job was exposed to H<sub>2</sub>S as it escaped from the released flanged cover. The mechanical supervisor (Team Leader) was unaware that the vessel had been recommissioned. A number of the systems drain into the vessel including liquid from a compressor's suction side knockout pot. The level controller on this knockout pot initiated a H<sub>2</sub>S rich hydrocarbon liquid discharge into the vessel just at the time the flange cover seal was loosened. The mechanic, after a brief period of unconsciousness, was transferred to hospital for treatment and observation which resulted in 10 lost workdays.

The basic cause was a breakdown in the planning, communication, coordination and control of the job particularly related to the effectiveness of the work permit system and associated safety rules.

A number of contributory factors were associated with the incident:

1. There was a requirement to keep this vessel in operation because it collected drains from critical equipment, e.g., the liquid from the knock out drum on the suction side of a compressor.
2. The tasks suffered too many delays which required the vessel to be put back in service each time these occurred.
3. The delays related to planning (scaffolding not completed, crane not available, cover plate in poor condition, size of bolts) and the breakdown of equipment (pneumatic bolting machine)  
[leak, asphyxiation, management system inadequate]

### Lessons

The effective application of a permit-to-work prevents:

1. Tasks being undertaken at the wrong time.
2. Ignorance of the risks involved.
3. Ignorance of the necessary precautionary measures to be followed.
4. Possibility for miscommunication on matters associated with the job between the parties involved.

**Source :** LOSS CONTROL NEWSLETTER, FEB, 1997.

**Location :** , CHINA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transportation incident. 1540 lbs of cyanide may have entered a near-by river after a truck carrying 200 drums plunged into it. Nearly 0.5 million people were warned against drinking the water.

[spill, loss of control, cyanide product]

---

**Lessons**

[None Reported]

---

3204 18 March 1997

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An incident at a coatings plant. A let-down tank containing a white spirit based resin, overflowed by approximately 800 litres. The site was evacuated and the spillage cleared.

The level in the tank was controlled by a PLC. The PLC had correctly opened the inlet valve to the tank, but the incident happened when the valve failed to shut. It was discovered that the controller on the valve had drifted out of calibration.

[evacuation, valve failure]

---

**Lessons**

Data store to check and calibrate controllers.

Install additional valves to this, and other tank inlets and hard wire from high level switches.

---

1197712 March 1997

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A static discharge occurred whilst a solvent with a flash point of -2degrees C, was being transferred to a drum. This caused ignition of the drums contents, the fire spread to two adjacent drums. The fire was quickly extinguished.  
[material transfer, fire - consequence]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

The failure of a tank discharge pump caused a tank containing acetic acid and anhydride, to overflow into its bund. The standby pump was started. However a leaking flange required the level in the bund to be controlled by pumping out into road tankers, and to discharge approx 40 to 50 tonnes to trade effluent. This was contained at the water works, with no resultant spillage to the local river.

[pump failure, near miss]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of 12,000 litres of methyl ethyl ketone occurred from an 100,000 litre tank. Spillage covered with foam to suppress vapours. A nearby factory had to be evacuated during the incident.

[evacuation, environmental]

---

**Lessons**

[None Reported]

---

8799 27 January 1997

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location** : Buckinghamshire, UK

**Injured** : 1      **Dead** : 0

---

**Abstract**

A drum containing polyester resin exploded causing slight injury. The employee who was wearing suitable protective clothing suffered minor burns. He had been working removing the tops of barrels with a flame cutter and had successfully removed three lids the fourth exploded due to a build up of styrene vapours.

[explosion, hot work, container, hot surface, vapour cloud explosion, injury]

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 136, 26.

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

A company has been fined and ordered to pay costs totalling almost £4,000 (1997) after a barrel containing hazardous fumes exploded and injured an employee. The incident occurred when an employee was removing the tops of barrels with a flame cutter. The employee had removed the tops of three barrels, which had once contained a polyester resin, with no problems. But when he applied the torch to a fourth, which still contained styrene vapour, there was a loud bang. The top of the 205-litre drum, measuring about two feet in diameter and weighing about 2.7 kilos, was ejected and flew past the employee, landing 70 m away on top of a house. The employee suffered minor burns but was wearing suitable protective clothing.

[explosion, drums, safety procedures inadequate, hot work, injury]

---

**Lessons**

[None Reported]

---

9055 25 January 1997

Source : CNN.COM, U.S. NEWS, (<http://www.cnn.com>).

Location :

Injured : 12    Dead : 0

---

**Abstract**

An explosion occurred at a 400,000 tonne middle distillate synthesis plant causing severe damage to the plant. Two production tanks, one containing naphtha and the other kerosene were set on fire as a result of the explosion, the remaining eight product and two sludge tanks were cooled off to prevent any further possible spread.

The plant produces various products ranging from distillates to waxes, averaging 1,200 tonnes per day.

[damage to equipment, distillation]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , GERMANY

Injured : 0      Dead : 0

---

**Abstract**

An incident at an acrylics manufacturing plant. An upper tray in a steam stripping column shifted. This was normally prevented by regular cleaning measures, but routine cleaning was not scheduled for a further two months.

As a result of the shift and subsequent blockage, inflowing filtrate containing acrylonitrile escaped from the system and leaked into a bunded area. The level in the bund rose such that the contaminated water leaked into an adjacent waterway and into the nearby river.

The local fire brigade attended the scene and pumped the water out of the bund and into a container.

The local County Council and Water Authority were notified.

[flow restriction, spill, processing, environmental]

---

**Lessons**

Change of cleaning routine from 6 to 4 months.

---

Source : HAZARDOUS CARGO BULLETIN, 1997, MAR.

Location : Lahore, PAKISTAN

Injured : 100+ Dead : 20

---

**Abstract**

A road transportation incident. A leak of poisonous gas occurred, the gas believed to be chlorine, leaked from drums loaded inside two containers which were being carried on a lorry that slid into a ditch. It is believed that the safety valves on the drums had not been tightened properly and loosened as the truck slid into the ditch.

The leak lasted for several hours until the area was flooded the area to dissipate the gas. 1,000 people were evacuated into nearby schools. Police in gas masks eventually removed the containers.

[evacuation, fatality, injury]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , PAKISTAN

Injured : 200 Dead : 20

---

**Abstract**

A road transportation incident. Chlorine gas leaked from drums loaded inside two containers on a lorry which slid into a ditch. It is believed that the safety valves on the drums had not been tightened properly and loosened as the truck slid into the ditch.

[gas / vapour release, design or procedure error, fatality]

---

**Lessons**

[None Reported]

---



Source : LLOYDS LIST, 3 JAN, 1997.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

About 336,000 gallons of propylene oxide was being transferred from a barge to a 535,000 gallon tank when a fire erupted. The fire was contained to the tank and extinguished in an hour.

[material transfer, marine transport, fire - consequence]

---

**Lessons**

[None Reported]

---

**Source :** LOSS PREVENTION BULLETIN, 134, 25.

**Location :** ,

**Injured :** 0      **Dead :** 1

---

**Abstract**

A maintenance assistant was working with a filter in silo used to store wood chips. The chips, produced by a chipping machine from broken pallets and waste wood, were loaded into the top of the silo by a charging conveyor, suspended vertically, moved up and down within the silo equalising the level of the contents.

To gain access to the upper end of the charging conveyor, the employee rode the equalising conveyor to the top of the silo. As it was lowered back down, it started automatically, and he became trapped between the conveyor's slats and a drive shaft. Rescue was carried out by the emergency services, but the employee died later from internal injuries. Fatality.

[silo/hopper, storage]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

**Location :** ,

**Injured :** 0      **Dead :** 0

---

**Abstract**

Approximately 120,000 litres of hydrochloric acid leaked from two linked tanks into a bund compound and storm drains. Polluted water containing acid from the drains was pumped to the foul sewer drains and treated at a local sewage work. The majority of the spillage has been diluted and contained in a storm overflow tank, a neutralising chemical will be added to this liquid, once neutralised it will be pumped through the surface system. There is no threat to local drinking supplies.

[drains & sewers]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

**Location :**

**Injured :** 7      **Dead :** 0

---

**Abstract**

A safety valve burst on a 1100 litter distillation tank, spraying paint stripper over an industrial estate.

[safety equipment failure, spill, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :** ,

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of timber preservative occurred causing pollution of a watercourse. The chemical spill should have been contained within a bund but the bund was unlined and the preservative leaked into the watercourse killing aquatic life.  
[ecological damage, unknown chemicals]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :**

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of a herbicide (fluroxypyr) occurred contaminating a water course. A leaking container of fluroxypyr had been stored in an area which had been thought to be isolated from surface water drains. This was not the case and the drains fed to a nearby stream. Levels of 21,5 mg/l of fluroxypyr were detected in the water.

[storage, drainage system, ecological damage, leak]

---

**Lessons**

[None Reported]

---

Source : THE SAFETY AND HEALTH PRACTITIONER, APRIL, 1997.

Location : , UK

Injured : 0      Dead : 1

---

**Abstract**

A fire fighter saved the lives of two men when he died in a chemical quick sand in a silo. The two workers had entered the silo through a small hatch to carry out cleaning operations but had become trapped when encrusted in soda ash on the sides of the silo had come down like an avalanche. The fire-fighter wearing breathing apparatus tried to enter the hatch but was unable to do so because of the size of the cylinder on his back so therefore entered without breathing apparatus. The fire-fighter stood for 45 minutes on an internal ladder reassuring the trapped men while his colleagues arranged for a hole to be cut in the side of the silo. But when a further fall of ash covered one mans head, he abandoned the ladder and crossed the ash surface to dig away ash with his hands. In a matter of seconds he had disappeared below the surface and died from asphyxiation. Shortly afterwards, the two men were rescued.

[fatality, silo/hopper]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

**Location :** , UK

**Injured :** 1      **Dead :** 0

---

**Abstract**

A water supply station has been closed following contamination of a nearby stream with lindane. An open drum containing 20lbs of lindane powder was found in the stream. A woman who put her hands in the stream was burned and dead fish have been found. An emergency clean-up operation has been carried out.

[ecological damage, burns, drums, leak]

---

**Lessons**

[None Reported]

---



**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :** ,

**Injured :** 3      **Dead :** 1

---

**Abstract**

A decommissioned boiler that was being removed from its supports started rolling. A lug on its side gashed a hole in a cylinder of propane gas. The gas ignited and the cylinder exploded. Four men were severely burnt and one of them died as a result of his burns.

[decommissioning, explosion, fatality]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :**

**Injured :** 0      **Dead :** 0

---

**Abstract**

A catalyst-containing supply vessel exploded during transfer of solution to another vessel.

[material transfer, explosion, container]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :**

**Injured :** 0      **Dead :** 0

---

**Abstract**

A tank of epichlorohydrin was discharged into the wrong holding tank causing an explosion.

[material transfer]

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

**Location** : Texas, USA

**Injured** : 2      **Dead** : 8

---

**Abstract**

An explosion occurred at a metal fabricating plant. The accident happened when workers uncapped a nitrogen tank scheduled for maintenance. The tank was one of sixteen containing either water or nitrogen scheduled for maintenance and should have been un-pressurised. Instead the tank turned out to be under 5000 PSI pressure and the force of the blast blew through the roof of the facility.

[high pressure, fatality]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, NOV.

**Location** : Kondinin, WESTERN AUSTRALIA

**Injured** : 0      **Dead** : 1

---

**Abstract**

A road transportation incident. Correct packing procedures helped reduce the impact of the rollover of a semi-trailer. The trailer was carrying four 205 litter drums of nitric acid and four cases containing six 500ml bottles of hydrofluoric acid. The severity of the incident was minimised due to the fact that the load had been secured as required and all the dangerous goods were found to be in approved packaging.

There was some spillage of nitric acid but the cases containing hydrofluoric acid were not damaged during the incident. However, the death of the driver contributed to delays in identifying the type of products involved and the extent of the spill. In addition, a number of other factors delayed the response of emergency services.

1. The incident occurred at night in an isolated and remote location.
2. The truck was not required to display placards because of the small quantity of dangerous goods on board.
3. Shipping documents could not be recovered due to damage sustained to the driver's cab.

[fatality]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Yosu, SOUTH KOREA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. A marine crude tanker with 250,000 tonnes crude oil on board struck dolphin causing spillage of 300 tonnes from punctured side tank.

[collision]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , SWEDEN

Injured : 0      Dead : 0

---

**Abstract**

A dangerous occurrence at a coatings plant.

An operator was removing a plug that was attached to a ball valve, in order to decant water from a toluene storage tank. The operation was being carried out at night in a poorly lit area. The operator did not realise that he was inadvertently disassembling the valve.

The ball valve started to pass and 18 tonnes of toluene spilt into the tank bund. This was later pumped away to containers.

[maintenance, storage tanks, spill, maintenance inadequate]

---

**Lessons**

The following recommendations were made:

1. Engineering measure to change drainage system 2. implemented.
  3. Spillage procedures to be improved.
  4. Improved instruction for weekend responsible supervisors.
-

Source : OIL AND GAS JOURNAL, 1996, NOV, 25.

Location : , MEXICO

Injured : 4      Dead : 19

---

**Abstract**

An explosion occurred in a gasoline storage tank attributed to faulty valve. About 100,000 bbl of leaded and unleaded gasoline burnt out of control for more than 36 hours, destroying 2 of 6 storage tanks. More than 5,000 people were evacuated from adjacent residential area. Fatality.  
[fire - consequence, evacuation, valve failure]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , FRANCE

Injured : 0      Dead : 0

### Abstract

An off-site crude unit charge pump operating in parallel with another, caught fire from the mechanical seal about one and a half hours after a common alarm had sounded. The initially small fire spread to the adjacent pumps and the crude unit was shut down for 24 hours until one of the pump's electrical wiring and instrumentation could be repaired. The cause of the vibration leading to the seal failure is either motor bearing failure or coupling failure due to loss of alignment, and there was evidence of cavitation an hour before the initial vibration alarm.

On this refinery the Crude Distillation Unit control room is fed from three identical crude oil feed pumps (A), (B), (S) located off-site in the crude tank farm area about 1 km from the unit. In normal operations two pumps are running in parallel with one spare. Each pump is fitted with a common alarm for six bearing temperatures (two on the electric motor, four on the pump itself) and a vibration detector. At the time of the incident (A) and (S) were running. Analysis of flow recordings and tank levels shows a reducing flow rate as tank level (1) fell. This was a usual event and the new tank (2) was placed in service at 05:50 hrs., about an hour before the first common alarm. Vibration analyser charts show evidence of cavitation in (S) at 05:50 hrs. and this disappeared after the tank change. The common alarm sounded in the control room at 06:48 hrs. Because no vehicle was available and because the alarms were considered unreliable, it was left to the day operator to check the alarm on his rounds, about one and a half hours later. By this time the pump operation had deteriorated seriously, crude was leaking and the fire developed. It was promptly extinguished by the fire crew but the crude unit was shut down until the electrical wiring for one of the other pumps was restored allowing start-up.

Two potential immediate causes have been identified. These are:

1. Rupture of the coupling membranes.
  2. Failure of the bearing on the coupling side of the motor due to lack of oil or mechanical misalignment.
- [fire - consequence, mechanical equipment failure, excessive vibration, design or procedure error, fire - consequence, refining, pump bearing, plant shutdown, lubrication failure]

### Lessons

The following recommendations were made:

1. Operators must respond to alarms, no matter if they may be nuisance alarms.
2. Equipment does have a limited performance capacity, and operating at extremes places operations at risk.
3. Monitoring devices must be maintained in proper working order, especially those for remote operating areas where operator surveillance is less frequent.
4. Mechanical integrity must be maintained by use of the correct part of the equipment, as designed by the equipment supplier.

8648 November 1996

Source : LLOYDS LIST, 1996, NOV, 13.; THE GUARDIAN, 1996, NOV, 11.

Location : , MEXICO

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred at a fuel storage facility after explosion in tank containing gasoline. A second tank was also involved. 1000 people evacuated.

[fire - consequence, evacuation]

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 136, 26.

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

A company has been fined £1,000 (1996) and ordered to pay £2,500 (1996) costs after a skip container being removed by a railway crane fell onto an employee, causing serious injuries.

[safety procedures inadequate, injury]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME

**Location :** ,

**Injured :** 0     **Dead :** 0

---

**Abstract**

A small explosion occurred on a hot dip tank. It is thought that the incident occurred due to the tank's extraction system was connected into an inactive ventilation system during the changeover to new spinning machines.

There were no injuries nor loss in production.

[design or procedure error]

---

**Lessons**

[None Reported]

---

8636 01 September 1996

Source : LLOYDS LIST, 1996, SEP, 3.

Location : Antwerp, BELGIUM

Injured : 0      Dead : 0

---

**Abstract**

Warehouse of polyethylene caught fire and collapsed.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Spill during the transfer of tank bottoms at a refinery.

During a planned transfer of tank bottoms from one tank to another, the hose attached to the pump outlet separated from its flanged connection, releasing a significant amount of tank bottoms. It was found that the non-return valve was fitted in the line the wrong way which created a pressure build-up and led to the hose separating from the flange. In addition, the equipment was not operated in the manner in which the designers and suppliers had intended, and there was no pressure relief in the system using positive displacement pump. The cause was due to the incomplete training of the labour crew since tank bottoming practice had changed requiring flanged fittings and assembly of reducers and a non-return valve onto the tank valve flanges. No training was provided on the set up and operation of the compressor/pump facility. Inadequate policies, procedures, evaluation of loss exposures, specification of design criteria, and evaluation of changes also contributed to this incident.

