



Accidents with LPG in Norway

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The Lillestrøm LPG Accident April 5 2000



Photos: NRBR



Introduction

- Transport of LPG – not Seveso.
- Norway's most serious accident with LPG, also described as the most dangerous LPG-situation Europe has ever seen.
- Potential for massive loss of lives – 2000 people were evacuated from the centre of Lillestrøm.
- One of few accidents with dangerous substances in Norway that has been investigated by a government-appointed commission.
- Important lessons to be learned regarding how dangerous an LPG tankfire can be, and how important good land use planning and external emergency plans are.

The accident

- A train with two fully loaded LPG tanks (92 tons) lost brake power and collided with a waiting train at Lillestrøm train station, the LPG-tanks derailed.
- LPG started to leak from both tanks and caught fire, and the potential for a disaster was there:
 - 200 meters from the centre of Lillestrøm
 - The accidents happens 00:57, cooling of the tanks starts 03:05, the tanks were quickly getting overheated.
 - Over the next hours more and more water cannons were brought in and the tank temperature was lowered



Photo: NRBR

The accident

- Thursday April 6 an increasing wind caused the water cooling to become less efficient. Efficient cooling was essential to avoid a BLEVE
- A team of swedish gas experts were brought in, in an attempt to empty the tanks by controlled burning off of LPG.
- The fire needed to be put out before this could happen, but all actions were unsuccessful.
- The fire spread to the top of one tank, probably because of a cracked weld.



Photo: NRBR

The accident

- Late Thursday night all personnell close to the tanks were removed from the site and the tanks were left without cooling for a couple of hours, and the risk of a BLEVE was greater than ever before.
- Statoil made a plan for how to burn off the contents of the tank in a more controlled manner
 - For the second tank at the back, this could be done by connecting of flexible piping to the tank valve
 - For the front tank new valves were installed by hot-tapping – an operation that required specialist personnell
- Late April 8 the contents of the tanks was burned off.



