

2007-12-21

Major accident report

With reference to At manual C.0.3 (the applicable guideline by the Danish Working Environment Authority, "Arbejdstilsynet"), we hereby send details as required by clause I as a result of the accident that has occurred:

A. Date, time and place, including name of business.

The accident occurred at 01:42 on 4 December 2007 in the basement below under the dry fractionating plant at Slipvej 1, Port of Århus.

The name of the business is:

AarhusKarlshamn Denmark A/S
M. P. Bruuns Gade 27
8000 Århus C
Denmark.

B. Circumstances of the accident, including cause and consequences.

The Fractionating building consists of 3 fire sections containing the following sections:

- Fractionating plant with hexane.
- Tank space for vegetable oil at the lowest level, starting below ground level.
- Pump room for vegetable oil, starting below ground level. There is a fractionating plant that does not use hexane located on the floors above the pump room.

There are several storage tanks for hexane in the ground outside the building. Transport of hexane between underground tanks and the processing plant that uses hexane is by pipes that are connected by pumps. The route of the pipes is in covered concrete ducts from the underground tanks to the pumps, which are located in the open air at ground level outside the pump room and tank room. From the pumps the pipes continue in the open to the exterior wall and run from there to the processing plant.

After the accident it was observed that a relatively new pipe in the concrete duct had begun to leak as a result of corrosion. The leak gave rise to unstable pumping. As a result of the leak, hexane flowed out into the concrete duct. This duct was constructed to collect hexane in the event of a possible leak. This system has no sources of ignition that could ignite hexane vapour.

The concrete duct terminates at the outer wall of the building at the break between the pump room and the tank space. Hexane could have permeated through the wall, whereupon an explosive gas mixture was produced in the pump room.

It has up to now been regarded as inconceivable that hexane could penetrate through the wall and hence the tank space and pump room, where there should not be any hexane, are not classified as specially secure areas without sources of ignition. Penetration by hexane means that an explosive gas mixture could be ignited by the electrical equipment.

There were 3 staff (2 operators and 1 team leader) in the department at the time of the accident. Shortly before the accident occurred, one operator noticed a slight smell of hexane in the section of

the building where the dry fractionating plant is located. The substance is not used in this section of the building. They decided to find the cause of the smell.

One member of staff was outside the building by the pumps that are used to pump hexane to the fractionating plant when the explosion occurred in the underground pump room and was killed.

The cause of the accident was thus a combination of circumstances that resulted in hexane vapour being generated in a room with sources of ignition that then triggered an explosion.

The consequences of the explosion are that one person was killed.

The subsequent fire of leaking hexane was extinguished by Århus Fire Service.

The pressure wave from the explosion damaged the structure of the building around the pump basement and demolished partitions, windows and doors in adjoining rooms. There was corresponding damage to the electrical systems and piping and tank installations.

C. The substances involved

The substance involved was the solvent hexane.

D. Information for assessment of the consequences of the accident for people in and outside the business and environmental consequences

No physical harm to other persons have been observed, but the accident has affected an unknown number of people mentally.

No damage to the environment has been recorded.

E. The emergency actions taken

- The staff have been offered crisis and psychological help.
- Hexane in the covered concrete ducts has been removed.
- The connection between the underground hexane tank and the fractionating plant has been blanked off.
- The damaged piping installations have been removed.
- The electrical systems have been repaired so as to ensure that safety systems in the fractionating plant work.

These safety systems are:

- Ventilation
- Gas detection
- Fire alarm
- Automatic fire extinguishers.