[material transfer, valve failure, refining]

---

**Lessons**

The scenario demonstrates clearly how one wrong item in a chain of events, i.e., the reverse fitting of an NRV led to the incident.

There are probably lessons that all sites can learn; essentially better communication and control of contractor operations.

---

Source : THE GUARDIAN, 1996, AUG, 8.; CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : , UK

Injured : 0      Dead : 2

---

**Abstract**

An explosion and fire destroyed an adhesives factory. The incident occurred whilst workers were emptying 205 litre drums containing highly flammable liquids into a 1500 litre vessel by hand. The company was fined £100,000 (1999). Three years previously, the company had begun risk assessment, but had never completed it.

[processing, fatality, material transfer, fire - consequence, safety procedures inadequate]

---

**Lessons**

The case highlights the need to comply with Management of Health and Safety at Work Regulations 1992. (Chemical Hazards In Industry, Sept 1999).

---

8621 06 August 1996

Source : LLOYDS LIST, 1996, AUG, 9.

Location : , FRANCE

Injured : 1      Dead : 0

---

**Abstract**

A fire caused by an explosion in an agricultural chemicals storage depot sent a toxic cloud over the town.

[fire/explosion, fire - consequence, gas / vapour release]

---

**Lessons**

[None Reported]

---



8618 22 July 1996

**Source** : LLOYDS LIST, 1996, JUL, 22. LOSS CONTROL NEWSLETTER, ISSUE 3, 1996.

**Location** : Ontario, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Lightning struck a gasoline additive (raffinate) storage tank and blew off the roof. The tank contained 8.2 million litres.

The fire took 7 hours to extinguish. 300 evacuated.

[evacuation, raffinate]

---

**Lessons**

[None Reported]

---

8617 19 July 1996

**Source** : LLOYDS LIST, 1996, JUL, 22.

**Location** : Barcelona, SPAIN

**Injured** : 1      **Dead** : 0

---

**Abstract**

An explosion occurred in a packaging warehouse.

[packaging equipment, warehousing]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

A pipeline connecting 3rd and 4th stage suction drums on a cracked gas compressor on an ethylene plant was being modified as part of a series of wider plant modifications, using contractors. After new pipework had been prepared and positioned a welder struck an arc to complete welding, when there was a detonation. The source of the fuel for the explosion was gasoline from residual pockets of hydrocarbons which had evaporated from the cracked gas system and migrated into the line under modification. The total mass of fuel estimated to have been in the line was 48 grams. the welder was only slightly injured, and others working in the vicinity were unharmed.

Investigation showed that there had been failure to observe fully the permit to work and hot work systems in the factory; and that there had also been a failure to ensure that the part of the plant on which welding was to take place had been effectively isolated and purged.

[permit to work system inadequate, injury]

---

**Lessons**

The following lessons were learnt:

1. This incident classically illustrates the risks associated with hot work on plant and vessels in which flammable substances might be found, and emphasises the need for rigorous observance of adequate operational precautions.
  2. Although there were clear operational failures in this case, investigation of the incident led to analysis and modification of the company permit to work systems, with the objective of increasing the protection afforded by them.
-

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A sudden emission of some 33 tonnes of hydrocarbon vapour from a floating roof crude tank occurred at a refinery. The release was caused by an uncontrolled heat input to the steam coils in the tank, which contained a mixture of crude oils and a considerable amount of wet process unit slops. This event was potentially catastrophic. When the cause of the emission was discovered, a full emergency response situation was declared, the tank was isolated from the steam supply and cooled to bring it back into a safe condition.

[gas / vapour release, floating roof tank, process causes, refining, design or procedure error]

---

**Lessons**

[None Reported]

---

8613 08 July 1996

**Source** : LLOYDS LIST, 1996, JUL, 10.

**Location** : Gebze, TURKEY

**Injured** : 0      **Dead** : 0

---

**Abstract**

An fire occurred on an ethyl alcohol storage tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Compressor flywheel failure. A north recycle hydrogen compressor was started after several unsuccessful attempts. Within seconds, the two cast iron flywheels disintegrated, launching missiles in all directions. It was found that the compressor had been started in a wholly unsatisfactory condition: the flywheels were cracked and the compressor cylinder was badly fouled. The cause of this incident was a failure to devise and implement appropriate mothballing measures to ensure the unit would be available to meet future production needs. In addition there had been deficient design, particularly in the design of the key-way, and the machine design long predated current design tools.

[mechanical equipment failure, standards inadequate, start-up]

---

**Lessons**

Idle process plant must be carefully preserved if it is to be safely used in the future.

Even the most familiar tasks can present unexpected hazards, especially if carried out under unusual circumstances.

---

8608 03 July 1996

**Source** : LLOYDS LIST, 1996, JUL, 5.

**Location** : Ohio, USA

**Injured** : 5      **Dead** : 8

---

**Abstract**

A fire engulfed a firework store caused by arson. Fatality.

[fire - consequence, fireworks, storage]

---

**Lessons**

[None Reported]

---

8623 22 June 1996

Source : THE GUARDIAN, 1996, JUL, 23.

Location : Nebraska, USA

Injured : 15    Dead : 1

---

**Abstract**

An explosion occurred at a sugar factory which damaged 7 silos and scattered sugar over a wide area. Fatality.

[damage to equipment, storage, silo/hopper, processing]

---

**Lessons**

[None Reported]

---



8609 14 June 1996

**Source** : LLOYDS LIST, 1996, JUL, 5.

**Location** : Samara Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Oil in two settling tanks attached to pipeline caught fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

8599 14 June 1996

**Source** : LLOYDS LIST, 1995, JUN, 17.

**Location** : Gothenberg, SWEDEN

**Injured** : 0      **Dead** : 0

---

**Abstract**

During the preparation for loading a tank container with ethylene diamine, the tank container overturned and landed on its side. Small leak found on the tank.

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 3, 1996.; HEALTH AND SAFETY AT WORK JUNE 1997.

**Location** : Huddersfield, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion occurred causing the roof of a plant to be blown off. This was due to overpressurisation of the reactant tank.

The firm was fined £50,000 (1996) after an explosion demolished half of its premises. The reactor explosion happened after added a chemical nitrosyl sulphuric acid which was too low for it to react. He turned off the reactor's cooling water when he thought the process was complete. The temperature actually built up until the explosion occurred from a runaway reaction. The reactor top went through the roof and landed 100 metres away. The base went downwards through one floor and embedded itself in the concrete floor below. A previous incident in August 1995 2 tonnes contents of the reactor erupted through the lid at 270 degrees C.

[reactors and reaction equipment, methyl nitrophenol, runaway reaction, processing, methyl nitrophenol, nitrosyl sulphuric acid]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY NO: 1, JANUARY 1998.

Location : , GERMANY

Injured : 0      Dead : 0

---

**Abstract**

A release of contents of a pressure vessel occurred when a longitudinal weld tore open. The vessel had been shut down and had just been put into use again when the incident occurred.

The gas mixture contained hydrocarbons with 30% hydrogen. It has reached its working pressure of 31 bar, but was only at -26 degrees C, instead of the working temperature of -73 degrees C, no liquid was present.

An investigation found a crack, 1.6 metres long, had formed near the upper end of the weld.

[incorrect temperature, gas / vapour release, weld failure, tank]

---

**Lessons**

The following recommendations were made:

All vessels of similar construction to be tested for incipient cracks on the inner surface by using a dye penetration test.

If the interior is inaccessible, welds and impact zones are to be tested by ultrasonic methods.

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 1

---

**Abstract**

Contractor fatality during tank construction at an LPG terminal. A contractor's fitter working on a 3 m high catwalk for the erection of a water storage tank fell head-down into the bottom of the tank. It was found that the fitter was not using/standing on a proper platform. The time was approaching the end of the working day and, instead of rearranging the catwalk (wooded plank), he chose to balance with one foot on the pointed edge of a slender angle bar, which gave way. Fatality.

[safety procedures inadequate]

---

**Lessons**

Detailed discussion with tank constructors by the project teams on how safe working platforms are to be provided is obviously necessary before the work starts, and requirements must be written into the contracts and checked on throughout the project.

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : New Jersey, USA

**Injured** : 0      **Dead** : 1

---

**Abstract**

An explosion occurred when a contract welder was in the process of cutting up a metal sump which had been removed from a partially dismantled tank.  
[welding, hot surface, fatality, maintenance]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location :** California, USA

**Injured :**        **Dead :**

---

**Abstract**

A fire occurred on one of the coking drums at a 100,000 bpd refinery was under control in 2.5 hours and extinguished in 4 hours. Two coking drums on the 56,000 bpd coker were put out of service. The mutual aid support activated by the contingency plan from the public and industry fire brigades in the area was highly praised.

[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

Location :

Injured : 0      Dead : 0

---

**Abstract**

A fire and explosion occurred in a consignment of lithium battery waste in a 45 gallon drum container. The material which caught fire had been stored on site for five months should have been destroyed within one week of arrival.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---



**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

**Location :** Solihull, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spill of chlorinated solvent occurred while 6000 litter tank of trichloroethylene was being moved on site. After heavy rain the chemical washed into a recreation area.

[weather effects]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Frankfurt, GERMANY

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of potassium hydroxide into a river occurred following a storage container overflow. The reason for the leak is unknown.

---

**Lessons**

[None Reported]

---

8588 23 March 1996

**Source** : LLOYDS LIST, 1996, MAR, 25.

**Location** : Uttar Pradesh, INDIA

**Injured** : 1      **Dead** : 3

---

**Abstract**

An explosion of a tank of methane gas at an effluent treatment plant was caused by welding on the roof of the tank to repair leaks. Police have registered a case of criminal negligence against the company. Fatality.  
[safety procedures inadequate]

---

**Lessons**

[None Reported]

---

**8585 21 March 1996**

**Source :** LLOYDS LIST, 1996, MAR, 22.

**Location :** Rijeka, CROATIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Spillage of 30 tonnes of oil into the sea from a tank.

---

**Lessons**

[None Reported]

---

8576 05 March 1996

Source : LLOYDS LIST, 1996, MAR, 8.

Location : Montevideo, URUGUAY

Injured : 0      Dead : 0

---

**Abstract**

A fire broke out in a store and warehouse of chemical products. Fire caused by electrical short circuit.

[fire - consequence, storage, warehousing, unknown chemicals]

---

**Lessons**

[None Reported]

---

**Source** : LLOYDS LIST, 1996, FEB, 26.

**Location** : Rotterdam, NETHERLANDS

**Injured** : 17    **Dead** : 0

---

**Abstract**

A warehouse containing 80 - 100 tonnes hydrochloric acid and chlorine based chemicals destroyed. Dense orange smoke caused problems to residents and industries. Release of chlorine gases caused by the fire but as within toxic level limits. Residents of the city were told to stay indoors. Some shipping operations at the port were suspended.

[fire - consequence, gas / vapour release, warehousing, storage]

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , AUSTRALIA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a warehouse storeroom believed to have contained 100 drums of oxidising chemicals.

[fire - consequence, storage, warehousing, unknown chemicals]

---

**Lessons**

[None Reported]

---

---

**Abstract**

A company specialising in the removal of redundant low-level radiation waste, removed four level gauges used to measure liquids into cans. These contained a sealed radioactive source, which emits alpha-rays. During the removal, the containers holding the source were damaged, the driver, van and car park were contaminated. The van then travelled to another destination, the contamination was only discovered at the company's premises after the week end. The correct type of container had been used but it was found to be too small.

[road transport, damage to equipment, contamination, material transfer]

---

**Lessons**

[None Reported]

---



8660 16 January 1996

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Ludwigshafen, GERMANY

**Injured** : 3      **Dead** : 0

---

**Abstract**

A tank containing amine burst while firemen were trying to prevent it from overheating. No air pollution was found outside the plant from the spillage.  
[storage]

---

**Lessons**

[None Reported]

---

8567 09 January 1996

Source : LLOYDS LIST, 1996, JAN, 12.

Location : Vado Ligure, ITALY

Injured : 0      Dead : 0

---

**Abstract**

An explosion and fire occurred in a No. 33 shore tank at the petroleum terminal while marine tanker was unloading.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : THE CHEMICAL ENGINEER, 25 JAN, 1996.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Up to one tonne of concentrated sulphuric acid leaked into a beck (river) at a plant after a spill by-passed the site's treatment system. A metal tank filled with the acid was being moved into position at the site, when it toppled onto its side and ruptured. The spilt acid entered the site's drain which should have taken it to the treatment unit. But the drain was later discovered to have collapsed causing the drainage line to fill up and overflow into a storm water drain and hence discharged into the stream.

[processing, pollution]

---

**Lessons**

All drains to be surveyed on a six monthly period.

---

Source : THE CHEMICAL ENGINEER, 1996, JAN, 25.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Up to one tonne of concentrated sulphuric acid leaked into a river after a spill by-passed the site's effluent treatment system. A metal tank with the acid toppled over when being moved and ruptured.

[pollution]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 1

---

**Abstract**

Contractors were attempting to unplug a blockage in a pump suction line in the bottom of a mix tank used in their process to convert hazardous waste material into cement kiln fuel. One of the contractors decided to enter the tank, contrary to instructions from his supervisor, in an attempt to expedite the work. He was wearing an air purifying respirator (canister mask) and protective clothing but quickly became disoriented and lost consciousness. He had been exposed to benzene. Fatality

[entry into confined space, asphyxiation, operator error]

---

**Lessons**

There was lack of sufficient appreciation for the acute toxic hazards of petroleum hydrocarbons.

There is a need to ensure that contractors effectively carry out their written safety programmes in the field.

---

**Source :** ICHEME

**Location :** ,

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 5500-m3 floating roof tank failed catastrophically during filling operations. The tank was being filled with water for the final water test subsequent to repairs. Fortunately no one was seriously injured.

The tank shell ruptured over the full height of the tank and the sudden release of about 5000-m3 water caused extensive material damage to pipework and 2 other tanks in the same bund.

An investigation into the incident found a tensile fracture " zip failure " due to thinning of the tank shell caused by corrosion. This corrosion was found as concentrated vertical grooves and pitting on the inside of the tank. Scratching by the rim seal brackets, fixed to the floating roof pontoons have contributed to the groove formation and "accelerated" corrosion of the tank shell. The absence of the so-called bumper bars on the floating roof pontoons allowed the brackets to touch the tank shell.

[tank failure, loading, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 1

---

**Abstract**

A contractor had been carrying out the work of moving catalyst drums. Upon entering the storage area, the unloaded forklift truck collided with a lamp post and knocked it down. The operator was thrown from the vehicle; but the vehicle overturned, trapping him between the safety roof and the ground. It was found that blind spots obstructed clear vision of the lamp post in the work area. The basic cause was overconfidence with regard to repetitive, routine work, without apparent risk and insufficient awareness in attitude toward safety.

[safety procedures inadequate, fatality]

---

**Lessons**

Even trained and experienced forklift truck operators have serious accidents, most likely through complacency.

Emphasis must be placed on maintaining an AWARENESS of good safety practice.

---

Source : HAZARDOUS CARBO BULLETIN, JUNE 2000.

Location : Ohio, USA

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred at a commercial incineration facility. The incident involved drums containing hazardous waste. Significant damage occurred to the facility.

An investigation into the incident found that the drums contained primary and high explosive materials. The drums were not properly marked or labelled. The company was fined \$40,000 (2000).

[damage to equipment, labelling incorrect, design or procedure error, incinerator]

---

**Lessons**

Mis-classification of any hazardous material is a very serious matter because it can result in improper handling of the material by the carrier and may cause danger to emergency personnel responding to an incident.

---



8238 01 December 1995

Source : LLOYDS LIST, 1995, DEC, 7.

Location : McCamey, Texas, USA

Injured : 3      Dead : 2

---

**Abstract**

An explosion in tank farm when welders were welding on a tank. Valve work was also said to be in progress. Fatality.

---

**Lessons**

[None Reported]

---

**Source** : ENDS REPORT 263, 1996, DEC.

**Location** : North Yorkshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A road transportation incident. A road tanker delivered 7 tonnes of 96% sulphuric acid which was unloaded into a tank of dioctyl phthalate. No violent reaction occurred but clean up operations were difficult.

[unloading, near miss, design or procedure error]

---

**Lessons**

[None Reported]

---

**8226 16 November 1995**

**Source :** MANCHESTER EVENING NEWS, 1995, NOV, 16.

**Location :** Heaton Chapel, Stockport, UK

**Injured :** 4      **Dead :** 0

---

**Abstract**

A fire occurred in a tank containing naphtha and bitumen melted the aluminium tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---

8216 14 November 1995

Source : LLOYDS LIST, 1995, NOV, 11.

Location : Pittsburgh, Pennsylvania, USA

Injured : 0      Dead : 0

---

**Abstract**

An explosion in a tank containing unknown chemicals forced evacuation of houses.

---

**Lessons**

[None Reported]

---

8212 08 November 1995

Source : LLOYDS LIST, 1995, NOV, 11.

Location : Kingston, JAMAICA

Injured : 0      Dead : 0

---

**Abstract**

An explosion at the plant destroyed the raw material warehouse causing damage estimated at \$43 million (1995).  
[damage to equipment, warehousing]

---

**Lessons**

[None Reported]

---

8224 29 October 1995

Source : BBC NEWS, 1995, OCT, 30.; CHEMISTRY IN BRITAIN, 1995, DEC.

Location : Dagenham, Essex, UK

Injured : 0      Dead : 0

---

**Abstract**

Release of 12 tonnes of hydrogen chloride from 30 ton tank resulted from a faulty valve. The gas passed over during the evening. Leak.  
[valve failure, gas / vapour release]

---

**Lessons**

[None Reported]

---

8190 25 October 1995

Source : LLOYDS LIST, 1995, OCT, 26.