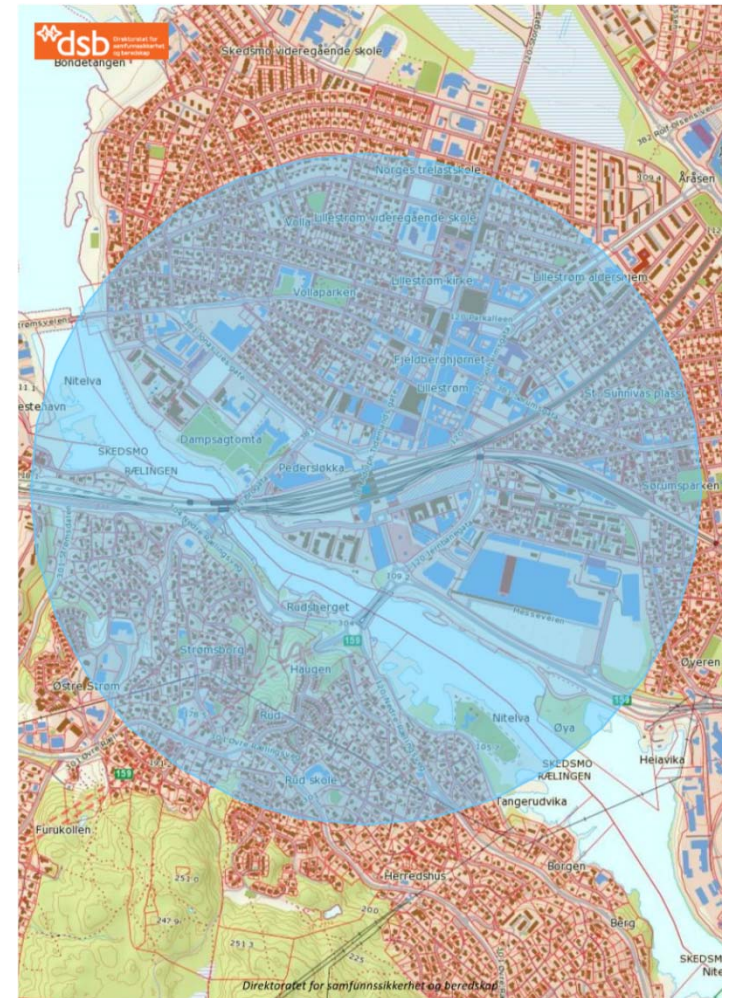
Photo: NRBR





Evacuation during the 5-day incident

- April 5 , 30 minutes after the accident, the station area was secured, and shortly after an evacuation zone of 200 meters established.
 - One of our colleagues, a father of 4, was sent up to Lillestrøm to assist the police
- Our colleague recommends 05:20 that the safety zone must be extended to 750 – 1000 meters, and that all citizens within should be evacuated.
 - 2000 people were then evacuated, including patients in the local hospital
- Sunday April 9, the evacuated people can return to their homes.
- No people were injured!

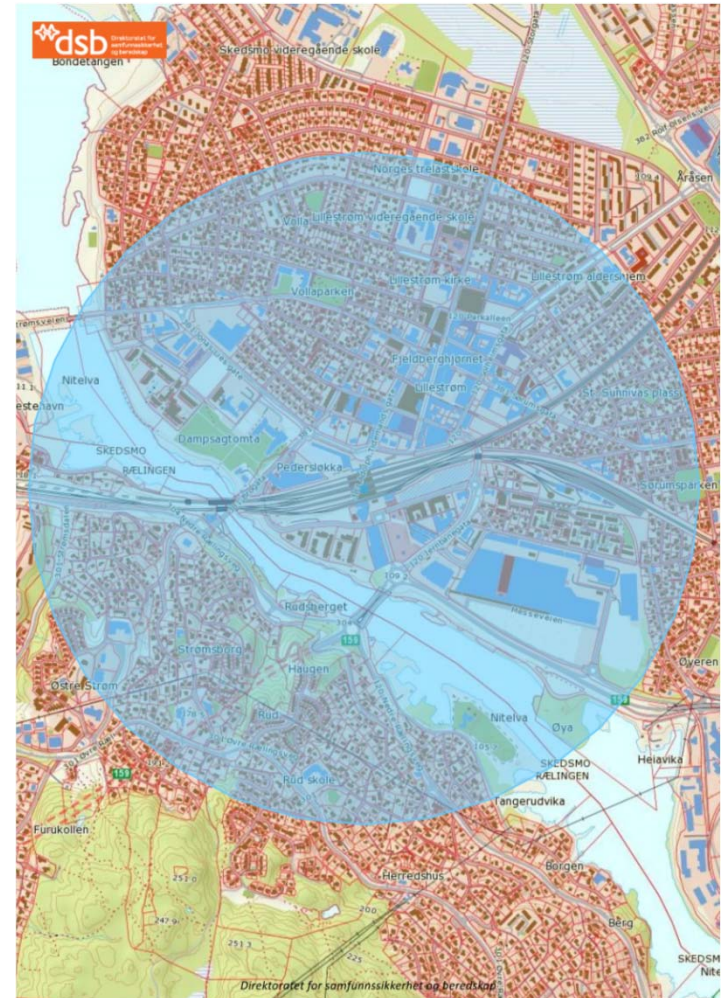


This accident demonstrates

The importance of

- Land Use planning
- Emergency preparedness and training
- Information to population

