

BLEVE!

Twenty-five years ago, on Nov. 19, 1984, a major fire and series of catastrophic explosions occurred at a liquefied petroleum gas (LPG) storage and distribution terminal in Mexico City. About 600 people were killed, around 7,000 were injured, 200,000 people were evacuated, and the terminal was destroyed. The blasts were detected on a seismometer 20 km from the terminal — nine explosions were recorded, the largest being 0.5 on the Richter Scale.

Because of the damage, the cause of the accident was not conclusively established. It appears that a large quantity of LPG leaked from a pipeline or tank, spilled into a walled enclosure, and formed a flammable vapor cloud, which ignited. The resulting flash fire and explosion impacted other LPG storage spheres, tanks, and piping, releasing additional LPG and exposing other tanks to fire. Many of the explosions were of a type called *boiling liquid expanding vapor explosions* (BLEVEs). These were caused by the failure of LPG vessels that had been exposed to flames or heat from the fires.

After the incident, it was reported that there had been many problems with inoperative or bypassed safety devices, a missing relief valve, poor housekeeping, and inaccurate instruments.



Do You Know?

- A BLEVE occurs when a vessel containing liquid above its normal boiling point and under pressure fails catastrophically. When the vessel fails, the pressure immediately drops to atmospheric, and the hot liquid rapidly boils, generating a large quantity of vapor. The damage is caused by the pressure wave from rapid expansion of the released vapor, and from flying pieces of the vessel and piping. If the material is flammable, it can ignite and create a large fireball.
- A BLEVE can occur for many reasons, including excessive pressure in the vessel, damage to a pressurized vessel from mechanical impact or corrosion, and exposure of a pressurized vessel to external fire.
- A vessel exposed to external fire may fail below its design pressure, resulting in a BLEVE, if the vapor space of the vessel is exposed to flames. The flames heat and weaken the metal, causing it to fail.
- Water-spray fire-protection systems, such as fixed deluge systems or fire water monitor nozzles, are an effective way to keep vessels cool enough to maintain their mechanical integrity when exposed to fire.

What Can You Do?

- Be sure that the fixed water-spray fire-protection systems in your plant are available and working. They provide important protection against a BLEVE.
- Understand firefighting procedures to protect emergency response personnel.
- Know what the worst events that could occur in your plant are, what systems are in place to ensure those events do not happen, and your responsibility to verify that these systems are working properly.
- Immediately report any problems with protective safety systems and follow up to make sure they are fixed.

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Be aware of the potential for a BLEVE in the event of a fire in your plant!

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