Location : Cilacap, INDONESIA

Injured : 0      Dead : 0

---

**Abstract**

A fire in 7 storage tanks at major oil refinery set alight by lightning. The blaze started in one tank and spread to others.

[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

8206 21 October 1995

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.

Location : Off Suva, FIJI

Injured : 0      Dead : 3

---

**Abstract**

A marine transportation incident. Chief officer and 2 ratings were overcome by fumes and killed after entering No. 3 deep tank during deballasting on cargo ship. Fatality.

[entry into confined space]

---

**Lessons**

[None Reported]

---



Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , KUWAIT

Injured : 0      Dead : 0

---

**Abstract**

One of two strings of hoses parted during loading of 350,000 dwt tanker. Up to 800 tonne crude oil spillage occurred.  
[hose failure]

---

**Lessons**

[None Reported]

---

8188 16 October 1995

**Source** : LLOYDS LIST, 1995, OCT, 18.

**Location** : Invercargill, NEW ZEALAND

**Injured** : 0      **Dead** : 0

---

**Abstract**

Warehouse fire contained unknown chemicals. Believed to be arson.

[fire - consequence, warehousing, storage]

---

**Lessons**

[None Reported]

---

8227 09 October 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Immingham, Humberside, UK

**Injured** : 3      **Dead** : 0

---

**Abstract**

A spillage from a leak of liquid ammonium nitrate through a drainage pipe on a 3500 tonnes static tank.

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 132, 9-11.; LLOYDS LIST, 1995, OCT, 10.

Location : , UK

Injured : 0      Dead : 0

### Abstract

A fire broke out in a storage of polypropylene finished products.

A major emergency was declared and the site emergency plan was initiated. The scale of the fire escalated rapidly ultimately resulting in the attendance of some 200 fire fighters and 40 appliances which included support from an outside county.

The intensity of the fire resulted in a large thermal updraught which tended to convey the plume of black smoke over nearby buildings, over the local towns and out to sea, carried by a southerly wind. The site toxic gas alarm was sounded primarily to restrict movement around the site with the impending shift change to allow access for emergency services.

The public immediately downwind were advised by the media and police to stay indoors and to keep doors and windows closed.

The fire was eventually brought under control and the site emergency was ended.

Nobody suffered any injury as a result of the fire. There were no reported medical treatments from any member of the public. Damage was restricted to the warehouse, an adjacent pipebridge, an office and adjacent workshop and polypropylene bin compound.

A detailed examination of the warehouse, tests and other information concluded that the probable cause of the fire was related to a failure in a fluorescent light fitting which resulted in overheating and flaming acrylic sheeting dropping on to the polypropylene product stored beneath. A combination of the continuous operation of the lighting system and the age and design of the light fittings contributed to the probable source of the ignition. This developed into a fire during a period when the warehouse was unmanned.

[fire - consequence, warehousing]

### Lessons

The following recommendations were made:

1. Lighting systems in warehouses should be checked as some of the older designs are potentially more hazardous in the event of an electrical fault.
2. The design, location, alarms and annunciation of smoke and fire detection systems should provide effective and accurate early warning of a fire.
3. The provision of sprinkler systems should be considered for large warehouses when stock losses could be high particularly if early fire detection cannot be guaranteed or if rapid fire fighting response is not possible.
4. Management systems and controls should be regularly audited to ensure that procedures and standards do not deviate from their original intent and to ensure that the potential risks associated with any changes or developments are recognised and addressed.
5. Risk assessments and hazard reviews should be prepared which consider the potential hazards and consequences of a major fire particularly where there could be an off site impact.
6. Existing warehouses and their materials of construction should be checked for potential hazards which could result from the impact of a fire or features which could encourage the spread of a fire.
7. The location of warehouses should be reviewed with respect to potential hazards they may pose to adjacent plants and services and vice versa.
8. The presence of other facilities and activities within warehouses should be reviewed from an operational and potential hazard aspect.
9. Design and maintenance of the lighting system were considered to be at fault.
10. Subsequently the light design and the previous 'breakdown' approach to light fitting maintenance were replaced by formal inspection and maintenance approach.

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.; ICHEME.

Location : Near Redcar, Cleveland, UK

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred at two warehouses containing polypropylene plastic chips. Fire under control after 11 hours. Steelworks and 3 schools closed.  
[fire - consequence, warehousing]

---

**Lessons**

1. Lighting systems on the site should be checked since the age and design contributed to the probable source of ignition.
  2. The design, location, alarms and annunciation of smoke and fire detection systems should provide effective and accurate early warning.
  3. Sprinkler systems should be considered for polypropylene storage if early fire detection is not possible and if fast firefighting response cannot be guaranteed.
  4. Management systems and controls should be regularly audited to ensure that procedures and standards do not deviate from their original intent and to ensure that the potential risks associated with any changes or developments are recognised and addressed.
  6. Risk assessments and hazard reviews should be prepared which consider the potential hazards and consequences of a major fire particularly where there could be an off-site impact. Results of the risk assessments and hazard reviews should be incorporated in the Site Major Emergency Plans.
  7. Existing warehouses and their materials of construction should be checked for potential hazards which could result from the impact of a fire or features which could encourage the spread of fire.
  8. The location of warehouses should be reviewed with respect to potential hazards they may pose to adjacent plants and services and vice versa.
  9. The presence of other facilities within warehouses should be reviewed from an operational and potential hazard impact.
-

8185 09 October 1995

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

A road transportation incident. A vehicle carrying a load of 45-gallon drums containing M.E.K. was involved in a near collision.

The incident occurred when the vehicle made an emergency stop and three drums rolled forward onto the cab of the vehicle. One of the drums was punctured in falling and the subsequent spill ignited.

The cause of the ignition is not known but it is thought that ignition may have been due to the vehicle's exhaust pipe or by a spark resulting from short-circuiting of the vehicle's battery.

The tractor unit of the vehicle was completely burnt out in the fire. The driver suffered minor burns.

The remainder of the drums were not involved in the fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 7      Dead : 0

---

**Abstract**

Fire at hydrofiner compressor on a refinery. During recommissioning, the west recycle gas compressor on a hydrofiner was overpressurised. The cylinder head was blown off, resulting in explosive decompression and fire. It was found that the discharge valve was installed in the wrong direction. The cause was the criticality of the task to replace the valve not being understood or reflected in procedures. Though the compressor was purchased to the standard of API 618, which

requires a design that prevent valves from being installed in the wrong direction, the equipment did not meet specification.

Production losses and repair costs were estimated at \$500,000 (1995) (£318,300) and \$400,000 (£254,600) (1995), respectively.

[fire - consequence, overpressurisation, installation inadequate, product loss]

---

**Lessons**

There have to be measures in place, as part of contractors' and suppliers' quality assurance programs, where critical issues on machines are identified and reviewed.

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Houston, Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire started when lightning struck a 168,000 bbl crude oil floating roof tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 3, 1995.

**Location** : Nizhniy Tagil, RUSSIA

**Injured** : 2      **Dead** : 0

---

**Abstract**

Four storage depots completely destroyed when 28 tonnes of salts of 2-ethylhexoic acid exploded. Windows 3 km away broken.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, NOV.

**Location** : Aqaba, JORDAN

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion of a container with nitrocellulose at marshalling yard destroyed 20 and damaged 32 containers. Spontaneous combustion suspected.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1995, DEC.

**Location** : East Rutherford, New Jersey, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Gas from an old compressed cylinder leaked and ignited. After the initial blast, several other cylinders containing unidentified gases also exploded.  
[explosion]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CONTROL BULLETIN, 1995, OCT.

**Location** : Lowestoft, Suffolk, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Suspect weld on 9,900 litre tank container caused half of contents of hydrochloric acid to leak. Spillage washed down.

[weld failure]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 3, 1995.

**Location** : Kucove, ALBANIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire broke out when a bolt of lightning struck an oil tank, igniting 400 tonnes of crude in a depot. The fire seemed to be under control when a second tank exploded. The fire was extinguished 33 hours after the blaze broke out, after engulfing 1,600 tonnes of crude oil.

[explosion, fire - consequence, storage]

---

**Lessons**

[None Reported]

---

8176 21 August 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, OCT.

**Location** : Preston, Lancashire, UK

**Injured** : 60    **Dead** : 0

---

**Abstract**

An explosion occurred in drums containing diethyl carbonate. Cloud drifted over homes and out to sea. 60 people treated in hospital with breathing and skin problems.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

**1894 20 August 1995**

**Source :** THE CHEMICAL ENGINEER, 1995, SEP, 14; LLOYDS LIST, 1995, AUG, 22.

**Location :** Preston, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

Explosion in a drum that contained waste from a distillation process and was a mixture of bromodiethyl carbonate, diethyl carbonate and ethyl bromoacetate. This caused a cloud to drift over the town from the chemical works.  
[drums, gas / vapour release, evacuation]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location :** Buffalo, New York, USA

**Injured :** 7      **Dead :** 1

---

**Abstract**

A fire occurred in a warehouse. Preliminary cause attributed to the decomposition of sodium persulphate. 800 tonnes of sodium persulphate, ammonium persulphate and potassium persulphate were destroyed. Fatality.

[warehousing, storage, product loss, fire - consequence]

---

**Lessons**

[None Reported]

---



1862 31 July 1995

**Source** : LLOYDS LIST, 1995, 1 AUG.

**Location** : Tokyo, JAPAN

**Injured** : 17    **Dead** : 0

---

**Abstract**

Explosion in warehouse at a metal factory sending debris hundreds of metres. The blast may have been caused by butane.  
[storage, warehousing]

---

**Lessons**

[None Reported]

---

3499 22 July 1995

**Source** : LLOYDS LIST, 1995, JUL, 27.

**Location** : Tacoma, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Three dust explosions in the nine story elevator during unloading.  
[storage equipment, silo/hopper]

---

**Lessons**

[None Reported]

---

1751 22 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Smethwick, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire caused up to £1 million (1995) damage at a plastics factory when stocks of polystyrene and pallets were destroyed in a storage area but left the main factory unaffected.

[warehouse, damage to equipment, fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A release of 2.4 tonnes of acetone "dope" occurred while the material was being charged to a tank. The material overflowed on to the floor and was recovered and properly disposed of as waste. There was no escape of material to the drains and there were no injuries.

The vessel was fitted with a high level alarm which when tested after the incident was working correctly. It was active on the panel at the time of the incident. [spill, material transfer]

---

**Lessons**

The incident was attributed to:

1. both the operator and the team leader being in places where the alarm was inaudible when it sounded.
  2. the alarm being cancelled by someone who failed to appreciate its significance.
  3. lack of clear understanding of respective responsibilities among the operating team.
-

7654 19 July 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, SEP.

**Location** : Tacoma, Washington, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Port operation shut-down for 4 hours due to phosphorus fire in a tank container.

[fire - consequence, plant shutdown]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Hailsham, East Sussex, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Leakage of 250 tonnes of hydrochloric acid from cone roof tank. Half of spill was contained by protective wall, bund wall, the rest escaped to a river and required neutralisation.

[storage tanks, environmental]

---

**Lessons**

[None Reported]

---

1196415 July 1995

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An overflow occurred on a tank containing bitumen and white spirit when water flowed into the tank. The maximum possible overflow for the tank was 4.5 tonnes containing 43% white spirit. It is not known why the water flowed into the tank.

It is thought that the majority of the material was retained on site but an unknown amount was lost into the nearby river causing a slick.

[spill, unidentified cause]

---

**Lessons**

---

**Source :** ICHEME**Location :** , USA**Injured :** -      **Dead :** 0**Abstract**

A newly constructed delayed coker unit was started at a refinery in early May of 1995. In July of the same year, a major fire occurred which resulted in substantial equipment damage and unit downtime. There were no serious injuries but the total loss exceeded \$15 million (£8,955,224), (1995).

The design feed and process parameters of the unit were such that shot coke was expected (granular coke as opposed to a solid bed). Due to known difficulties with handling of shot coke, the design included an automated coke drum bottom head removal system. The intent here was to protect the operators from the hazards of removing the bottom head. The bottom de-heading device used hydraulics, high pressure nitrogen and a movable ramp ring to seal the coke drum head prior to the introduction of hydrocarbon. Hydraulic power is used as the motive force for moving the ramp ring and lock ring used to secure the bolts. Positioning the bolts and locking them into position with the lock ring is the first step in installing the head. Following that, high pressure nitrogen is used to tension the bolts and provide enough clearance so the ramp ring can be moved into position. Hydraulic power then rotates the ring until a mechanical seal has been achieved. The hydraulic and nitrogen systems are then powered down and the drum is ready for pressure testing prior to introducing hydrocarbons. The control panels for the device are located such that the operator is shielded but able to clearly see the bottom head area.

On the day of the incident the day shift operator installed the head on Drum No.1. He proceeded with pressure testing and air-freeing of the drum and then began hydrocarbon warm-up in preparation for a drum switch later that night. The investigation revealed that the ramp rings were never closed on the drum and that the seal was provided by the nitrogen pressure. The evening shift operator completed the switch into Drum No.1 and then in his routine check of the system discovered that the head was not properly installed. He then compounded the previous error by shutting down the nitrogen system prior to closing the ramp rings. The head subsequently opened up and there was an immediate fire. The investigation concluded that the human error was the primary cause for the event. It was clear that not all of the operators fully understood how the deheading device worked and thus were unable to troubleshoot the device. It was also clear that while the procedure for operating the device was very clear, not much was said about what was going on as the different steps were occurring. It was also concluded that the safeguards to minimize the potential for operator error were inadequate given the consequences of such an event. The equipment design did not include any inherent protection against the head being mistakenly opened while the drum was in service. Additionally, the cross checking procedures in place at the time were deemed inadequate.

[fire - consequence, damage to equipment, operator error, design or procedure error, competency lacking, drums, processing, injury]

**Lessons**

Operators should have fully understood how the drum's de-heading device operated.

Adequate safeguards should have been in place to minimize the potential for operator error through the following:

- 1.inherent equipment design.
- 2.cross/double checking arrangements.



3950 12 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Tampa; Florida, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Lightning struck a tank of methanol causing a fire. One nearby tank filled with solvent reached its boiling point and blew its lid but the blaze was contained. The methanol tank had a 250,000 gallon capacity but was only holding 40,000 gallons when struck.  
[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

3534 04 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUATER, 1995.

**Location** : Chengdu, CHINA

**Injured** : 19    **Dead** : 3

---

**Abstract**

An explosion in a steel chlorine cylinder led to numerous injuries and 3 fatalities.

[fatality, injury]

---

**Lessons**

[None Reported]

---

1779 01 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Yaroslavl, RUSSIA

**Injured** : 1      **Dead** : 0

---

**Abstract**

A fire at an oil refinery probably occurred due to a spark during maintenance work. Three out of four LPG tanks were destroyed and the fourth was expected to burn out shortly after.

[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

2622 26 June 1995

**Source** : LLOYDS LIST, 1995, JUN, 30, HAZARDOUS CARGO BULLETIN, 1995, AUG.

**Location** : Bucharest, ROMANIA

**Injured** : 0      **Dead** : 3

---

**Abstract**

Explosion at a gas bottle distribution centre. Fatality.

---

**Lessons**

[None Reported]

---

2967 24 June 1995

**Source** : THE CHEMICAL ENGINEER, 1995, JUN, 29.

**Location** : Houston, Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Warehouse fire containing pesticides forced the evacuation of 500 homes.

[fire - consequence, warehousing, storage]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, SEP.

**Location** : Astara, IRAN

**Injured** : 200 **Dead** : 3

---

**Abstract**

A marine transportation incident. Release of chlorine from container at sea port. Fatality.

[leak]

---

**Lessons**

[None Reported]

---

2579 12 June 1995

**Source** : LLOYDS LIST, 1995, JUN,; HAZARDOUS CARGO BULLETIN, 1995, AUG.

**Location** : Losari, Java, INDONESIA

**Injured** : 45    **Dead** : 21

---

**Abstract**

Explosion in fireworks factory started in 2 drums of chemicals.

[fatality]

---

**Lessons**

[None Reported]

---

2194 04 May 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1995.

**Location** : Greenwood County, South Carolina, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire destroyed a 75,000 sq. ft. plastics reprocessing facility with a capacity of 35 million lbs/yr and caused explosions of propane cylinders on fork lift truck in the plant.

---

**Lessons**

[None Reported]

---



2411 26 April 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1995.

**Location** : Sri Racha, THAILAND

**Injured** : 0      **Dead** : 0

---

**Abstract**

A major tank fire was reported to result from a lightning strike at a refinery.

[fire - consequence, refining, storage tanks]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, JUN.

**Location** : Tucson, Arizona, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire destroyed film set when 35 cum (cubic metre) propane tank and black powder store threatened by flames. 300 employees and visitors evacuated.  
[fire - consequence, evacuation, black powder (gunpowder)]

---

**Lessons**

[None Reported]

---

8095 20 April 1995

Source : DAILY TELEGRAPH, 1995, APR, 21.

Location : Watford, Northants, UK

Injured : 31    Dead : 0

---

**Abstract**

A road transportation incident. Fifteen gallons of benzyl mercaptan leaked from a road tanker carrying drums containing the chemical. Thirty one people were taken to hospital for treatment and residents living within 10 miles of the release were advised to keep indoors.  
[drums]

---

**Lessons**

[None Reported]

---

8115 06 April 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, JUN.

