Communicating Safety Information

How far have we come?

Not-So-Great Moments in Chemical Safety

Excerpts from *Chemical Heritage Magazine*

- *Gay-Lussac was temporarily blinded as a result of a potassium explosion in 1808*
- *Bunsen lost the use of his right eye as a result of an explosion of a flask of cocadyl chloride (C_2H_6AsCl) – additionally he was nearly killed by inhalation of vapors from arsenic compounds*
- *Davy working to isolate fluorine had numerous injuries to his eyes and fingers, the Knox brothers also working to isolate fluorine both suffered from severe hydrogen fluoride poisoning, and two other chemists died in their attempts to isolate the compound*

www.chemheritage.org/discover/media/magazine/articles/26-2-not-so-great-moments-in-chemical-safety.asp

Other notable laboratory hazards

- Mercury poisonings – including Karen Wetterhahan
- Laboratory fires – Nikola Tesla, 1895; and Thomas Edison, 1914
- Laboratory-Associated Infections – Review published in the 1979 Annual Review of Microbiology by Robert M. Pike and a review in Public Health Briefs – a 1986 Survey by Vesley and Hartmann (injury rates were 3.5/1000 FTE aggregate)
- Explosions – 3-Post Docs died at Harvard, 1998; 6 injured at Lehigh in 1999; Univ. of Chicago in 1990; Univ. of Utah in 1992

The Scientist » Magazine » Technology

Chemical Lab Safety Problems Spaw New Laws, Practices

In July 1973, while driving home from his job as a chemist at Dow Chemical Co.'s Way Mass., research facility, James Kaufman heard on the radio that there had been a serio explosion at nearby Worcester Polytechnic Institute. Kaufman, who had been working for only a few weeks, had recently completed postdoctoral work at Worcester Polytec had earned his Ph.D. there a few years before. Upon hearing the news of the accident, bypassed his house, driving straight to the Worc

By Rebecca Andrews | February 18, 1991

ril 14, 1981, OSHA published a Request for Comment and Information concerning health hazards of toxic substances in atories (46 FR 21785). This action was taken to gain further insight into the problems OSHA health standards might pose for atories. Interested parties were invited to submit comments, views and data concerning issues which OSHA needed to ss in deciding whether a special laboratory policy was necessary. Some 200 comments were received in response to this e.

ly 24, 1986, on the basis of information received in response to the Request for Comments and other considerations, OSHA shed a notice of proposed rulemaking (NPRM) entitled "Occupational Exposures to Toxic Substances in Laboratories" (51 660). OSHA received 129 comments in response to the NPRM.

DSonline®
mpliance Made Simple

ANSWER CENTER | NEWSROOM | MSDS / CHEMICAL MANAGEMENT | RECORD

: History of GHS

GHS (as an idea) predates OSHA's Hazard Communication Standard (HCS), which was first issued in 1983. Today, GHS is more than an idea, having been implemented or partially implemented in some 67 countries.

Much ground still needs to be covered for GHS to be fully realized as conceived back in 1992; nevertheless, as the following timeline demonstrates, the strength of the original idea has sustained the development of GHS through decades and with some recent successes, it appears to be gaining momentum.

OSHA issues Hazard Communication Standard (HCS) covering the manufacturing industry.
First HCS preamble recommends an internationally harmonized system: "*The development of internationally agreed standards would make possible the broadest recognition of the identified hazards while avoiding the creation of technical barriers to trade and reducing the costs of dissemination of hazard information by elimination of duplicative requirements which could otherwise apply to a chemical in commerce.*"
HCS is expanded to include all industries where employees are potentially exposed to hazard chemicals.
OSHA issues Request for Information (RFI) on international harmonization efforts and the work being done by International Labor Organization (ILO) on chemical safety at work.

This combined with accidents like

- Flixborough – 1974
- Seveso - 1976
- Bophal -1984
- Piper Alpha - 1988
- Houston Chemical Complex – 198
- Sterlington - 1991
- Texas City – 2005
- West Texas – 2013

Not to mention local events such as train derailments, tractor-trailer rig and other smaller accidents which h close to home.

dditionally -

You have superfund sites –

Love Canal; Picher, Oklahoma; Anniston, Alabama

All of these have combined to make communication about possible hazards essential.

But There are the Unintended Consequences -

All Chemicals are Hazardous

One page of instructions – fifty pages of cautions

We can add an alarm for that…

It's too dangerous to allow that …..

You can't put that pipeline through here because…

There should be a law…..

Understanding the Meaning of the Words

Hazard – a situation or status that poses a level of treat to life, health, property, or the environment.

Risk – the potential of losing something of value or the deviation from the expected

Perception of Risk – a subjective judgment about the severity of a risk

The Challenge in the Communication of Safety Information

Putting the information in terms that are understandable based upon the known biases and in a context that is relatable.

Comparisons are a means of communicating acceptable risk

From which injury are you most likely to die from:

A fall on the same level from slipping, tripping or stumbling

OR

Excessive Heat

Fire and Flames

OR

Poisoning by solid and liquid

A fall on the same level from slipping, tripping or stumbling

Lifetime Odds 1 in 163

OR

Excessive Heat

Lifetime Odds 1 in 3,217

Fire and Flames

Lifetime Odds 1 in 1,344

OR

Poisoning by solid and liquid

Lifetime Odds 1 in 126

From the 2012 Injury Facts fr

Multiple Definitions of Risk

- Risk as hazard
- Risk as probability
- Risk as consequence
- Risk as potential adversity or threat

The Perception of Risk

- It is very subjective
- Based on characteristics and severity.
- Personal history
- Sense of control
- Perceived benefits

Laws of Acceptable Risk

- Roughly proportional to the cube of the benefits.
- Voluntary risks are 1000 times more likely to be accepted than involuntary ones.
- Inversely related to the number of persons exposed to that risk.
- The level of risk for voluntarily accepted hazards is similar to the level of risk from disease.

The Perception of Risk, Paul Slovic, credited to Starr 1969

We as safety communicators have to:

1. Make clear the difference between a hazard and a risk.

2. Expose our students to safety information routinely so t
   reviewing and understanding the hazards becomes part
   overall laboratory process.

3. Put risks in terms that are understandable.

4. Put risks in terms of what they can control.

Genie – You're Free"