Learning from Incidents

Incident	**Single tank fire and explosion during gas free operation**
Country of incident	China
Date of incident	November 2013

Brief account of the incident

A 3000 m^3 tank, exploded during gas freeing operation. The tank was emptied of Toluene after loading it to a ship. The top and bottom of the tank were opened for ventilation. An (Ex-d) electrical blower, with damaged power supply cable, was installed in one of the ground level manholes to ventilate the tank using forced air flow. A fixed gas detection system installed around the tank generated an alarm in the central control room. As the blower was turned on the tank exploded blowing off the roof, landing around 40 meters away from the tank shell. After the explosion a small fire continued in the tank shell/sump pit that was extinguished by operators with water.

There were no personal injuries, spills or damage to other tanks, pumps or pipelines.

Lessons Learnt

- Gas free operations are extremely hazardous; using forced ventilation must only be done using a system where a flammable atmosphere cannot come in contact with any potential source of ignition until maintained <10% LEL.
- For gas freeing, tank cleaning and tank ventilation tasks you must check and confirm that you have a safe operation, Vopak requires the following:
    - **>10% LEL**; ventilation only by system with no moving parts (i.e. venturi).
    - **<10% LEL** (and maintained at this concentration); air driven ventilator fan may be used.
    - **Clean tank** for confined space entry; electrically driven fan with correct hazardous area classification.
- Procedures must be checked to ensure that they are accurate and correct; check on translations to ensure they are accurate and correct for the context.
- Ensure that your workers fully understand the risks of the environment they are in and the tasks they execute.
- When alarms are generated there must be an effective alarm management process implemented with clearly defined priorities and corrective actions.