**Location** : Northwich, Norfolk, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of 2 of 18 five litre containers of butoxy ethanol acetate and butyl glycol acetate during unloading at parcel station.

---

**Lessons**

[None Reported]

---

8105 04 April 1995

**Source** : LLOYDS LIST, 1995, APR.

**Location** : Novorossisk, Black Sea, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A tank caught fire in oil storage area and was extinguished within 15 minutes and caused little damage.

[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : BEDFORDSHIRE TIMES AND CITIZEN, 1995, NOV 9.

**Location** : Great Barford, Bedfordshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Pollution of river by 40 gallons of ammonium nitrate fertiliser killing 300 fish over a 750 metre stretch. The cause was attributed to a leak from a fibreglass tank which had to be emptied before a repair could be made. The company was fined £1000 (1995) with £631(1995) costs.  
[ecological damage]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location :** Wilmington, Los Angeles, USA

**Injured :** 4      **Dead :** 0

---

**Abstract**

Internal tank explosion which ruptured a 90,000 bbl asphalt by-product tank apparently due to build up of flammable atmosphere inside tank. The tank was 85% full of vacuum bottoms, coker feed at the time of incident. Fire continued to the following day and caused smoke inhalation difficulties to 4 operators.  
[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location** : Wuxi, Jiangsu Province, CHINA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Storage drum containing sodium hydrosulphite exploded in workshop.  
[drums, explosion]

---

**Lessons**

[None Reported]

---



8126 23 March 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location** : Shanghai, CHINA

**Injured** : 1      **Dead** : 1

---

**Abstract**

On first day of annual maintenance shut-down, two empty hydrochloric acid containers exploded due to violation of operating instructions.  
[explosion, human causes]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Grand Bahama Island, BAHAMAS

**Injured** : 0      **Dead** : 0

---

**Abstract**

A 400,000 barrel diesel storage tank caught fire following a lightning strike and was being allowed to burn itself out. Local inhabitants evacuated as a precaution.

[fire - consequence, evacuation]

---

**Lessons**

[None Reported]

---

8101 08 March 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, MAY.

**Location** : Freeport, BAHAMAS

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred after lightning struck diesel tank at oil refinery facility. Blaze extinguished after 2 days. Residents evacuated. Damage estimated at \$7 million (1995).

[fire - consequence, damage to equipment, evacuation, refining]

---

**Lessons**

[None Reported]

---

3165 01 March 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Lake Charles, Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire destroyed tank M-4650.

[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

8559 March 1995

**Source :** NEWS STRAITS TIME MALAYSIA

**Location :** Pangkor, MALAYSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

41 drums of potassium cyanide were dumped at a island landfill. Three fish breeders located 500 metres away blamed the dumping of the drums on the killing of 18000 fish.

[pollution]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

A road transport incident. Explosion in No. 3 tank on bunker tanker at anchor in lighting area. Fire extinguished and cargo transferred to tanker. Small spill, tank roof lifted 1 metre above other tanks.  
[material transfer, fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, MAY.

**Location** : Minneapolis, Minnesota, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Ceiling fire ignited 4 truck loads of 'granular' chlorine (sic) in warehouse. Blaze allowed to burn out rather than use water. Black cloud over city. 200 residents evacuated.

[fire - consequence, warehousing, evacuation]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, APR.; CHEMICAL HAZARDS IN INDUSTRY, 1995, JUN.

**Location** : Offenbach, GERMANY

**Injured** : 2      **Dead** : 0

---

**Abstract**

A small dust explosion occurred as naphthol powder was poured from metal container into blender. The stirrer was not working at the time of the incident. The cause of the incident is not known but is thought that an electrostatic spark may have ignited the dust. One worker suffered 10% burns and another suffered slight injuries.  
[material transfer, injury]

---

**Lessons**

[None Reported]

---



Source : HAZARDOUS CARGO BULLETIN, 1997, MAR.

Location : , NORTH ATLANTIC

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. A leak from a tank container occurred aboard a container ship. The frame of a tank container buckled during a storm at sea, causing damage to the tank shell and discharge valve and the loss of some eight tonnes of product (a solution of sodium borohydride and sodium hydroxide in water) occurred. This compound, UN number 1760, is a Class 8 corrosive product and releases hydrogen when in contact with metals. When discovered the frame around the tank container was seen to be bent and the discharge valve was damaged. The crew attempted to staunch the leak but was only partially successful.

[weather effects, damage to equipment, spill]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, APR.; EUROPEAN CHEMICAL NEWS, 1995, FEB, 27.**Location** : Essen, GERMANY**Injured** : 4      **Dead** : 1

---

**Abstract**

An explosion and fire occurred at a chemical plant applying silicone coatings. The blast occurred when some polymethyl hydrogen siloxane was accidentally fed into a reactor, together with the correct feedstock, allyl glycidyl ether. The two epoxides reacted, overheated and hydrogen burst out of a ruptured pipe into the building, where it mixed with air and exploded. The 5 workers were caught in the resulting fire. According to the Company, the police believe that human error is to blame. Although both chemicals were labelled, they were stored in drums of the same colour. Damage is put at DM 10m \$6.7m (1995). Fatality.

[fire - consequence, human causes, damage to equipment, identification inadequate, overheating, chemicals added incorrectly, charging reactor, reactors and reaction equipment]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Puente Hierro, Sucre, VENEZUELA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred at 700,000 litre diesel oil storage tank within naval port area.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.

Location : , INDIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion and fire occurred in a gas cylinder store. Worker's cigarette is thought to have caused fire.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

**8514 03 February 1995**

**Source** : LLOYDS LIST, 1995, FEB, 6.

**Location** : Senglea, MALTA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. A large internal tank explosion in a chemical tanker ruptured ship. The ship spent 3 days at a tank cleaning facility prior to work on the vessel in the dry docks.

---

**Lessons**

[None Reported]

---

8500 01 February 1995

Source : GUARDIAN, 1995, FEB, 2.

Location : Lancashire, UK

Injured : 40    Dead : 0

---

**Abstract**

Nearly 40 people received hospital treatment for the effects of fumes after a propane gas leak at a warehouse.  
[warehousing, gas / vapour release]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.

Location :

Injured : 0      Dead : 0

---

**Abstract**

A road transportation incident. 3 one tonne IBC (intermediate bulk containers) filled with polyester amide (toxic substance) broke through the side of an unaccompanied curtain sided trailer and fell onto the deck. The trailer contained 17 IBC.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An ignition of ethylene glycol vapour occurred in the headspace of a dye mixing tank. The tank lid was ejected on to the floor of the building. There was a small fire that was quickly extinguished. There were no injuries to personnel and no significant damage to plant. The mixing tank was heated to 160 degrees C by hot oil coils. At this temperature the glycol in the vapour space is well above the upper flammable limit. However as the tank contents and temperature change during mixing operations, there are clearly times when the contents of the vapour space pass through the flammable range. The basis of safety therefore relied on exclusion of sources of ignition. The explosion occurred as the level was being reduced. The investigation indicated that the ignition source was exothermic decomposition of the dyestuff on the exposed hot oil tubes. Charred residues were identified on the tubes.

[explosion, fire - consequence]

---

**Lessons**

The investigation identified that maintaining an atmosphere above the upper flammable limit is an unreliable basis for safety and that alternative means were required. It also identified that improved explosion vents were required. The operating procedures should be changed to prevent hot oil being circulated through the coils when they are not covered by liquid.

---



8503 12 January 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, JAN, 12.

**Location** : North Sea, NETHERLANDS

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Tank container with herbicide lost overboard from ro-ro ship 40 km from Dutch coast. Spill.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

Improper alignment of valve. Workers began heating a tank containing an acid solution used to de-scale heat exchangers. The tank was unintentionally filled to 100 percent and, when an operator was in the process of removing the inspection port, the pressure in the tank forced the port off the tank and the operator was sprayed with the acid solution. Extreme pressure had built up under the inspection port, and the steam supply by-pass valve to the heating coil was not aligned. The basic cause was the improper installation of by-pass valve, which increased the amount of steam going to the coil.

[installation inadequate]

---

**Lessons**

When working with high energy sources, such as steam, ensure that extreme care is exercised, repairs double checked, and that system valves are correctly identified/labelled.

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, FEB.

**Location** : North Sea,

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Container broke apart on deck of ro-ro vessel due to poor weather conditions. 30 barrels containing sulphur oxychloride lost overboard.

[weather effects, spill]

---

**Lessons**

[None Reported]

---

6790 16 December 1994

Source : LLOYDS LIST, 1994, 17 DEC.

Location : Binh Dinh, VIETNAM

Injured : 0      Dead : 0

---

**Abstract**

A hose from a marine tanker to a storage tank broke off causing a spill of 37000 litres of diesel into the sea.

[hose failure, material transfer]

---

**Lessons**

[None Reported]

---

6787 13 December 1994

**Source** : LLOYDS LIST, 1994, 15 DEC., & 20 DEC.

**Location** : Port Neal; Sioux City; Iowa, USA

**Injured** : 15    **Dead** : 5

---

**Abstract**

Explosion in ammonium nitrate fertiliser plant. Metal fragments punctured a 15 000 refrigerated storage tank of ammonia causing spillage of 5 700 tonnes of ammonia contained in bund but some released to atmosphere. Metal fragments also punctured nitric acid tank causing spillage of 100 tons of 56% nitric acid. 2500 people from 4 towns 25-30 miles away were evacuated. 3 nearby power stations damaged and line across river knocked out. Fatality  
[evacuation, processing]

---

**Lessons**

[None Reported]

---

6783 05 December 1994

Source : LLOYDS LIST, 1994, 8 DEC.

Location : Acajutla, EL SALVADOR

Injured : 0      Dead : 0

---

**Abstract**

Blockage in pipes going to sludge separation tanks caused oil spillage and pollution to 1.5 km of beach which is severely oiled. Oil did not go into sea.  
[flow restriction]

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 126, 3-6.

Location : ,

Injured : 13    Dead : 0

#### Abstract

A breakdown of operations occurred on plant which was caused by the bursting of an acrylic acid tank. This resulted in a large-scale fire fuelled by the escaping acrylic acid/polyacrylic acid. The polyvinyl alcohol storage facility nearby also caught fire

The following combination of events lead to the accident:

1. A power supply failure.
  2. External temperature of around 5 degrees C, with a north wind.
  3. The open-topped building.
  4. Crystallising out by the acrylic acid in both pipeline circuits.
  5. Warming-up and polymerisation caused by the pump working against a blocked delivery route.
  6. Thawing of the crystallised acrylic acid in the bypass pipeline.
  7. Transfer of polymers into the acrylic acid storage tank.
  8. Slow warming of the tank's contents by around 0.5 degrees C/hr due to the pump passing against a throttled valve,
  9. Ineffectiveness of the temperature monitoring system, since the large circulation pipeline remained blocked all the time.
- [cold weather, rupture, fire - consequence, polymerisation, chemical missing, instrumentation failure, temperature meter/control]

#### Lessons

The following safety procedures were introduced to avoid the reoccurrence of a similar incident:

1. A continuous independent temperature measurement of the tank contents will be provided.
2. The circulation pump will be equipped with a temperature control safety switch.
3. Safeguards put in place to ensure that temperatures in acrylic acid storage facilities and in rooms containing acrylic acid pipelines do not fall below a certain level. This will avoid crystallisation of the acrylic acid in the event of a power failure.
4. Analytical surveillance will ensure that the inhibitor concentration within the acrylic acid does not fall below 200 ppm.
5. A measuring device will be installed to monitor the throughput of the major pipework.
6. An emergency reaction inhibition system will be installed.

6779 27 November 1994

Source : LOSS PREVENTION BULLETIN, 126, 03; EUROPEAN CHEMICAL NEWS, 1994, 5 DEC.; THE CHEMICAL ENGINEER, 1994, 15 DEC.

Location : Burghausen; Bavaria, GERMANY

Injured : 13    Dead : 1

---

**Abstract**

Incident at a polyvinyl acetate plant. A faulty power switch cut off the electricity supply to a circulating pump in an acrylic acid tank. The temperature of the acid in the pipes then fell from the safe range of 15 - 25 degrees C to 12 degrees C when it crystallised. The crystallised acid material polymerised uncontrollably destroying the storage unit, a manufacturing unit and a warehouse. Fatality.

[polymerisation, power supply failure, processing]

---

**Lessons**

1. The temperature of the tank to be monitored.
  2. The circulation pump to be equipped with a temperature control safety switch.
  3. Safeguards to ensure that the temperature of the storage tank and building do not fall below the crystallisation temperature.
  4. Analytical surveillance to ensure inhibitor level does not fall below 200 ppm.
  5. Measurement of large cycle throughput
  6. A stopper system installed.
  7. Pressure release system for storage tanks.
-



6772 22 November 1994

Source : LLOYDS LIST, 1994, 6 DEC.

Location : Nakhodka, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Powerful explosion and fire at fuel reservoir. The underground storage tank reservoir had its concrete roof blown off. 2000 tonnes of fuel oil involved.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

6770 18 November 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Takasago; Hyogo Prefecture, JAPAN

**Injured** : 1      **Dead** : 2

---

**Abstract**

Liquid vinyl chloride monomer tank was being inspected by personnel when it caught fire and exploded. Fatality.  
[inspection, explosion, fire - consequence]

---

**Lessons**

[None Reported]

---

**6769 18 November 1994**

**Source :** LLOYDS LIST, 1994, 19 NOV.

**Location :** Ghent, BELGIUM

**Injured :** 2      **Dead :** 0

---

**Abstract**

Dust explosion occurred in cells underneath weighing installation of grain silos.  
[silo/hopper, storage]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, DEC.; LLOYDS LIST, 1994, 25 NOV.

**Location** : Morrice; Michigan, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A rail transportation incident. A boxcar on a train carrying a drum of sodium isopropylxanthate burst into flames and exploded. Fumes caused evacuation of people within 3 km radius.

[explosion, fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An explosion and small fire occurred in a tri-acetate mill hopper. The hopper explosion relief panel lifted but the explosion relieved through a bag-filter door. There was limit damage to the plant and no injuries. A blockage had occurred in the transfer line from the base of the rotary drier. The valve at the base of the drier has stopped presumably due to choking. The blockage was clearer following standard practice. The explosion occurred during the unblocking operation. The cause of the explosion remains unclear. An explosible dust concentration was ignited within the hopper. The most likely ignition sources are tramped material or thermal degradation of tri-acetate material.

[solids processing equipment, flow restriction, cleaning, unwanted chemical reaction, overheating]

---

**Lessons**

1. Restrict access to the processing area - it was fortunately that no one was exposed to the force of the explosion.
  2. Formalise procedures for clearing blockages.
  3. Review instrumentation and control requirements for system to prevent blockages and allow automatic shutdown to be instigated.
-

1195916 November 1994

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

Hydrogen sulphide rich dilute sulphuric acid overflowed from an acid recovery plant. This was contained in a bunded area but hydrogen sulphide evolved and spread to an adjacent area. The area was evacuated. A contractor working in this area was affected and fortunately recovered fully.

[gas / vapour release, people, evacuation]

---

**Lessons**

[None Reported]

---

6763 14 November 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Grozny, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

2000 cum oil storage tank destroyed by plastic explosive.

[terrorism]

---

**Lessons**

[None Reported]

---

6750 02 November 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1995, JAN.; LLOYDS LIST, 1994, 3 NOV.; THE GUARDIAN, 1994, 4 NOV.4

**Location** : Dronka; Assuit, EGYPT

**Injured** : 0      **Dead** : 390

---

**Abstract**

Lightning struck a complex of 8 fuel storage tanks causing explosion of tank during a thunderstorm. Burning gasoline flowed on flood waters into village causing many deaths. Rail track subsided and 2 rail tankers overturned and spilt fuel. Fatality.

---

**Lessons**

[None Reported]

---



6746 29 October 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1995, JAN.

Location : New Delhi, INDIA

Injured : 2      Dead : 8

---

**Abstract**

Explosion of drum of nitrocellulose when being unloaded from a truck at a nail polish factory. Fire spread to other chemicals. Fatality.  
[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

6738 21 October 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 22 OCT.

**Location** : Montreal, CANADA

**Injured** : 1      **Dead** : 1

---

**Abstract**

Bunker oil storage tank at an asphalt plant exploded and led to fire. 2 employees were preparing to clean or were cleaning the tank. Fatality.  
[explosion, fire - consequence]

---

**Lessons**

[None Reported]

---

6731 17 October 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 19 OCT.

Location : Landhi, PAKISTAN

Injured : 0      Dead : 0

---

**Abstract**

Explosion of chemical drum caused a major fire and shed to collapse.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

6723 11 October 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 13 OCT.

Location : Ueda; Nagano, JAPAN

Injured : 3      Dead : 1

---

**Abstract**

Fire at oil storage terminal when a gasoline floating roof tank exploded and caught fire and 3 other tanks were involved. Led to the evacuation of 70 residents.

Fatality.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6720 10 October 1994

**Source** : BBC NEWS

**Location** : Hucknell; Nottingham, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Material leaking from storage drums reacted from water to give hydrochloric acid fumes.

[gas / vapour release, contamination]

---

**Lessons**

[None Reported]

---

6718 04 October 1994

Source : THE GUARDIAN, 1994, 5 OCT.; THE CHEMICAL ENGINEER, 1994, 13 OCT.

Location : Balby; Doncaster, UK

Injured : 26    Dead : 0

---

**Abstract**

Water came into contact with sodium dithionite in a storage drum and released fumes of sulphur dioxide.

