CENTER FOR Hydrogen SAFETY
Connecting a Global Community

Safety Culture Spotlight

Weak Process Hazards Analysis—Risk Awareness

- Hazards analysis limited to single point failures
- Failure to promote a questioning "what if" environment
- Continuous improvement ignored in preference for business as usual

BACKGROUND

A new Process Safety coordinator attended a Process Hazards Analysis (PHA) revalidation shortly after she started working at a facility. It was being led by a process engineer who had worked at the facility a long time and led many of the facility's PHAs. She discovered that many hazard scenarios she believed should be included were discarded by the team because multiple failures would have to occur to realize the scenario.

WHAT HAPPENED

The team leader and the rest of the team seemed to resist including these scenarios. In a later discussion with the team leader, she learned this was way PHAs were performed at the facility for years, and none of the many auditors and government inspectors had challenged the "Double jeopardy" assumptions before.

The Coordinator explained at her previous facility, multiple failures were considered possible, and were considered in PHAs. The team leader seemed to regard this difference of opinion as a minor technical detail while the Coordinator regarded it as a fundamental flaw.

The new Coordinator was almost certainly right. Many deviation - consequence scenarios identified in a PHA require 2 or more Independent Protection Layer to reduce the risk to a tolerable level. Indeed, many incidents involve multiple failures. The Bhopal incident involved up to seven failures, although some of the failed layers of protection were not independent.

The new Process Safety Coordinator also discovered that the consequences for some scenarios were not the credible worst-case consequences. The consequences recorded in the study assumed some of the safeguards limited the severity of the consequences. The team leader explained later that the company considered these safeguards highly reliable. They had never failed and were regularly tested and inspected. The team leader believed it would not be reasonable to discount them. Indeed, he felt insulted that someone who knew nothing about the facility's PHA approach would challenge his previous PHAs.

What cultural conditions make the concept of double jeopardy attractive? How should the Coordinator convince her colleagues to evaluate PHA scenarios more thoroughly?

SAFETY CULTURE FOCUS

- ✓ Strong leadership will support the full spectrum of hazard analysis scenarios including low probability with high consequences, and high probability with low consequences.
- ✓ Maintaining a questioning and open environment is essential to identifying and mitigating potential risk.
- ✓ Continuous improvement requires the willingness to look beyond past practices and protocols.

****Only 54% of those surveyed indicated risk planning 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

Keywords: weak, poor, minimum, regulations, flammable, chemical, checklists, compliance