

5418 23 August 1991

Source : NEW CIVIL ENGINEER, 1991, 5 SEP.

Location : Sleipner A; Gandsfjord; Stavanger, NORWAY

Injured : 0 **Dead :** 0

Abstract

The 500,000 tonne base of an offshore platform sank and imploded during a ballasting test. Sudden failure of a sealed wall opening seems the most likely reason why water penetrated the drill shaft.

[capsize of platform, implosion]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

A road transport incident. A tank truck catastrophically collapsed as it was unloading a hazardous liquid.

The 6,300 gallon tank on the trailer had a nameplate design pressure of 30 psig, and appeared to have been very well maintained before the incident.

The truck arrived about 09.00 hrs and was set up for unloading about 09.15 hrs. A 3 inch unloading hose was connected to an unloading pump by an operator and a three quarter inch nitrogen hose was connected to a manifold which was located just forward of the rear wheels on the trailer.

The operator opened the valves on the nitrogen supply line, both upstream and downstream of the pressure regulator to pad the truck. The truck manifold pressure gauge read the expected 20 psig. The operator opened the proper delivery valves and started the unloading pump.

At this point the unloading activity appeared normal. The truck driver checked the sight glass on the truck and informed the control room that the truck was empty. The busy operator passed by and observed that the unloading hose was still vibrating, which indicated that the tank truck was not quite empty.

About 10.05 hrs, people in the area reported hearing a loud rumbling noise, and they observed the collapse of the tank. There were no injuries, no leak of hazardous material, and no damage to the plant receiving the feedstock. Engineers determined that a nitrogen valve was open connected to the tank trailer manifold, but there was a failure to open the valve on top of the tank.

It seems that the driver misunderstood a nitrogen supply piping modification.

Investigators discovered a device which appeared to be a combination safety relief valve and vacuum breaker; however, it was subsequently established that the tank was not equipped to deal with vacuum.

[design or procedure error, implosion]

Lessons

[None Reported]

Source : ICHEME

Location : , LIBYA

Injured : 0 Dead : 0

Abstract

A 20,000 cubic metre methanol storage tank was being used to load a chemical marine tanker by gravity flow. The tank is twin-walled design with outer diameter of 33 metres and 27.4 metres high. The tank is provided with a nitrogen inlet line through a flame arrester and has a PV valve followed by a flame arrester to atmosphere. While loading the tanker by gravity the roof of the tank bulged inwards due to vacuum that had occurred in the tank. Nine I beams in the roof were found to be severely distorted. The crown of the roof was tilted downwards.

No investigation of the accident is reported but the possible causes are:

1. The flame arrester on the outlet of the PV valve may have been blocked from sandstorms. There was no evidence of inspection of the flame arrester.
2. The nitrogen supply was isolated.
3. The dip hatch was used to sample the contents and was supposed to be left open but it could have been shut.

[storage tanks, implosion, design or procedure error]

Lessons

Procedure for the operation and inspection of a tank is important and had to include:

1. Maintain and inspect PV Valve and flame arrester on a regular basis.
 2. A flame arrester after a PV valve is not required in most codes.
 3. Dip hatches should be closed at all times to prevent increase of lightning.
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Source : ICHEME

Location : , KUWAIT

Injured : 0 Dead : 0

Abstract

Damage to a refinery storage cone roof tank due to a vent blocked implosion.

[damage to equipment, refining]

Lessons

[None Reported]

1378 14 May 1977

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Damage to a cone roof tank at a refinery plant storage. Cause: vent blocked implosion.

[damage to equipment]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 **Dead :** 0

Abstract

Implosion in storage tank area of refinery plant.

[refining]

Lessons

[None Reported]

1006 16 March 1975

Source : 100 LARGEST LOSSES A THIRTY YEAR REVIEW OF PROPERTY DAMAGE LOSSES IN THE HYDROCARBON-CHEMICAL INDUSTRIES, MARSH & MCLENNAN PROTECTION CONSULTANTS, 9TH EDITION, 1986.

Location : Avon; California, USA

Injured : 0 **Dead :** 0

Abstract

Observing a high liquid level in feed drum of fluid coking unit, operators increased the pump out rate. The drum was sucked in, implosion, and spilt hot oil which ignited and burnt for 11.5 hours. Instrumentation failure was responsible for a second fire on a gantry structure.