[gas / vapour release, contamination]

---

**Lessons**

[None Reported]

---

**Source** : EUROPEAN CHEMICAL NEWS, 1994, 31 OCT.

**Location** : Montreal, CANADA

**Injured** : 1      **Dead** : 1

---

**Abstract**

Fire occurred in a tank that was being brought back into service. Fatality.

[fire - consequence, commissioning]

---

**Lessons**

[None Reported]

---

6709 27 September 1994

Source : CHEMICAL ENGINEER, 1994, 13 OCT.

Location : Ellesmere Port, UK

Injured : 0      Dead : 1

---

**Abstract**

Body of 15 year old boy found in a toluene storage tank when opened for cleaning prior to demolition. The boy had disappeared 7 years previously. Fatality.

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A smell of chlorine from a bleach plant was detected within the adjacent site. There was some uncertainty about the exact sequence of events. It is believed that routine sampling of the chlorine stream with a syringe led to a very small leak of chlorine into a drain line. This triggered a chlorine detector and led to shutdown of an electrolytic cell. Coincidentally there was a problem with a circuit breaker, which delayed the restart of the plant. On restarting there was a transient high chlorine flow to a reaction vessel that was not fully neutralised. The pH record showed a fall from the normal pH 8 to pH 5. This led to free chlorine being released in a bleach tank, which is only enclosed with a loose fitting lid.

[operation inadequate, gas / vapour release, start-up, design inadequate]

---

**Lessons**

The investigation recommended improving the tank ventilation to prevent a recurrence.

Immediate provision of an extract fan was not a complete solution.

A plant HAZOP study was scheduled after a previous incident and it was recommended that the current incident was included in the study.

---

6706 22 September 1994

Source : THE CHEMICAL ENGINEER, 1994, 27 OCT.

Location : Dunston, UK

Injured : 0      Dead : 0

---

**Abstract**

370 kg of ethyl acrylate and styrene vapour escaped to atmosphere. The accident was caused by the decomposition of a catalyst involved in a polymerisation reaction. The reactants, ethyl acrylate and styrene, and the catalyst were being dripped onto a reaction vessel full of hot xylene when fumes were noticed. At first it was thought the fumes were coming from the kettle until it was noticed they were coming from the overhead tank. The catalyst had started to decompose and the reaction was taking place there instead.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

6697 13 September 1994

Source : LLOYDS LIST, 1994, 16 SEP.

Location : Montevideo, URUGUAY

Injured : 0      Dead : 0

---

**Abstract**

Leaking dry cargo container containing 400 drums including metamidophos poison.

[spill, storage]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Aguazul Casanare, COLUMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

2 production stations blown up by terrorists. The blast set ablaze some large crude oil storage tanks.

[terrorism, fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Wilson; North Carolina, USA

**Injured** : 0      **Dead** : 2

---

**Abstract**

Explosion and fire at plant. Equipment involved, oil storage tank, Substance involved, fuel oil. Fatality.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

6691 08 September 1994

Source : LLOYDS LIST, 1994, 22 SEP.

Location : Windy Craggy; British Columbia, CANADA

Injured : 0      Dead : 0

---

**Abstract**

Diesel fuel oil spill from storage tank.

---

**Lessons**

[None Reported]

---

6675 22 August 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.

Location : , BASS STRAITS

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. Tank container with ammonia washed overboard.

---

**Lessons**

[None Reported]

---

2493 09 August 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1995..

**Location** : SemBeth Shipyard, SINGAPORE

**Injured** : 6      **Dead** : 5

---

**Abstract**

Poor control of work led to ignition of paint solvent vapours during a paint spraying operation in the double bottomed tank of the stern block of a cargo ship.  
Fatality.

[human causes, repair, marine transport]

---

**Lessons**

[None Reported]

---



6649 05 August 1994

Source : CIVIL PROTECTION, 1994, AUTUMN.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994 OCT.

Location : Avonmouth, UK

Injured : 1      Dead : 1

---

**Abstract**

A port worker was killed in a fire at a fuel pipeline at dock. Fire spread to Kerosene in tanks at the storage depot and burned for 18 hours. Fatality.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

6639 22 July 1994

**Source** : OIL AND GAS JOURNAL, 1994, 1 AUG.

**Location** : Delaware City, USA

**Injured** : 6      **Dead** : 0

---

**Abstract**

Lightning struck an oil storage tank which caught fire destroying that tank and an adjacent tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6637 17 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Kaucuk, CZECH REPUBLIC

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire in 30 000 tonne oil storage floating roof tank was extinguished in 2 hours. Fire caused by lightning striking tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL WEEK INTERNATIONAL, PAGE 6, 1994, JUL, 27.

Location : California, USA

Injured : 1      Dead : 2

---

**Abstract**

A road transportation incident. A lorry carrying drums and a bulk container of acetic acid, bleach, sodium hydroxide, methanol, sulphuric acid and surfactants, was involved in an accident. The spillage caused the evacuation of residents. Fatality.

[leak]

---

**Lessons**

[None Reported]

---

6629 12 July 1994

Source : ICHEME

Location : , FRANCE

Injured : 0      Dead : 0

---

**Abstract**

Roof of polyisobutylene storage tank opened.

---

**Lessons**

[None Reported]

---

6616 01 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Laguna Bay, PHILIPPINES

**Injured** : 0      **Dead** : 0

---

**Abstract**

Hose broke at a fuel storage tank at a power plant. 950 tonnes of fuel oil were spilled into catchment area.

---

**Lessons**

[None Reported]

---

6612 30 June 1994

**Source** : LLOYDS LIST, 1994, 2 JUL.

**Location** : Bandar Khomeini, IRAN

**Injured** : 26    **Dead** : 30

---

**Abstract**

20000 tonnes of wheat destroyed in silo explosion due to an electrical short circuit. Fatality.

[silo/hopper, storage]

---

**Lessons**

[None Reported]

---

6611 29 June 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Briqah; Aden, YEMEN

**Injured** : 0      **Dead** : 0

---

**Abstract**

Aircraft bombed this storage tank depot during a Civil War.

[deliberate acts]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A loss of containment of sodium hydroxide occurred during the transfer of material from a bulk storage to a day tank. 900 litres were emptied into a 100 litres day tank used for a water softening system. The tank overflowed into a containment bund. The incident was only discovered the next day. A failure of the distributed control system was considered. An incorrect reprogramming of the system was found to be at fault.

A software change had been requested to modify the refilling of the day tank from a manual to an automated operation because operators had forgotten to carry out this operation on a number of occasions. The software change was implemented but was not subject to any testing. Subsequent investigation also found that the high level check built into the software was also defeated because the day tank level device was incorrectly calibrated.

[material transfer, operation inadequate, spill]

---

**Lessons**

1. Software changes to be incorporated into the general engineering change control system. This would have ensured that a risk assessment of potential hazards would have been carried out. This was not required as part of the software change.
  2. Software changes on hazardous systems to be 'walked through' or simulated to ensure all eventualities have been considered.
  3. Software to be tested under real working conditions, to confirm it operates correctly.
  4. Important instruments (such as level devices) to be placed on a preventative maintenance schedule.
  5. Independent hardwired level switches are preferred for shutting off flow when overfilling is a possibility.
  6. A time delay should ideally be incorporated into charging sequences to guard against valves remaining open for too long.
-

6603 26 June 1994

**Source** : LLOYDS LIST, 1994, 25 JUN.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, AUG.

**Location** : A'amshite; Byblos Area, LEBANON

**Injured** : 28    **Dead** : 8

---

**Abstract**

Explosion and fire at fuel storage and gas depot after LPG from overfilled cylinder, at a filling machine, was ignited by a road truck engine. Gas cylinders exploded. Fatality.

[overflow, fire - consequence]

---

**Lessons**

[None Reported]

---

6604 26 June 1994

**Source** : LLOYDS LIST, 1994, 29 JUN., &, 1 JUL.

**Location** : El Tablazo, VENEZUELA

**Injured** : 7      **Dead** : 0

---

**Abstract**

During testing an explosion followed by fire occurred in a 5 year old storage tank containing propylene. Alternatively fire occurred following a fuel oil leak during material transfer to a road transport vehicle.

---

**Lessons**

[None Reported]

---

6577 23 June 1994

**Source** : CIVIL PROTECTION, 1994, AUTUMN.; HAZARDOUS CARGO BULLETIN, 1994, AUG., 72-74.; LLOYDS LIST, 1994, 25 JUN.

**Location** : Gatwick, UK

**Injured** : 45    **Dead** : 0

---

**Abstract**

Spillage from drums of insecticide at airport cargo building.

[transportation]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Intermediate bulk containers (IBC), containing 36% hydrochloric acid, were being unloaded from a lorry, using a forklift truck.

The HCL was to be used for cleaning of cracked gas coolers. An IBC tipped sideways off the forklift truck and fell approximately 3 feet to the ground. The top of the IBC fractured on hitting the ground, and the entire contents (1000 litres) spilled onto the ground. The acid was diluted with water then neutralised for disposal.

The IBC was fabricated from medium density polyethylene.

[unloading, material of construction failure]

---

**Lessons**

1. The IBC fell because the cotton spar of the supporting frame was missing, probably due to corrosion.
2. The IBC should have withstood a fall of 3 feet without rupture.
3. The IBC had exceeded its recommendations inspection periodicity. No inspection had been carried out at the recommended time or up to the time of the incident.
4. An inspection would have revealed the defective frame.

The following recommendations were stated:

1. Inspect all IBC's and frameworks for defects.
  2. Visually inspect all IBC's and frames before commencing offloading from a lorry.
  3. No defective equipment to be offloaded.
  4. Have systems available to contain effluent spills that could contaminate works drains.
  5. Ensure that only the correct type of IBC is used for a particular job.
  6. Review forklift truck driver training and implement improvements if necessary.
  7. Continue with investigations to establish why the IBC ruptured.
-

**Source** : WASTE ENVIRONMENT TODAY, 1994, 7, (7), 18

**Location** : Bristol; Pennsylvania, USA

**Injured** : 39    **Dead** : 0

---

**Abstract**

Violent explosion in plant during mixing of trichlorosilane and styrene in a steel drum. There was a heatwave prevailing at the time which may have caused the unusual reaction during this normally routine mixing operation. The resultant fire took 5 hours to control. Incident led to the evacuation of 200 people in a half mile radius.

[runaway reaction, fire - consequence, weather effects]

---

**Lessons**

[None Reported]

---

6590 12 June 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Port Said, EGYPT

**Injured** : 20    **Dead** : 0

---

**Abstract**

Large fire broke out in blending warehouse facility of a paints and chemicals company, led to the evacuation of 10 000.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

6573 30 May 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, MAY.

**Location** : Tsing Yi, HONG KONG

**Injured** : 0      **Dead** : 1

---

**Abstract**

Container with 22 tonnes of shampoo fell onto cab of truck carrying ammonia sulphur cylinders. Fatality.

[transportation]

---

**Lessons**

[None Reported]

---



6571 28 May 1994

**Source** : LLOYDS LIST, 1994, 31 MAY.

**Location** : Draugen; North Sea, NORWAY

**Injured** : 0      **Dead** : 0

---

**Abstract**

Crude oil leak in a cell of storage tank on offshore platform.

---

**Lessons**

[None Reported]

---

6564 24 May 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Vancouver, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion caused severe damage to a 10 metre diameter cone roof storage tank and 3 smaller tanks. Substance involved solvents.

---

**Lessons**

[None Reported]

---

6556 17 May 1994

Source : THE CHEMICAL ENGINEER, 1994, 26 MAY.; THE GUARDIAN, 18 MAY.

Location : Aspatria; Cumbria, UK

Injured : 0      Dead : 0

---

**Abstract**

Overfilling of a 34% caustic soda storage tank caused a fish kill when the caustic soda spilled into a river.  
[overflow, sodium hydroxide]

---

**Lessons**

[None Reported]

---

6532 03 May 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUL.

Location : Solapur, INDIA

Injured : 76    Dead : 22

---

**Abstract**

Sparks from fireworks display during festival triggered explosion and fire in fireworks warehouse. Fatality.  
[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUN.

**Location** : Mossoro, BRAZIL

**Injured** : 0      **Dead** : 3

---

**Abstract**

Contract workers employed at oil field fell into a tank containing acid. Fatality.

[fall]

---

**Lessons**

[None Reported]

---

**Source** : ENDS REPORT, 1996, JUL.

**Location** : Atherstone, UK

**Injured** : 0     **Dead** : 1

---

**Abstract**

An operator entered a tank without breathing apparatus or protective clothing nor been trained in the work. He died after inhaling trichloroethylene. Fatality.  
[entry into confined space, management system inadequate]

---

**Lessons**

[None Reported]

---

6526 30 April 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUL.

**Location** : Krasnokamsk, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire in chemicals warehouse spread to several sections of paper plant. Most of plant destroyed.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUN.

Location : Apapa,

Injured : 0      Dead : 0

---

**Abstract**

Explosion ignited a fire in container loaded with unknown chemicals at a storage terminal. 15 containers severely damaged.

[fire - consequence]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred in a waste incinerator, used to dispose of waste from acrylic and viscose plants. Damage was sustained by the incinerator and associated equipment. Immediately prior to the incident, fourteen drums, originating from a viscose making plant, had been discharged into the furnace. The explosion followed a couple of minutes later.

Although the precise circumstances of the explosion are not clear, it was considered that molten salt residues within the incinerator were involved and that the explosion was due to the rapid evaporation of water. Salts (sodium sulphate and sodium hydroxide), entering the incinerator with waste would form a molten pool in the kiln section.

[damage to equipment, normal operations]

---

**Lessons**

A number of recommendations were made. These included:

1. The kiln to be operated in such a way that molten salt pool formation is minimised.
  2. A number of routine jobs are carried out in the vicinity of the kiln. These are to be minimised and access to the area should be prohibited if the presence of a molten salt pool is present (and for a period of time after charging waste to the incinerator).
-

Source : LOSS PREVENTION BULLETIN, 124, 9-10.

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

Attempts were made to remove the yoke and regulator from an empty chlorine cylinder. About 9 kg of chlorine gas was released. Because of the location of the release, 900 employees were evacuated from the facility in approximately 9 minutes, 40 employees were exposed to the chlorine gas, 20 employees were transported to the regional hospital and the operator who removed the yoke was hospitalised overnight. No permanent injuries were reported.  
[evacuation, gas / vapour release, injury]

---

**Lessons**

1. Where highly hazardous chemicals must be used, the need to ensure comprehensive safety management systems are in place to prevent and deal effectively with accidents.
  2. Emergency response plans need to be completed and fully exercised for toxic gas emergencies to identify and eliminate weaknesses and deficiencies.
-

6505 12 April 1994

**Source** : LLOYDS LIST, 1994, 14 APR.

**Location** : Karachi, PAKISTAN

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire destroyed 50 - 60 tonnes of pesticides and unknown chemicals in warehouse.

[warehousing, fire - consequence]

---

**Lessons**

[None Reported]

---

6504 12 April 1994

**Source** : LLOYDS LIST, 1994, 11 APR.

**Location** : Kfar Ata; Haifa, ISRAEL

**Injured** : 2      **Dead** : 0

---

**Abstract**

Fire broke out at depot where gas cylinders are refilled.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A container was being loaded with shrink-wrapped pallet loads of bagged polyethylene product using a forklift truck. A proprietary mobile ramp was being used to allow access to the container, the platform of which is approximately 4ft above ground level. During the loading operation the ramp became detached from the container and resulted in the forklift truck and driver being placed in a hazardous position.

No injuries were sustained by the driver and damage to the fork-lift truck and ramp were minimal.

The cause of the accident was the failure to adhere to correct operating procedures for locating the ramp to the container.

[loading, operation inadequate, near miss]

---

**Lessons**

1. The secondary safety stop 'A' frame is to be bolted to the floor.
  2. The loading ramp is to be fitted with a mechanical stop.
  3. The security chains will be locked in position
  4. Operating Instructions are to be revised.
  5. All warehouse personnel to be given refresher training on container filling operation.
  6. Housekeeping standards should be improved in the loading area.
  7. Prior to further use of ramps inspections should be carried out to ensure the ramp is fit for purpose.
  8. All 'near-misses' should be reported
-

6490 03 April 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Mina Al-ahmadi, KUWAIT

**Injured** : 1      **Dead** : 0

---

**Abstract**

Fire in atmospheric storage tank extinguished in 15 minutes.

[fire - consequence, atmospheric tank]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Drums containing CS<sub>2</sub> (carbon disulphide) were being loaded onto a freight container by a forklift truck. When the driver removed the forks from the one pallet (holding four drums) he found a leak of CS<sub>2</sub>. It is thought that the trucks forks had pierced the bottom of a drum. To stop the leak, the driver placed the forks back into the hole and then moved the pallet to a nearby pool of water. When he removed the forks again the CS<sub>2</sub> leaked and caught fire. The fire was controlled and extinguished.

[loading, fire - consequence, leak, human causes]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Rio De Janiero, BRAZIL

**Injured** : 0      **Dead** : 0

---

**Abstract**

14000 cum storage tank of ethyl alcohol ignited after being struck by lightning.

