

Sabotage of the Plant or Culture?—Training

- Explosion from gas leak results in fatalities
- Pump head connection identified as source of leak
- Investigators hypothesize sabotage

BACKGROUND

A massive gas explosion at a government-owned refinery killed 7 workers and 40 people offsite including 35 members of the National Guard and their family members (Ref E.11). Security footage and eyewitness accounts suggest a gas leak began in the morning, but was hard to detect due to heavy rain and mist, except for occasional whiffs of rotten eggs. Just before midnight, the rain eased, and the gas leak became more apparent. Investigators believed the explosion was initiated by an offsite truck starting its engine

WHAT HAPPENED

Investigators discovered the bolts on a pump head had worked loose, enabling the gas to leak out. This type of failure can happen on excessively vibrating equipment, and with the plant's reputation for a weak mechanical integrity program, this could be taken as the incident's root cause. Inspection of the bolting showed seven bolt studs were only partially threaded into the pump body. Some were over-stressed, and some of the nuts and bolt-ends had bite marks left from improper use of a pipe wrench. However, the investigators concluded these bolting issues were evidence of sabotage, they hypothesized, by a government opposition group. Considering the weak security of the plant and the proximity of the compressor to the property boundary, saboteurs could have entered the plant and loosened the bolts. Regardless of the true cause, culture was clearly at play in the incident.

No person or group took responsibility for sabotage, which normally occurs. Could the sabotage theory have been advanced to enable workers, managers, and the government as an excuse for not fulfilling their safety responsibilities? If the cause was not sabotage, then the pump head had clearly been short-bolted during a prior maintenance activity, perhaps accepting the short-cut rather than cleaning out and re-tapping the bolt holes in the valve body. Were there other examples of normalization of deviance in plant maintenance activities?

The plant circulated a survey asking employees whether they felt the incident was caused by sabotage or safety failure. Did employees feel compelled to select sabotage?

SAFETY CULTURE FOCUS

- ✓ Strong leadership is essential for everyone to have a sense of ownership for safe operations.
- ✓ When everyone takes responsibility for safety all tasks are performed to a high standard.
- ✓ A questioning environment promotes transparency and allows for continuous improvement.

****Only 37% of those surveyed indicated management involvement was a strength in their organization.****

IMPROVING HYDROGEN SAFETY CULTURE

LEARNING OPPORTUNITIES FROM OTHER'S EXPERIENCES

***“Safety culture is how the organization behaves...
...when no one is watching.”***

Safety Culture Framework

- ▶ Safety is everyone's responsibility
- ▶ Strong leadership support
- ▶ Integrated into all activities
- ▶ Open, timely, effective communications
- ▶ Questioning/learning environment
- ▶ Mutual trust
- ▶ Continuous improvement

What are the benefits?

- ✓ Eliminates common weaknesses identified as contributing factors to catastrophic events.
- ✓ Promotes trust in the hydrogen energy industry's ability to deliver safe, reliable, quality products and services.
- ✓ Supports a sustainable legacy for companies and the hydrogen industry.
- ✓ Fosters efficiency and productivity in the workplace.

Resources

- ✓ For further information and resources on safety culture, see: <https://www.aiche.org/ccps/safety-culture-what-stake>
- ✓ For further case studies on safety culture, see: <https://h2tools.org>