How vulnerable we are if an accident occurs

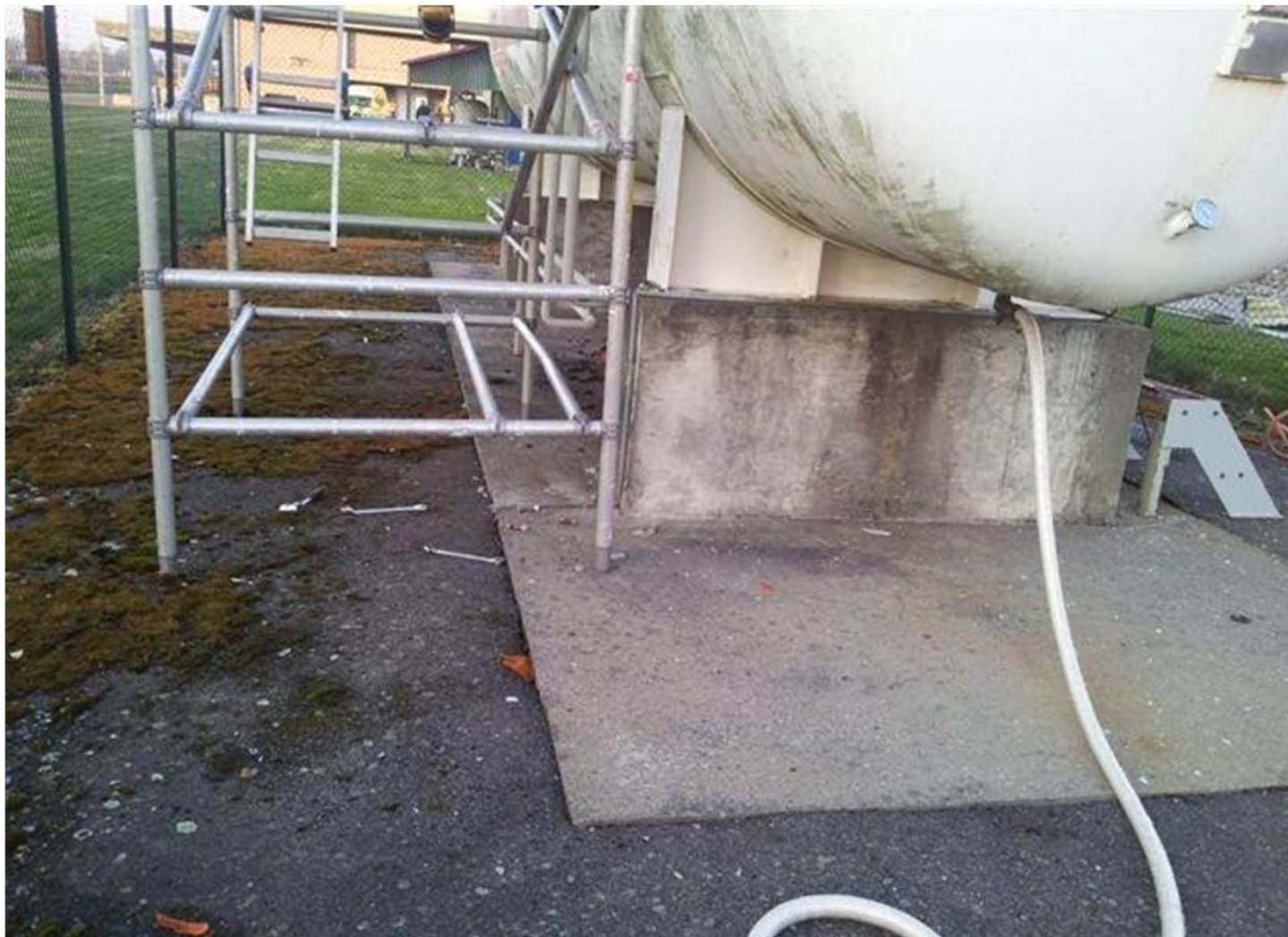


2012 - LPG accident at a food-factory –non Seveso



Introduction

- LPG was used for heating of water and production of steam – 30 kbm storage tank.
- The factory had engaged an experienced company to requalify the tank according to the regulated 10 year frequency.
- The company performing the requalification were emptying the tank by pumping the liquid phase LPG to transportable tanks, and thereafter burning off the gasphase.
- In order to enhance the pressure in the tank and speed up the burning off process, the company connected a water hose from the factory water purification plant to the bottom of the LPG tank.





The accident

- Father and son was performing this work.
- The son leaves the site in order to buy lunch.
- When he leaves the flare is burning, the manometer on the tank shows 0,5 bar overpressure.
- As he returns from shopping an explosion occurs in the water purification unit, the entire building collapses and several nearby buildings are damaged by the overpressure.
- The father dies.









What went wrong?

- The connection of the waterhose to the tank was highly irregular, and a back-flow of gas from the tank to the water purification plant occurred.
- The explosion in the water-purification plant was caused by non-ex equipment.
- When our colleague went to the factory to find out what had caused this to happen, he found that a lot of irregularities had taken place which caused this accident to happen.
- Even «non-Seveso» amounts of LNG can create havoc.