[fire - consequence]

---

**Lessons**

[None Reported]

---



6472 18 March 1994

**Source** : PETROLEUM REFINER, 1995, FEB.

**Location** : Piper Bravo; North Sea, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Two men were draining hydrocarbon from a sealpot using buckets. A fire began due to static in one bucket and spread to the mens clothing. The fire was extinguished quickly and neither were hurt. Neither of the buckets were bonded to earth. Company were fined £5000 (1994).  
[fire - consequence, lack of earthing]

---

**Lessons**

[None Reported]

---

6470 18 March 1994

**Source** : EUROPEAN CHEMICAL NEWS, 1994, 28 MAR.; CHEMICAL WEEK, 1994, 20 APR.

**Location** : Frankfurt, GERMANY

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion occurred at this plant producing hydrochlorofluorocarbon substitute. Explosion occurred during maintenance shutdown possibly when air entered a storage container and 1.5 tonnes was released.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

6462 14 March 1994

**Source** : EUROPEAN CHEMICAL NEWS, 1994, 21 MAR.

**Location** : Droylesden; Manchester, UK

**Injured** : 3      **Dead** : 0

---

**Abstract**

An explosion occurred when a phosphorus oxychloride tank was flushed through with water after the material had been off-loaded into drums.  
[decomposition, cleaning]

---

**Lessons**

[None Reported]

---

6454 07 March 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : La Plata; Buenos Aires, ARGENTINA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire broke out in atmospheric storage tank facilities feeding this catalytic cracking unit. Maintenance contractors men injured. No effect on refinery operation. Substance gas oil.

[atmospheric tank, fire - consequence]

---

**Lessons**

[None Reported]

---

Source : LLOYDS LIST, 1994, 4 MAR.

Location : , ALASKA

Injured : 0      Dead : 0

---

**Abstract**

2000 to 2500 gallons of residual oil spilled at pump station. Crude oil overflowed holding storage tank when alarm switch failed.  
[overflow, instrumentation failure]

---

**Lessons**

[None Reported]

---

**6434 24 February 1994**

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; EVENING STANDARD, 1994, 24 FEB.

**Location** : Harlow; Essex, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

About 1200 tonnes of polyethylene sheeting and plastic pellets caught fire in warehouse and damaged railway lines.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

**Source** : EUROPEAN CHEMICAL NEWS, 1995, 6, MAR, 12, MAR.

**Location** : Frankfurt, GERMANY

**Injured** : 2      **Dead** : 0

---

**Abstract**

Naphthol powder was being emptied from a metal container into a blender when the dust ignited. The stirrer was not working at the time. Electrostatic spark considered to be the ignition source.

[fire - consequence, dust explosion, charging reactor, naphthol]

---

**Lessons**

[None Reported]

---

6432 22 February 1994

Source : LLOYDS LIST, 1994, 23 FEB.

Location : Nanjing, CHINA

Injured : 0      Dead : 0

---

**Abstract**

1200 tonnes of waste oils and chemicals including sulphuric acid in corroding storage drums may be washed into river in rainy season.

[pollution, corrosion]

---

**Lessons**

[None Reported]

---



6429 20 February 1994

Source : LLOYDS LIST, 1994, 22 FEB.

Location : Karachi, PAKISTAN

Injured : 0      Dead : 0

---

**Abstract**

Fire at chemical plant destroyed plastics and unknown chemicals in storage drums.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6421 14 February 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUN.

Location : Ndola, ZAMBIA

Injured : 0      Dead : 0

---

**Abstract**

20,000 cum floating roof tank containing crude oil caught fire.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

6413 08 February 1994

Source : LLOYDS LIST, 1994, 10 FEB.

Location : Nottingham, UK

Injured : 0      Dead : 0

---

**Abstract**

Fire at plastics warehouse.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

Source : INDUSTRY ENVIRONMENT BUSINESS, 1995, MAR, 29.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A tank was being repaired when there was a delivery of 550 gallons of heavy fuel oil. The fuel oil flowed through the tank and the bund, which was also being maintained, and into the river. The two companies were fined £15000 (1994) each for polluting the river.

[pollution]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 1

---

**Abstract**

A tank fire/explosion occurred at a refinery. While removing the breather valve of a tank, to conduct gauging, an explosion occurred, propelling two workers off the roof. A worker was attempting to use a portable electric saw to cut the tank roof and there was no indication that any testing had been done on the tank to check for flammable materials. Fatality.

[maintenance, hot work, fire - consequence, testing inadequate, electrical]

---

**Lessons**

All refinery tank and pipe systems should be checked for flammable contents before hot work, regardless of their previous duty.

---

6393 26 January 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Corpus Christi, USA

**Injured** : 1      **Dead** : 1

---

**Abstract**

Explosion in out of service storage tank. Fatality.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Penang, MALAYSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Major warehouse fire.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1995, MAY.

**Location :** , France

**Injured :** 0      **Dead :** 1

---

**Abstract**

A warehouse employee was asked to clean out an empty a wine vat which had just been emptied. He was later found dead near the manhole at the bottom of the vat. The autopsy found death was due to asphyxiation. Carbon dioxide, sulphur dioxide and hydrogen sulphide had accumulated at the bottom of the vat. Fatality.

[cleaning, warehousing, entry into confined space, testing inadequate]

---

**Lessons**

[None Reported]

---



124131994

Source : ICHEME

Location : ,

Injured : 0      Dead : 1

---

### Abstract

An explosion occurred during loading operations. The incident occurred when two instrument technicians were filling the wet leg of a level transmitter with glycol. Near the completion of the job the glycol filling container exploded and struck one of the technicians. The technician died as a result of the injuries inflicted.

[permit to work system inadequate, fatality, loading]

---

### Lessons

The report stated the following recommendations:

1. Work to be undertaken on live equipment to be covered by a valid permit-to-work and to be properly supervised. Isolation of process equipment and reopening upon completion of the job to preferably be carried out by process operators / supervisors.
  2. For this kind of job, clear and unambiguous, written step-wise procedures are required. The steps to be followed to be elucidated by drawings showing the particular line-up with all instrument connections, process valves, vent valves, etc. These procedures have to be strictly adhered to by the technicians under all circumstances.
  3. As the small non-return valve in a filling/flushing connector may fail an extra non-return valve at the filling pump is strongly recommended.
-

117051994

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A drum of waste solvent and paint residues exploded on a manufacturing site. The drum failed due to build up of pressure within it. The exact cause is unclear, but the drum is known to have contained zinc residue and water and the ambient temperatures were high for the week leading up to the incident. The combination of zinc, water and heat is believed to have lead to a release of gas. Damage was limited and there were no injuries, possibly because it was a bank holiday.

[zinc, storage, drums, explosion, unwanted chemical reaction, high pressure, weather effects, gas / vapour release]

---

**Lessons**

1. Waste streams to be segregated to keep incompatible materials separated.
  2. Zinc and aluminium residues are known to be potentially reactive with water and to not be mixed with aqueous residues. They should also be clearly labelled.
  3. Waste drum stocks to be regularly checked for signs of pressure build up.
-

Source : ICHEME

Location : ,

Injured : 1      Dead : 0

---

### Abstract

An explosion occurred on an effluent water treatment tank resulting in a contractor suffering severe burns.

The incident occurred whilst contractors were constructing a tank and following heavy rain the tank had filled with water and a submersible electric pump was installed to pump the tank dry. While checking the water level through the tank's manhole, an explosion occurred injuring the contractor.

An investigation into the incident revealed the presence of flammable vapours inside the tank which are believed to have been ignited by the pumps connection to the electrical socket (located outside the tank). This could have resulted in a flash back due to the vapours coming through the tank manhole.

Vapour/Gas had been noted from the onset of the job and contractor personnel had been equipped with respirators. There was no thought at the time that these vapours might be flammable.

Work throughout the job was in the open until the lid of the tank was built.

The confined the space, concentrated the gasses and together with the source of ignition produced an explosive situation.

Tank construction was suspended until the accident was investigated.

Samples of the water remaining in the tank were taken for analysis. Ketones, aromatics and possible degradation compounds of agrochemical products were identified.

The source of flammable liquids/gases was determined and mechanical aeration and gas freeing of the tank was performed. Gas analysis showed presence of propane, butane, benzene, toluene and xylene.

1. Subsoil analysis was used to establish the source of the flammable gases or liquids and avoid their entry into tanks.

2. The procedures regarding the issue and renewal of work permits are to be reinforced with direct on-the-job training.

3. Soil contaminants will be contained until such time as the appropriate measures can be taken for clean up.

4. Direct supervision of the jobs at the site was reinforced.

[construction, leak, entry into confined space, injury]

---

### Lessons

The report stated the following recommendations:

Contaminated soil can produce gases which can build up to explosive mixtures in (semi)confined spaces such as cellars, tanks during construction, etc.

---

Source : ICHEME

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

During routine cleaning operations on a casting machine, a pipefitter was rendered briefly unconscious when hydrogen sulphide was emitted whilst chemicals were being drained from the machine tanks. The fitter fell, sustaining minor injuries.

The casting machine had been having some problems, during operation, which had led to it being taken out of service so that washing operations and tank checks could be undertaken.

The drain valves on a sulphide tank were opened, allowing the contents of the tank to drain into a gully, beneath the machine. (From there the fluid would flow into the main drain).

The pipefitter was proceeding with the cleaning of the viscose feed to the casting machine. At this time other fitters were preparing to start jet washing tasks.

This initially involved removing particles of viscose from the acid baths, where the jets had been dripping the viscose, prior to the cleaning operations commencing. Following removal of the viscose particles, the drain valves under the acid baths were opened, draining the baths' contents into the main drain.

The main drain was flushed with water (as per normal operation) to dilute the contents of the drain.

It is believed that the sulphide tank and the acid baths were drained at the same time. The hydrogen sulphide was emitted and the incident occurred.

The plant Operating Manual did include a detailed warning of the dangers which would be faced in the event that the tanks / baths were drained simultaneously.

The Company investigated the incident. The Factory Inspector made a site inspection and considered the actions taken by the Company.

[draining, gas / vapour release, fall, asphyxiation, accidental mixing, injury]

---

**Lessons**

1. The Company reinforced its Operating Procedure. Draining of the tanks / baths became an operation subject to a General Permit to Work.

2. The Factory Inspector made a number of recommendations to try and prevent a similar incident occurring. These included:

- That human error could still be the cause of such an incident and if possible the Operating Procedure should be tightened further.
  - Consideration should be given to providing fixed audible alarms for hydrogen sulphide (and chlorine).
  - The main drain should be checked for acidity before dropping alkaline baths into the drain.
  - The potential for separate piping should be considered (although leakage could still provide a problem).
  - Provision of suitable breathing apparatus.
-

6306 18 November 1993

Source : LLOYDS LIST, 1993, 19 NOV.

Location : North Sea, NORWAY

Injured : 0      Dead : 0

---

**Abstract**

1 tonne of oil leaked from two holes in a crude oil storage tank on a offshore concrete production platform.

[spill]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

**Location** : Jacksonville, USA

**Injured** : 10    **Dead** : 0

---

**Abstract**

Fire destroyed a tank and warehouse after burning oil and xylene spread to nearby drum and tank storage area through open dykes.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

**Location** : Draugen; Haltenbanken, NORWAY

**Injured** : 0      **Dead** : 0

---

**Abstract**

An offshore platform developed a leak in one of 7 concrete storage silos. Spill of 1 tonne of crude oil attributed to two holes in silo from construction defect.  
[silo/hopper, material of construction failure]

---

**Lessons**

[None Reported]

---

6290 09 November 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.; LLOYDS LIST, 1993, 10 NOV.

Location : Houston; Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Fire gutted recycled paper and plastics warehouse. Propane cylinders exploded during fire. Blaze allowed to burn itself out. Sprinkler system destroyed as roof collapsed.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---



6283 03 November 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.; LLOYDS LIST, 1993, 8 NOV.

Location : Seattle, USA

Injured : 0      Dead : 0

---

**Abstract**

Fire in dust control building at 15 metre level above grain silo. Use of water stopped as expanding grain threatened structure. Blaze controlled with foam.  
[fire - consequence, silo/hopper, storage]

---

**Lessons**

[None Reported]

---

6268 21 October 1993

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1993.

**Location** : Dun Laoghaire, IRELAND

**Injured** : 1      **Dead** : 0

---

**Abstract**

Major fire at chemical plant attended by 7 fire brigades. Explosion of chemical storage drums.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6267 21 October 1993

Source : OIL AND GAS JOURNAL, 1993, 15 NOV.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.; EXECUTIVE NEWS, 1993, 1 NOV.

Location : Nanjing, CHINA

Injured : 0      Dead : 2

---

**Abstract**

Workers neglected level alarms during mistaken filling of a 10000 cum (cubic metre) storage tank resulting in overfill with gasoline and spillage into an adjacent drain channel. Spillage ignited by tractor giving fireball. 100 tonnes of gasoline caught fire. Fire attended by 10 fire brigades and took 17 hours to extinguish. Fatality.

[overflow, fire - consequence, operator error, loading]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , AUSTRALIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred in a spent caustic soda tank in a refinery. The tank roof separated from its shell, and a fire developed within the tank, burning hydrocarbon floating on the spent caustic.

There were no injuries as a result of the fire. The tank was severely damaged to its upper shell roof and internal roof supports and was being assessed to determine if repairs are feasible.

Investigation concludes that it is likely that a C3/C4 hydrocarbon mixture entered the tank ignited by glowing from the exothermic oxidation of pyrophoric iron sulphides.

[mechanical equipment failure, fire - consequence, exothermic reaction, damage to equipment]

---

**Lessons**

The following recommendations were made:

The incident demonstrates the careful watch that needs to be kept on the vapour space of such tanks and the introduction of air during withdrawals. Some tanks may be inert gas blanketed, however, this is likely to promote pyrophoric production. The ideal is an atmosphere in the tank vapour space which is too low in oxygen content to support combustion, but high enough in oxygen to inhibit pyrophoric iron sulphide production, a philosophy that can be applied to sulphur and bitumen rundown tanks. However, this degree of control is not easy to achieve in practice.

---

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

#### Abstract

A marine transportation incident. An unloading incident from a marine tanker to a tank causing an overfill at a refinery.

While receiving an import of atmospheric residue, a gauge became stuck at an incorrect level, and the tank was overfilled. 100 kl of residue overflowed into a bunded area, of which 85 kl were recovered. Prior to the incident the tank had been surveyed and an error in its indicated dip identified. The incomplete installation of gauges in that dip tubes (stillwells) were not installed on the majority of the tanks at the time the gauges were installed. When the ship's discharge rate appeared to slow (the gauge had stuck), it was assumed by boardman that the ship was nearing the end of its discharge; and he did not question the jetty operator. Also, boardman had no knowledge of the incorrect reading taken from the tank previously.

[overflow, refining, operation inadequate]

---

#### Lessons

Improved liaison between operators in monitoring transfers of hydrocarbons is required to avoid overfilling tanks.

Information on unreliability of instrumentation needs to be communicated between shifts.

---

6254 08 October 1993

Source : OIL AND GAS JOURNAL, 1993, 18 OCT.

Location : Martinez; California, USA

Injured : 0      Dead : 0

---

**Abstract**

Explosion and fire in a spent acid storage tank holding sulphuric acid from crude oil treatment at this oil refinery.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6252 02 October 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, DEC.

Location : Felling; Tyne And Wear, UK

Injured : 0      Dead : 0

---

**Abstract**

Forklift truck punctured 2 drums of ethylamine causing a spill. Fumes spread through storage depot.

[collision]

---

**Lessons**

[None Reported]

---

6250 01 October 1993

Source : OIL AND GAS JOURNAL, 1993, 11 OCT.

Location : Mcdonald Island; Stockton; California, USA

Injured : 0      Dead : 0

---

**Abstract**

An explosion at an underground storage tank holding natural gas caused site damage of US\$ 2 million and third party damage of \$50000 (1993).

---

**Lessons**

[None Reported]

---



Source : LOSS PREVENTION BULLETIN, 117, 17.

Location : Georgia, USA

Injured : 1      Dead : 0

### Abstract

Workers were transferring a 93% solution of sulphuric acid from a 3785 litre storage tank to 378 litre "day tank" when a 2.5 cm carbon steel transfer pipe line failed. The failure caused sulphuric acid to be sprayed about 18 metres from the origin of the leak. A worker walking through the area was sprayed by the acid mist and received second degree burns on his back. After being washed down in a safety shower by fellow workers, he was taken to a medical facility for treatment. The procedure for transferring acid from the bulk tank to the day tank required that the valve at the dilute tank be closed and that a transfer pump be used to facilitate the transfer of acid from the bulk tank to the day tank. When the accident occurred, the valve at the dilute tank was closed and the transfer pump had been started. The pump built up pressure in the pipe, causing the mist of acid.

An inspection indicated that the failed line was constructed of carbon steel and appeared to be a "Schedule 40 pipe", although the engineering drawings specified use of "Schedule 160 pipe", which has walls approximately twice as thick. In addition, it was known that the flow of acid through the line normally reduces the thickness of the pipe wall by about 5 microns per year. The section of the line that failed had been replaced approximately 10 years ago. On this occasion, as soon as the leak was discovered and the transfer pump shut down, the area was barricaded and thoroughly washed. All piping was subsequently inspected using non-destructive evaluation (NDE) techniques, and pipes of insufficient thickness were replaced.

[pipeline failure, incorrect equipment installed, spill, material transfer]

### Lessons

This incident provided several lessons relating to configuration control and the handling of corrosive materials:

1. Whenever system components are replaced or repaired, engineering documents must be checked to ensure that the correct materials are used. Engineering documents (especially drawings) must be carefully managed to ensure that they are kept up-to date. However, specifying the correct materials and components for maintenance and repairs is not enough. Follow up must be conducted to ensure that the entire process is performed correctly, appropriate replacement items must be ordered, inspected on receipt, adequately documented in work orders, installed, and functionally tested.
2. Management must ensure that all hazardous materials and processes are identified and that procedures are developed and implemented to ensure safety. A preventative maintenance programme, including a replacement schedule or through NDE testing, should be established to replace components where failure would result in serious safety or environmental consequences.
3. Implementation of relevant standards related to mechanical integrity, procedures, and training should have prevented the use of incorrect schedule piping. Although many standards apply to facilities with quantities of hazardous material above a certain thresholds, these recommended practices will prevent accidents even when applied to facilities that are not covered by the standard.

