

Explosioner med påföljande kemikalieutsläpp på en kemikaliefabrik.

911213 MARS 1991_27

På ett område med flera lagertankar om 600 kubikmeter, de flesta av dem fyllda till en tiondel pågick underhållsarbete. En bro skulle byggas mellan två tankar. Vid antingen borr- eller skärverksamhet antändes och exploderade den ena av tankarna strax följd av den andra. Det visade sig att den ena av tankarna varit fodrad med asbest. Kemikalierna som stömmade ut efter explosion antändes och orsakade en tredje, mindre explosion. Splitter från de första explosionerna punkterade en tredje tank med toluen som läckte ut och antändes. Vid undersökning fann man att arbetsorderna givits på otillräckligt underlag om säkerhet.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
bensoesyra	65-85-1	okänt
toluen	108-88-3	okänt

Skador:

Människor:	6 personer omkom vid explosionen. 1 person skadades allvarligt vid explosionen och avled några månader senare. 3 personer ble lindrigt skadade.
Materiella:	Anläggningen totalförstördes. Fönster i omgivningen krossades.
Miljö/ekologi:	Inga effekter rapporterade.
Infrastruktur:	Inga.

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1991_027_01

reported under Seveso I directive as major accident reports: SHORT

Date of Major Occurrence: Time of Major Occurrence

start: 1991-12-13 start: 10:24:00

finish: finish:

Establishment:

name:

address:

industry: - not applicable -

Chemical Industry (intermediate) Production of phenol and benzoic acid.

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

Date of Report:

short: full:

Authority Reporting:

name:

address:

Authority Contact:

rep_cont_name:

rep_cont_phone:

rep_cont_fax:

Additional Comments:

a) - not applicable -

b) - not applicable -

c) - not applicable -

d) - not applicable -

e) - not applicable -

Short Report

country: FA **ident key:** 1991_027_01

Accident Types:

release: Yes **explosion:** Yes

water contamination: No **other:** No

fire: Yes

description:

The tanks D1102, D102a-c are used for benzoic acid storage at 150 degrees celsius. Activities were performed to create a bridge between the two tanks just before the accident. An explosion of tank D1102, which caused a second explosion, the... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: Yes **explosive:** Yes

ecotoxic: Yes **other:** No

flammable: Yes

description:

Explosion of vapour/gas and solid/dust. The tanks were 1/10 full (600m3 per tank) ... see Appendix Short Report / description of substances involved

Immediate Sources of Accident:

storage: No **transfer:** No

process: No **other:** No

description:

- not applicable -

Suspected Causes:

plant or equipment: No **environmental:** Yes

human: Yes **other:** No

description:

The most probable cause was ignition of the explosive air/mixture by drilling or cutting activities. This

happened following several human procedural errors which accumulated to the final result. These procedural errors concerned:... see Appendix Short Report / description of suspected causes

Immediate Effects:

material loss: Yes

human deaths: Yes

human injuries: Yes **community disruption:** No

other: No

ecological harm: No

national heritage loss: No

description:

Casualties: 10 in total, namely: 6 persons killed by explosion; 1 person severely injured by explosion/fire and hospitalized (died later in spring 92); 3 persons lightly injured, but not hospitalized.... see Appendix Short Report / description of immediate effects

Emergency Measures taken:

on-site systems: No **decontamination:** No

external services: Yes **restoration:** No

sheltering: Yes **other:** Yes

evacuation: No

description:

A year after the incident newspaper articles report that at the time of the incident personnel from DSM chemicals did not have ready knowledge of the fact that benzoic acid can develop explosive gas mixture under certain circumstances. A sa... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: Yes

description:

The main problem after the incident were the large amounts of white asbestos scattered around and outside the establishment. Sufficiently protected fire brigade personnel took care of the removal of the asbestos on the days immediately afte... see Appendix Short Report / description of immediate lessons learned

Appendices for the FA / 1991_027_01 report

Appendix Short Report / description of accident types:

The tanks D1102, D102a-c are used for benzoic acid storage at 150 degrees celsius. Activities were performed to create a bridge between the two tanks just before the accident. An explosion of tank D1102, which caused a second explosion, the explosion of tank D102a. The following day it turned out that tank D102a was insulated with white asbestos, part of which was blown away through the explosion. A small third explosion took place outside the tanks, because benzoic acid had streamed out of tank D102a. Due to a fragment of either one of the exploded tanks, tank D151 at approx. 40m. distance got a leak. This tank contained toluene which streamed into the tank pit. the explosions also created some fires around the tanks, and a big fire in a chemical waste depot. Some buildings and process equipment was damaged by several fragments.

Appendix Short Report / description of substances involved:

Explosion of vapour/gas and solid/dust. The tanks were 1/10 full (600m³ per tank)

Involved in the explosion: Benzoic acid CAS:65-85-1

Fire, pool tank fire (mass involved unknown)

Release of toluene CAS:108-88-3 (involved mass approx. 1 kg/s)

Appendix Short Report / description of suspected causes:

The most probable cause was ignition of the explosive air/mixture by drilling or cutting activities. This happened following several human procedural errors which accumulated to the final result. These procedural errors concerned:

- the contractors had all the necessary permits to do the job, but after investigation of the incident it became clear that the permits were issued on false grounds;
- no explosion measurements had been carried out before permission was given to start work on the tank. In retrospect and after research had been done as a result of the incident, it turned out that the safety awareness that benzoic acid is flammable and can possibly lead to explosion was not sufficiently known by DSM Chemical's employees.

Appendix Short Report / description of immediate effects:

Casualties: 10 in total, namely: 6 persons killed by explosion; 1 person severely injured by explosion/fire and hospitalized (died later in spring 92); 3 persons lightly injured, but not hospitalized.

Material damage: approximately 16 million Dutch Guilders in total, varying from broken windows to a completely destroyed plant. These costs can be specified as follows:

- costs for DSM: material damage larger than 15 million guilders;
- costs for disaster control: no information available but estimated between 10.000 and 30.000 guilders (time used by personnel on evaluations, research etc.)

Appendix Short Report / description of emergency measures taken:

A year after the incident newspaper articles report that at the time of the incident personnel from DSM chemicals did not have ready knowledge of the fact that benzoic acid can develop explosive gas mixture under certain circumstances. A safety study by DSM Chemicals will be performed to analyse all properties of benzoic acid. All necessary changes will be made according to the results of the mentioned study. The internal safety procedures will be more strict. The management has promised to create a better control of these activities.

Appendix Short Report / description of immediate lessons learned:

The main problem after the incident were the large amounts of white asbestos scattered around and outside the establishment. Sufficiently protected fire brigade personnel took care of the removal of the asbestos on the days immediately after the explosion.

Texten som följer hör inte hit:

(1) the fire water was contaminated with gasoline due to violation of procedures (back-flow through a hose, connecting a hydrant and a drum) (2) no safety advice during contract negotiations for renting the mobile pump The Internal Emergency Plan was activated (code 7100). Gaz de France put in operation the safety resources (personnel and materials [code 7201]) available at Beynes (Yvelines). The release was halted with the assistance of a specialized contractor (code 7205) called in by the manufacturer, who covered the escape source with sludge and brought the bar to its original position by increasing the loading on it (code 7501). The External Emergency Plan was activated and the Authorities were alerted (code 7200). The Fire Brigade was mobilized but its intervention was not necessary (code 7201). The Police (code 7203) kept curious people away at a safe distance of 300m (code 7207). No emergency measures are still required, neither on-site nor off-site (code 7703).