

# Double fatality due to explosion of a water-condensate tank

**Date & time of incident**

31-05-05, 09:00 a.m.

## Incident description

At 09:00 a.m. on the 31<sup>st</sup> May 2005 an explosion occurred, followed by a fire, at the incident location in the North of the Netherlands. Since February 2005, refurbishment and inspection activities had been carried out on the location for which parts of the plant and the adjoining tank were made safe. The incident took place during pipe work installation of a vapour recovery system on the tank roof.

## Outcome

The tank explosion and subsequent fire killed a welder and a fitter working on the roof and injured two other persons.

## Immediate causes

- The tank contained approx. 170m<sup>3</sup> of water and 30m<sup>3</sup> condensate with oxygen ingress possible via the pressure vacuum valve and installed piping.
- Welding had taken place on the tank roof on the day prior to the incident as well as on the day of the incident. However, the direct ignition source has not been confirmed with absolute certainty.
- There was no positive isolation (spade) between the tank and new pipe work.

## Contributory factors

- The work permit stated that there was condensate in the tank and that hot work was allowed. The permit did not specify where the hot work could take place. It was issued for all activities related to pipe work for the vapour recovery system.
- The work permit indicated the work was low risk and therefore did not trigger a job safety analysis (JSA).
- Not everybody was aware of the presence or the risk of condensate in tank T3.
- The design philosophy had not been adequately integrated in the planning and execution.
- The complexity of the organisation and the supervisory structure has also been identified as a contributory factor to the incident.

## First Lessons learned

The key controls preventing hot work in the hazardous area of the plant were not effective. Specific actions will be developed to analyse and improve the controls for:

- Hot work near tanks and vessels with hydrocarbon inventory,
- Positive isolation,
- Work permits.

Further investigations will focus on:

- The overall HSE-coordination on site,
- Quality of work preparation and planning,
- Understanding the breakdown in risk management and controls from conceptual design, detailed design through to construction and commissioning,
- Clarifying the organization, including responsibilities and controls, site-supervision and contractual relationships.

## Provision of photograph or sketch



Partly installed pipe on roof before the accident (status 20 May 2005).



An overview of situation after the accident