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred in a spent caustic soda tank, separating the roof from its shell. A fire developed within the tank. It is likely that a C3/C4 hydrocarbon mixture entered the tank, and was ignited by glowing from the exothermic oxidation of pyrophoric iron sulphides. Analysis of the movements of the tank over the previous 6 months showed that conditions were right for the formation of pyrophorics, and this suggests that there should have been better monitoring of the tank. Review of the process unit where jet fuel is in contact with caustic, with the aim of minimising running down spent caustic contaminated with jet fuel. [unwanted chemical reaction, contamination]

---

**Lessons**

C3/C4s have been put into spent caustic soda tanks in the past, and the nature of sulphided caustic is such that the formation of pyrophoric deposits must be considered as possible.

This incident demonstrates the careful watch that needs to be kept on the vapour space of such tanks and the introduction of air during withdrawals. Some tanks may be inert gas blanketed; however, this is likely to promote pyrophoric production. The ideal is an atmosphere in the tank vapour space which is too low in oxygen content to support combustion, but high enough in oxygen to inhibit pyrophoric iron sulphide production, a philosophy that can be applied to sulphur and bitumen rundown tanks. However, this degree of control is not easy to achieve in practice.

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Spent acid failure. The alkylation unit's spent acid tank overpressurised, causing the roof and shell to separate completely from the floor, the reaction force propelled the tank into an adjacent tank. Hydrocarbons were released, and a fire ensued. There was equipment damage. It was found that weakly alkaline water was pumped into the spent acid tank, and the dilution of spent sulphuric acid in water released heat, increasing the temperature of the hydrocarbon layer, resulting in the tank overpressurising. The basic cause was insufficient monitoring to prevent weakly alkaline water from entering spent acid tanks.

[overpressurisation, spill, fire - consequence, damage to equipment, design or procedure error]

---

**Lessons**

When transferring liquids in a system containing acids and water solutions, account must be taken of the heat of dilution released by the chemical reaction of mixing acids with water or alkaline water mixtures. As was demonstrated, this can be sufficient to initiate equipment damage.

---

**Source** : OIL AND GAS JOURNAL, 1993, 4 OCT.

**Location** : Red Bluff; Pasadena; Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire in loading rack at a storage tank farm. Substance involved: gasoline.

[loading bay, fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

**Location** : Yountville; California, USA

**Injured** : 1      **Dead** : 0

---

**Abstract**

An explosion of a 11000 litre propane storage tank occurred forcing evacuation of 1800 local people.

---

**Lessons**

[None Reported]

---

**Source** : LLOYDS LIST, 1993, 17 SEP.

**Location** : Lake Alfred; Florida, USA

**Injured** : 2      **Dead** : 0

---

**Abstract**

Explosions in distillery forced evacuation of 700 people and halted rail traffic. 12 tanks burnt out. Construction crew were using cutting torch at the time of the incident.

[hot work, alcohol]

---

**Lessons**

[None Reported]

---

6222 09 September 1993

Source : CHEMICAL HAZARDS IN INDUSTRY, 1994, JAN.

Location : Odessa; Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Evacuation of 1000 people took place when a spill of benzyl chloride occurred during material transfer from a road tanker. 100 gallons were spilt when the larger tank ruptured.

---

**Lessons**

[None Reported]

---

6198 23 August 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, OCT.

Location : Alexandria, EGYPT

Injured : 70    Dead : 1

---

**Abstract**

Powerful explosion in oil storage tank at refinery. Suspected incorrect leak test procedure. Fatality.  
[testing inadequate]

---

**Lessons**

[None Reported]

---



6197 22 August 1993

Source : LLOYDS LIST, 1993, 25 AUG.; EXECUTIVE NEWS, 1993, 22 AUG.

Location : Schwelm; Ruhr, GERMANY

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a paints and packaging warehouse. Nearby residents were advised to stay in doors due to a release of toxic gases. The blaze was controlled in 6 hours.

[fire - consequence, warehousing, gas / vapour release]

---

**Lessons**

[None Reported]

---

6188 14 August 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, NOV.; LLOYDS LIST, 1993, 16 AUG.; EXECUTIVE NEWS, 1993, 15 AUG.

**Location** : Kanash; Chuvashia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion in pumping unit spread to 3 fuel oil storage tanks each of 1000 tonnes capacity.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

**Location** : Zhejiang, CHINA

**Injured** : 207   **Dead** : 0

---

**Abstract**

Due to malfunction of pump in a liquid chlorine packaging unit, chlorine leaked from tank for 6 hours.

[gas / vapour release, processing]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, OCT.

**Location** : Icklingham; Thetford; Norfolk, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A road transportation incident. A lorry carrying 45 drums of desalination chemical overturned on trunk road. Firemen using breathing apparatus cleared chemicals.

[spill]

---

**Lessons**

[None Reported]

---

6181 06 August 1993

**Source** : LLOYDS LIST, 1993, 6 AUG., & 8 DEC.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, OCT.; THE GUARDIAN, 1993, 6 AUG.

**Location** : Shenzhen, CHINA

**Injured** : 160 **Dead** : 15

---

**Abstract**

Explosion caused fires in 8 warehouses storing flammable materials. Massive explosion 10/15 minutes after fire spread to gas and chemical warehouse.

Substances involved: gas, ammonium nitrate and nitric acid.

[warehousing, fatality]

---

**Lessons**

[None Reported]

---

6176 02 August 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, SEP.

Location : St Louis; Missouri, USA

Injured : 0      Dead : 0

---

**Abstract**

Floods loosened 50 propane storage tank foundations at tank farm, causing vapours to leak from the pipe connections. Flash fire led to the evacuation of 11 500 people.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Vacuum residue tank roof to shell seam failure at a refinery.

An atmospheric tank containing vacuum bottoms overpressured, releasing material into the immediate area and the community. There were no injuries. Previous damage to the tank roof went unfixed and was viewed as "normal" by operators.

Total dollar losses were in excess of \$200,000 (1993).

The temperature of the product elevated due to pluggage of vacuum unit box cooler and the tank roof was damaged, possibly admitting higher oxygen content.

It was found that there was insufficient knowledge as to the safe operation of heavy oil tankage, and the tank used in a way other than that for which it was designed, it was used

beyond its design capabilities, and there was insufficient monitoring/observation of cooler while changes were being introduced.

[overpressurisation, refining, storage, damage to equipment, design inadequate, human causes]

---

**Lessons**

1. Rundown temperatures of residue to storage must not exceed safe levels.
  2. Damaged tanks retained in service may exacerbate problems at a later date.
  3. Temperature indications for storage tanks are usually poorly provided, giving operators limited reliable information. This needs to be considered when working close to safe temperature limits.
-

**Source** : ENDS REPORT NO. 232, 1994, MAY.

**Location** : Seal Sands; Cleveland, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion of a 50 tonne effluent waste storage tank occurred when hydrogen peroxide was passed to the tank. An oxygen rich atmosphere and the solvent vapours were possibly ignited by static generated by splash filling of the tank.

---

**Lessons**

[None Reported]

---



6165 29 July 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, OCT.

**Location** : El Secundo; California, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Rupture of storage tank caused a spill of 830 tonnes of fuel oil but most contained. 17 tonnes retained in storm water drain.

---

**Lessons**

[None Reported]

---

6153 16 July 1993

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

**Location** : Much Wenlock; Shropshire, UK

**Injured** : 2      **Dead** : 1

---

**Abstract**

Fire in waste tank during maintenance operations. Fatality.

---

**Lessons**

[None Reported]

---

**Source :** ENVIRONMENTAL PROTECTION BULLETIN, 030, 24-25.

**Location :** Near Dartford, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

An oil slick (less than 500 litres) was found coming from an underwater cooling water discharge to the middle of a river. The local authority sent out an inspector to investigate. On arrival the inspector could see no oil on the river, but he did find a small slick of oil beyond the final barrier of a surface oil water separator. The system treats general surface oily water drainings from the station, sending the cleaned water to a small creek, which in turn discharges to the river. Both the creek and the river are controlled waters.

Investigations began early the next day. The oil in the final separator to the creek in no way corresponded to the oil loss reported.

The power station, for some days previously had noticed a loss of lube oil from a reservoir that serves a number of lubricating and cooling oil duties on a No.1 generating set. Oil from the reservoir is pumped to bearings and seals and returned to the reservoir through a water cooler for re-use. Oil loss from the reservoir was not easily or immediately detectable, as the peak lopping operation and temperature changes cause big natural variations in oil level. However, for several days before the oil loss was reported, the station had been taking water samples for traces of oil. The day before the incident, oil had been detected in the water from a cooler associated with the hydrogen seal oil system on No. 1 set, and the equipment was valved off. It was subsequently found that leaks may have continued for a further period until the cooler was spaded off. The oil source had been found.

The cause of the spill was due to corrosion in the cooler water box body which had displaced a neoprene seal and permitted oil leakage. The sealing ring was out of position for about one fifth of its circumference. Looked into more closely, when the distance ring for the two neoprene rings was cleaned, weep holes were found in the circumference. The idea for this was to show leakage by an outward display of oil. The holes were all blocked and the main reason was that aluminium had been chosen, a totally unsuitable material for a ring on a saline water duty. The operator had been unaware that such ring holes existed. The operating manual was incorrect, it did not show weep holes. After the investigation the station revised their oil loss from 500 litres to 2,000 gallons (10,000 litres).

---

**Lessons**

[None Reported]

---

6150 13 July 1993

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1993, SEP.

**Location** : Miaoli, TAIWAN

**Injured** : 3      **Dead** : 4

---

**Abstract**

Sparks during maintenance ignited vapours in a polyvinyl chloride (PVC) storage tank undergoing repairs. Fatality.

---

**Lessons**

[None Reported]

---

6145 06 July 1993

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

**Location** : Baar, SWITZERLAND

**Injured** : 6      **Dead** : 0

---

**Abstract**

Warehouse used for storage of petroleum products caught fire during the material transfer of liquid into containers.

[warehousing, fire - consequence]

---

**Lessons**

[None Reported]

---

6144 06 July 1993

**Source** : LLOYDS LIST, 1993, 19 JUL.

**Location** : Shikarpur, PAKISTAN

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire engulfed operational area and caused the explosion of oil drums and damage to pumping stations.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6136 July 1993

**Source** : CHEMISTRY IN BRITAIN, 1993, NOV.

**Location** : Much Wenlock; Shropshire, UK

**Injured** : 0      **Dead** : 1

---

**Abstract**

Explosion in storage tank containing acid and volatile organic material at a fertiliser plant. Fatality.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

**Location** : Barzan Oilfield, TURKEY

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire after an explosion in floating roof tank of crude oil destroyed 2 tanks.

[terrorism, storage]

---

**Lessons**

[None Reported]

---



6121 14 June 1993

**Source** : LLOYDS LIST, 1993, 23 JUN., & 30 JUN.

**Location** : Buras; Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Lightning struck floating roof tank of crude oil causing a hole in the top of the tank. A small fire occurred which was extinguished after 3 hours.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

6120 14 June 1993

**Source** : LLOYDS LIST, 1993, 15 JUN.

**Location** : Thonburi, THAILAND

**Injured** : 10    **Dead** : 4

---

**Abstract**

Explosion and fire in whisky distillery. Ethyl alcohol and chemicals flowed into river. Explosion in storage tank with 20000 litres of alcohol. Fatality.  
[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

6117 11 June 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, SEP.

**Location** : Tuticorin, INDIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire in sulphur store.

[fire - consequence, storage]

---

**Lessons**

[None Reported]

---

6111 09 June 1993

**Source** : LLOYDS LIST, 1993, 10 JUN.

**Location** : Gateshead; Tyne And Wear, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Terrorist attack caused an explosion of a natural gas storage tank.

[terrorism]

---

**Lessons**

[None Reported]

---

6101 04 June 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUL.

**Location** : Swardeston; Norwich; Norfolk, UK

**Injured** : 5      **Dead** : 0

---

**Abstract**

Explosion of storage drums of nitric acid during dilution work. Orange cloud over village.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

6099 03 June 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUL.

**Location** : Wittering; Cambridgeshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A road transportation incident. Nitric acid leaked from 700 litre container on articulated truck. Cloud of corrosive gas drifted over two villages.  
[gas / vapour release]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, AUG.

**Location** : Vidreras, SPAIN

**Injured** : 4      **Dead** : 0

---

**Abstract**

Fire after several tonnes of fireworks exploded at warehouse.

[explosion, warehousing]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Fire in out-of-service tank at a refinery. While maintenance crews were cutting a 6' by 9' access door into the tank with a torch, a fire broke out. The tank's primary seal was damaged as was the panel board of sludge processing unit which was located outside the tank, nearby. The immediate cause was failure to secure the job site for the tasks to be performed and failure in the implementation of the work permit system. Contributing to the incident was the separation of the primary and secondary seals from the tank wall, conditions were changed significantly enough to invite a fire. Subsequent inspection of the seal area between the primary and secondary seal revealed an accumulation of oily material.

The basic cause was inadequate planning, and a lack of adequate training and experience, the hazards involved with the tasks had not been recognized, and supervision and accountabilities for the job were not clearly defined.

[fire - consequence, damage to equipment, management system inadequate, refining]

---

**Lessons**

1. Cleanliness of equipment must be ascertained by both visual inspection and gas testing before issue of hot work permits.
  2. Care must be taken to ensure that "trapped" pockets of oil, sludge, scale, which cannot be determined by gas testing alone, are not vaporized by hot work to give a flammable mixture with air leading to fires/explosions.
  3. Strict observance of well established safe procedures (e.g., API 2015 "Safe Entry and Cleaning of Petroleum Storage Tanks") for cleaning equipment is essential, paying extra attention to recesses, the area behind linings, and other trapped areas.
-



6079 24 May 1993

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1993.

**Location** : Houston; Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Lightning caused a small fire in a crude oil storage tank.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6067 07 May 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUL.

Location : Salvador, BRAZIL

Injured : 0      Dead : 0

---

**Abstract**

Wire rope on crane broke and 2 ISO tanks each containing 10 tonnes of triethyl aluminium fell to sea.

[unloading]

---

**Lessons**

[None Reported]

---

6059 02 May 1993

Source : EUROPEAN CHEMICAL NEWS, 1993, 10 MAY.

Location : Stade, GERMANY

Injured : 1      Dead : 1

---

**Abstract**

Maintenance worker killed in explosion on chlorine plant. They were engaged in repairs to the unit when a plastic container exploded. Fatality.

---

**Lessons**

[None Reported]

---

6056 01 May 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUL.

**Location** : Jacksonville; Florida, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An overflow of a tank of fuel oil occurred during tanker unloading. Spill of 24000 litres.

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 116, 21.

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A magnetic drive pump used for mixing acid (70% nitric acid, 30% sulphuric acid) exploded. After a low level pump shut down, an operator went into the plant and started the off-line pump, which he did not see was blocked in. Upon returning to the control room, he observed the acid tank level to be still low. He called another operator in the plant to restart the acid pump. The second operator started the on line pump and did not notice that the off line pump was still running. There was an explosion in the off line pump.

[operator error]

---

**Lessons**

After investigation the following main causes were found:

1. The mixed acid pump was run against a dead head until it failed 11 minutes later.
  2. Operator error.
  3. Management of change procedure failure, a project to repair a flow switch to automatically stop the pump on 'no flow' had not been completed.
  4. Maintenance pump running lights were not working.
  5. Equipment identification, both pumps and start buttons were poorly identified.
-

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

An inlet valve to a bitumen tank was opened to release pressure build up in the header fill line.

A rapid fire, with a minor explosion immediately occurred in the tank, followed by slow burning of deposits on some inside surfaces of the tank ullage space.

This continued for about six hours, indicated by occasional issue of smoke from the tank vent.

The local fire-brigade attended and although active intervention was not required, they maintained a reduced presence on site for 24 hours as a precautionary measure.

The incident was declared a "Major" following media interest, but was subsequently downgraded when interest subsided and it was established that there were no injuries or serious losses arising.

[fire - consequence, normal operations]

---

**Lessons**

A long history within the bitumen industry of the hazards of overheating bitumen storage tanks exists. The margin between necessary operating temperatures and those at which "cracking" of the product, combustion of tank deposits, etc., occurs can be very small with certain grades. Good understanding of this and adequate facilities for heating control and temperature indication are essential.

A must for developing plans for dealing with bitumen tank fires.

Storage and bitumen blowing temperatures must not be exceeded.

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a bitumen storage tank. When an inlet valve to a bitumen tank was opened to release pressure build up in the header fill line, a rapid fire and minor explosion immediately occurred in the tank. Failure of the inlet line heating control system resulted in material heating up above temperature; and a non-standard part had been fitted to the system, rendering the trace heating control inoperable. A contributing factor was excessive air entering the line as a result of railcar off-loading.

The cause was operators not fully understanding the need to control temperatures of lines manually, and a non-standard part being used in the maintenance of the trace heating, without authority. Also the monitoring of procedures was inadequate.

[control failure, high temperature, high pressure, operator error, design or procedure error]

---

**Lessons**

There is a long history within the bitumen industry of the hazards of overheating bitumen storage tanks. The margin between necessary operating temperatures and those at which "cracking" of the product, combustion of tank deposits, etc. occurs can be very small with certain grades. A good understanding of this and adequate facilities for heating control and temperature indication are essential.