[operator error, fire - consequence, processing, spill]

Lessons

[None Reported]

Source : BOND J, CASE STUDIES OF UNSTABLE SUBSTANCES, ICHEME SYMPOSIUM SERIES NO.102.

Location : ,

Injured : 0 **Dead :** 0

Abstract

A tank of ethanolamine was emptied and steam put onto the coil to warm the remaining residue prior to draining. The storage tank was seen to be heating and then imploding. Investigation found the formation of an iron complex which decomposed at 110 degrees C. The vent was blocked and the carbon dioxide dissolved into the ethanolamine and the tank imploded.

[implosion, storage tanks]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A liquor tank containing a small quantity of ammonia imploded, probably due to gas developing in water in the closed vessel.
[implosion, unwanted chemical reaction]

Lessons

[None Reported]

9651 Date Unknown

Source : MANUFACTURING CHEMISTS ASSOCIATION 1966 VOL. 2, CASE HISTORY 916.; LOSS PREVENTION IN THE PROCESS INDUSTRIES, F. LEES.

Location : ,

Injured : 0 **Dead :** 0

Abstract

A 40,000 gal horizontal tank was used to produce aqueous ammonia by introducing water at the top and anhydrous ammonia at the bottom. The tank was emptied and the water flow was started to make the next batch. The tank imploded due to the vacuum created by the absorption of the ammonia vapours by the water.

[implosion, mixing, gas / vapour release]

Lessons

[None Reported]

9667 Date Unknown

Source : MANUFACTURING CHEMISTS ASSOCIATION 1966 VOL. 2, CASE HISTORY 1011.; LOSS PREVENTION IN THE PROCESS INDUSTRIES, F. LEES.

Location : ,

Injured : 0 **Dead :** 0

Abstract

Acetic acid was being pumped out of one compartment of a two-compartment trailer. The manhole cover was propped open. The operator climbed on the tanker to obtain a sample. In order to do this he had to lift the manhole cover back. When he had taken the sample, he closed the manhole cover completely. A few seconds later the tank imploded as a result of the vacuum generated by the continued pumping. The tank was equipped with a spring-loaded vacuum breaker, but either this failed to open or it was undersized.

[material transfer, sampling, road tanker, implosion]

Lessons

[None Reported]

11465Date Unknown

Source : UNUSUAL INCIDENTS AT GAS WORKS AND THEIR LESSONS (PART III), COMMUNICATION NO. 564; TRANS. INST. GAS ENG.

Location : , UK+

Injured : 0 Dead : 0

Abstract

In a sequence of six tower box purifiers, No. 4 was in fifth position for 24hr and then in sixth position for 16hr, during which air admission amounted to 1.6% and 2.3% respectively. The 12 trays were then stacked in the spent-oxide storage tower, purged with inert gas containing 2% oxygen, and sealed. Four days later the tower was vented and the lid removed. One tray was withdrawn and the lid replaced. Forty minutes later a loud "boom" was heard and the sheeting of the tower found drawn in. A vacuum was found which continued to build up until a second "boom" was heard. The purging machine was started up to raise the pressure and when above atmospheric, purging continued with 2% oxygen gas throughout. However, vacuum was found later, and it was decided to vent the tower, and no further trouble was found.

[storage equipment, implosion]

Lessons

The cause is in some doubt. Most likely, the oxide was not fully revived. The presence of 2% oxygen resulted in a continuing action, the absorption of oxygen causing a slight vacuum during standing. The removal of a tray drew in a large quantity of air which was again absorbed, causing a further reduction in pressure. The high percentage of oxygen in the purge gas was due to an equipment fault, but was accepted as reasonable. Alternatively, the absorption of carbon dioxide by the oxide may have been a contributory factor. Incident shows the need to provide a small permanent vent in the tower.

12849Date Unknown

Source : QUARTERLY SAFETY SUMMARY, 1974, VOL.45, NO. 179.

Location : ,

Injured : 0 Dead : 0

Abstract

Three flasks supported in metal casings and fitted with vented covers containing solid carbon dioxide imploded. The cause of the implosion was due to spontaneous collapse.

Two of the explosions were contained within the metal casings but the third dispersed fragments of glass over the laboratory. Fortunately no one was injured. [implosion, material of construction failure, container, laboratory work]

Lessons

[None Reported]