---

6041 20 April 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUN.; LLOYDS LIST, 1993, 29 APR.

**Location** : Port Neches; Beaumont; Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A spill of 280 tonnes of crude oil occurred into a waterway from a pipeline between storage tanks. Discovered after discrepancy noted by receivers.

---

**Lessons**

[None Reported]

---



6040 20 April 1993

**Source** : LLOYDS LIST, 1993, 24 APR.

**Location** : Veddel; Hamburg, GERMANY

**Injured** : 3      **Dead** : 0

---

**Abstract**

Dust explosion in grain silo. 3 workers were inside at the time. Subsequent collapse of concrete silo.

[silo/hopper, storage]

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 113, 25-25.

Location : ,

Injured : 0      Dead : 0

#### Abstract

Vinyl acetate odour was noticed inside a reactor shed coming from an atmospheric Pre-Emulsion (PE) tank. The manway cover had lifted off the tank and emulsion was present on the deck in front of the manway. The PE tank held a complete pre-emulsion (monomers, maleic anhydride, surfactant, ferrous sulphate and water) since the previous shift on Friday night. Sometime between Friday evening and Sunday evening, a reaction began in the PE tank and was still taking place when the start-up crew arrived at midnight on Sunday. The Shift Supervisor shut the agitator off, recorded the PE tank temperature (60 degrees C) and evacuated the reactor area. Incident Command was established. Personnel donned breathing apparatus and rain gear and entered the area carrying an LEL/O<sub>2</sub> meter. They started the agitator on the PE tank. A sudden pressure surge again lifted the manway cover off the tank. They stopped the agitator and evacuated the area. Moments later they returned to the PE tank, replaced the manway cover, began circulation of the pre-emulsion through the heat exchanger and left the area. Periodic entry to the area to monitor the PE tank temperature while the area was continually monitored for flammables and oxygen (O<sub>2</sub>). The Safety, Health & Environment Manager arrived and called the Fire Department. She also contacted the Distribution Safety Manager who advised her to create a water quench in the reactor and transfer the pre-emulsion from the PE tank into the quench. Water and inhibitor were added into the cleaned reactor. The pre-emulsion was slowly metered into the reactor while monitoring the PE tank temperature and the filled space inside the reactor. Once they confirmed that the temperature was holding steady, they increased the pre-emulsion transfer rate. Approximately two-thirds of the pre-emulsion was transferred into the reactor resulting in a temperature drop to 23 degrees C effectively quenching the reaction. Water and inhibitor were added to the remaining pre-emulsion in the PE tank and the material was circulated through the heat exchanger. After confirming that the PE tank temperature was stable, the PE agitator was started. The PE tank temperature dropped from 54 to 37 degrees C. Conditions remained stable on both the reactor and the PE tank and an end to the emergency was declared.

The key findings were:

1. There were a number of problems associated with the emergency response actions and equipment availability.
2. Some formulations called for adding catalyst or other additives to the pre-emulsion tank.
3. The pre-emulsion tank was not monitored.

[reactors and reaction equipment, runaway reaction, spill]

#### Lessons

Key actions taken were:

1. No monomer mix or pre-emulsion will be left unattended or monitored.
2. Remove catalyst and activators from the pre-emulsion tank.
3. Establish written procedures for minimising hold times of pre-emulsion and monomer mix for handling non-typical (e.g. polymerisation) situations.
4. Improve written emergency response procedures and employee emergency response training.
5. Remove heat sources from pre-emulsion vessels.
6. Complete the ongoing process vessel high temperature/high level alarm project.

6027 11 April 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUN.

**Location** : Hyderabad, PAKISTAN

**Injured** : 0      **Dead** : 10

---

**Abstract**

Fire in warehouse storage of fireworks. Blaze spread through densely populated area. Fatality.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---

6023 08 April 1993

**Source** : LLOYDS LIST, 1993, 8/9 APR.; THE GUARDIAN, 1993, 9 APR.

**Location** : Floriffoux; Namur, BELGIUM

**Injured** : 5      **Dead** : 4

---

**Abstract**

Dust explosion in grain silo damaged houses and factory. Fatality.

[silo/hopper, storage]

---

**Lessons**

[None Reported]

---

6020 06 April 1993

Source : NATURE, 1993, 15 APR.

Location : Tomsk; Siberia, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

A chemical explosion occurred in a stainless steel reprocessing tank when nitric acid was added. The explosion blew off a concrete lid.  
[reaction vessel]

---

**Lessons**

[None Reported]

---

6016 06 April 1993

**Source** : LLOYDS LIST, 1993, 9 APR.

**Location** : Tomsk-7; Siberia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A storage canister of radioactive material exploded in an unoccupied building of a chemical factory. Elevated levels of radio-activity found 12 miles away. 2470 acres contaminated. Incident rated 3 on international 7 point scale.

[radioactive release, container, uranium solution]

---

**Lessons**

[None Reported]

---

6018 06 April 1993

**Source** : LLOYDS LIST, 1993, 8 APR.

**Location** : Brussels, BELGIUM

**Injured** : 0      **Dead** : 0

---

**Abstract**

4 storage tanks ignited and fire spread to 10 nearby houses. Led to the evacuation of 1500. Barrels nearby exploded.  
[paint thinner]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1993, MAY.

**Location :** New Jersey, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Chlorine and smoke cloud 1500 ft wide and five miles long came from a warehouse fire.

[fire - consequence, warehousing]

---

**Lessons**

[None Reported]

---



6006 31 March 1993

Source : THE CHEMICAL ENGINEER, 1993, 8 APR.

Location : Martinez; California, USA

Injured : 0      Dead : 0

---

**Abstract**

Steel lid blew off sludge storage tank and cut power lines before landing on railway lines.

[explosion]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

The roof of a tank which was located in an Effluent Treatment Plant lifted off the tank and flew some 175 feet south. The roof knocked over an area lighting pole, severed some power lines, bounced on the ground, and eventually came to rest near a railway track. The gauger's platform was also separated from the tank and travelled some 100 feet east, landing near a filter house.

Witnesses in the area reported hearing an explosion, seeing flames coming from the tank, and seeing subsequent arcing coming from the power transmission lines. Witnesses reported that the flames were present only during the initial flash and that smoke dissipated after a short time. Witnesses also reported hearing a turbine-like roar which lasted several seconds or more immediately preceding the incident.

After the explosion, the tank wall and floor remained intact. No leakage of the tank contents after the event were noted. There were no injuries.

It has been determined that the roof on the tank failed due to the ignition of a flammable mixture in the vapour space of the tank. While numerous sources could potentially create a flammable vapour space in the tank, the most probable source was normal variations in the volatility of the Dissolved Air Flotation (DAF) float combined with changes in sealing and scrubbing of the DAF units required by environmental regulations.

Evidence points to overheating of the carbon drum on the tank vent as the source of ignition.

[explosion / pressure release, mechanical equipment failure, gas / vapour release]

---

**Lessons**

[None Reported]

---

5979 09 March 1993

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1993.

**Location** : Abidjan, IVORY COAST

**Injured** : 0      **Dead** : 0

---

**Abstract**

Storage tank fire at a refinery.

[fire - consequence]

---

**Lessons**

[None Reported]

---

5972 02 March 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAY.; LLOYDS LIST, 1993, 4 MAR.

**Location** : Agioi Theodoroi, GREECE

**Injured** : 7      **Dead** : 0

---

**Abstract**

An explosion occurred during the testing of an empty oil tank by hydraulic pressure. Substance: water.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Tank explosion attributed to reaction in carbon drum on vapour recovery system. An explosion in a tank lifted the roof and deposited it 175 feet southward. After the explosion, the tank wall and floor remained intact. There was no leakage of tank contents noted after the event. The most likely cause was the presence of a mixture in the vapour space of the tank and overheating of the carbon drum on the tank vent presented a source of ignition.  
[unwanted chemical reaction, drums]

---

**Lessons**

Installation of vapor recovery measures can introduce "hidden" hazards to a site.

---

5967 26 February 1993

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1993.

Location : Warrington, UK

Injured : 0      Dead : 0

---

**Abstract**

Bomb explosion destroyed natural gas storage tank. Fire followed. Led to the evacuation of 250 families.

[sabotage, fire - consequence]

---

**Lessons**

[None Reported]

---

**5963 22 February 1993**

**Source** : THE CHEMICAL ENGINEER, 1993, MAR.; ENDS REPORT NO.223, 1993, AUG., & 1994, MAR.; FIRE PREVENTION NO.270, 1994, JUN.

**Location** : Overly; Telford, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire in storage area. Drums exploded and propelled through the air. Company and managing director fined. Substances involved: pesticides and mercury chemicals.

[fire - consequence, explosion]

---

**Lessons**

[None Reported]

---

5954 16 February 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, APR.

Location : Ponta Grossa, BRAZIL

Injured : 0      Dead : 0

---

**Abstract**

Explosion and fire in storage tanks at factory. 4 tanks destroyed and extraction equipment damaged. Substance involved soya oil.

---

**Lessons**

[None Reported]

---



**5951 13 February 1993**

**Source :** HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, APR.

**Location :** Off Madeira, MADEIRA

**Injured :** 2      **Dead :** 1

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**Abstract**

A marine transportation incident. Explosion during tank cleaning in ballast of a marine tanker. Substance involved: oil residue. Fatality

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**Lessons**

[None Reported]

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5947 08 February 1993

Source : LLOYDS LIST, 1993, 11 FEB.

Location : Achim; Bremen, GERMANY

Injured : 0      Dead : 0

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**Abstract**

Warehouse containing 20 tonnes of PVC and 20 tonnes of plastics pellets caught fire.

[fire - consequence, warehousing]

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**Lessons**

[None Reported]

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5927 17 January 1993

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAR.

**Location** : Escombreras, SPAIN

**Injured** : 0      **Dead** : 0

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**Abstract**

Explosion and fire in blending tank at oil refinery. Substance involved crude oil.

[fire - consequence, processing]

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**Lessons**

[None Reported]

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5924 15 January 1993

**Source** : LLOYDS LIST, 1993, 16 JAN.

**Location** : Paulinia; Campinas, BRAZIL

**Injured** : 0      **Dead** : 0

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**Abstract**

Lightning caused explosion and fire in storage tank causing loss of 2.5 million litres of diesel.

[fire - consequence]

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**Lessons**

[None Reported]

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5919 13 January 1993

**Source** : CHEMICAL ENGINEER, 1993, 28 JAN.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAR.

**Location** : Pyle; Mid Glamorgan; Wales, UK

**Injured** : 3      **Dead** : 1

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**Abstract**

Fire broke out during cleaning of process tank and swept through plastics factory on industrial estate. Fatality.

[fire - consequence]

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**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

**Location** : Chongju, SOUTH KOREA

**Injured** : 0      **Dead** : 0

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**Abstract**

Fire detonated LPG storage tanks in basement of 4 storey apartment block and levelled building.

[fire - consequence]

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**Lessons**

[None Reported]

---

Source : ICHEME

Location : Florida, USA

Injured : 0      Dead : 1

---

**Abstract**

An explosion and fire occurred on a tank, 100 feet in diameter, with a covered floating roof (steel pan).

The tank's content was unleaded gasoline with added butane to increase RVP. Exact composition of fuel not known.

A tanker was unloading gasoline to the tank when, during the night of 2 January, 1993, an overflow occurred. The overflow from the tank was estimated to be about 50,000 gallons in size. Intended transfers to another tank had not occurred. At about 03.15 hours there was a tremendous explosion which rocked the area, with a fireball sent hundreds of feet into the air.

Only one operator was on duty and had, at some time, driven his vehicle (gasoline engine) into the banded area presumably to monitor tank filling.

It was subsequently established that the incoming fuel flow was such that fuel was ejected through the top roof vent so that thousands of gallons of fuel covered the area both inside and outside the bund. Potential ignition sources included the operator's company vehicle (his body was found about 10 feet from the vehicle), overhead power lines, or other sources outside the banded area.

[fire - consequence, floating roof tank, static, road transport, fatality]

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**Lessons**

[None Reported]

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Source : ICHEME

Location : ,

Injured : 2      Dead : 1

---

**Abstract**

Major fire in tank farm. A floating roof tank was overfilled with gasoline to the point where spilled gasoline was both inside and outside the bund. A tremendous explosion occurred, and a fireball was sent hundreds of feet into the air. The basic cause of this incident was inadequate monitoring of tank filling. Fatality. [design or procedure error, fire - consequence]

---

**Lessons**

Review tanker pump-in rates, automatic cutoffs, communications between ship/shore. Internal roofs may fail for a number of reasons but management should assure themselves that this does not occur because of weaknesses in their systems of operations/provisions of suitable instrumentation, etc.

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5903 January 1993

**Source** : CHEMICAL WEEK, 1993, 3 FEB.

**Location** : Houston; Texas, USA

**Injured** : 1      **Dead** : 1

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**Abstract**

Welding on the top of a tank caused an explosion in a nearby tank containing sodium sulphide and residual hydrocarbons. Fatality.

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**Lessons**

[None Reported]

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Source : ICHEME

Location : ,

Injured : 2      Dead : 1

---

**Abstract**

A marine transportation incident. Gassing incident during unloading of sour crude oil from a marine tanker. Two inspectors and one crew member were gassed during sampling/measuring of the ship's tanks. Protective equipment was not used in this hazardous atmosphere, and workers were not aware of the potential hazards of H<sub>2</sub>S, hydrogen sulphide. Fatality.  
[asphyxiation, safety procedures inadequate]

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**Lessons**

With the introduction of inert gas blanketed cargo tanks, the latter no longer "breathe" on voyage; and, therefore, even small concentrations in the liquid space build up to high values in the vapour space. Exposure of personnel to this inert gas/H<sub>2</sub>S mixture will produce rapid loss of consciousness leading to death. Rescue attempts should only be made when wearing the appropriate respiratory protection.

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**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1994, MAR.

**Location** : Boston, USA

**Injured** : 13    **Dead** : 0

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**Abstract**

2 explosions occurred at tantalum plant when residual sodium was being cleaned out of drums.

[cleaning]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1993, DEC.

**Location :** , GERMANY

**Injured :** 0      **Dead :** 0

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**Abstract**

Rupture of dinitrobenzene tank. During cleaning of a tank at 130 degrees C, the tank split and fractured pipework. It was thought that picric acid and styphnic acid had become enriched in the residue through insufficient washing on previous occasions.

[cleaning inadequate]

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**Lessons**

[None Reported]

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5896 1993

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1993, DEC.

**Location :** , GERMANY

**Injured :** 0      **Dead :** 0

---

**Abstract**

An explosion occurred in a bitumen storage tank at 200 degrees C, 70 degrees C below the flash point.

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**Lessons**

[None Reported]

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**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1993, APR.

**Location** : Belle Chase; Louisiana, USA

**Injured** : 0      **Dead** : 0

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**Abstract**

An explosion occurred when an alkylphenol based detergent was being transferred out of one storage tank and in to another.

[material transfer]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1993, DEC.

**Location :** , GERMANY

**Injured :** 0      **Dead :** 1

---

**Abstract**

An aqueous dispersion was kept under nitrogen. A loading error required the tank to be emptied, cleaned and refilled. The operator went away to check the water supply, the driver opened the manway lid to check that the tanker was empty. He was found dead inside the tanker having lost consciousness and fallen in. Fatality.

[asphyxiation]

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**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

An operator detected a fire on the floating roof of crude oil storage tank. The fire, which was in the seal area of the roof, was successfully extinguished by foam application from fixed pourers and branch pipes and by cooling the tank shell.

An electrical storm was taking place at the time of the incident, with electrical strikes to ground, this is considered to have been the most likely source of ignition of crude oil vapours.

There were no casualties caused by the incident. Damage occurred in the primary and secondary seals of the tank and to the shell upper structure, with inspection of internal parts of the

double deck external roof awaiting tank emptying. Damage costs \$145,000 (1992) and \$17,000 (1992) for foam concentrate.

[floating roof tank, fire - consequence, damage to equipment, weather effects, lightning]

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**Lessons**

[None Reported]

---



Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A fire was detected by a refinery off-site operator, at roof level of a 19.5 metre high external floating roof crude storage tank.

Losses were of \$165,000+ (1992), and half of the primary and secondary seals of the tank were damaged there was also shell deformation in the upper structure.

Environmental damage. At the time of the accident weather conditions were poor and there was a great quantity of lightning. High intensity lightning would produce a spark even if the tank is equipped with safety preventative equipment and the seal in good condition, as was the case in this incident.

[floating roof tank, refining, fire - consequence, damage to equipment]

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**Lessons**

Once lightning protections are installed and seals and roofs are properly maintained, the emphasis has to be put on having adequate fire-fighting capabilities, and properly training refinery personnel.

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**Source :** HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

**Location :** Savona, ITALY

**Injured :** 0      **Dead :** 0

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**Abstract**

Crane cable broke when loading gas tanker cargo tank weighing 350 tonnes.

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**Lessons**

[None Reported]

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**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

**Location** : Billings; Montana, USA

**Injured** : 0      **Dead** : 7

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**Abstract**

Transportation. A cessna aircraft crashed causing a natural gas pipeline to ruptured and intense fire burnt warehouse. Fatality.  
[fire - consequence]

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**Lessons**

[None Reported]

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**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

**Location** : Rio Segundo, ARGENTINA

**Injured** : 0      **Dead** : 5

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**Abstract**

Explosion in storage tank containing 2000 litres of sulphuric acid at confectionery factory. Five killed from toxic fumes. Fatality.

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**Lessons**

[None Reported]

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