Setting the Scene

Introduction

“\textit{I never did anything worth doing by accident, nor did any of my inventions come by accident; they came by work}”

\textit{Thomas A Edison}

Learning from disasters is a brief analyses of two major disasters, the 1988 Piper Alpha oil rig disaster and the 1992 Guadalajara municipal sewer disaster. Some of the learning points from these disasters are highlighted and discussed.

Other typical safety topics for class discussion purposes are included and finally tips on improving the corporate memory are emphasized.

“It's not what you look at that matters, it’s what you see”

\textit{Henry David Thoreau}

Disasters

Disasters tend to recur and history tends to repeat itself every few years, and we must ask the question what can be done to prevent accidents, loss of life, loss of property and environmental damage.

\textit{It should not be necessary for each generation to rediscover principles of safety which the generation before already discovered. We must learn from the experience of others rather than learn the hard way. We must pass on to the next generation a record of what we have learned}”

\textit{Jesse C Ducommun}

Often we have the knowledge and the experience to prevent accidents but we do not use that knowledge or experience wisely.

Organizations often have little memory when it comes to learning from disasters, and yet this is the key to help prevent history repeating itself.

The 1988 Piper Alpha Disaster

The Piper Alpha disaster killed 167 people. According to official reports the disaster occurred because:

During the evening the duty propane condensate pump failed. The backup propane condensate pump was started and leaked gas from the poorly sealed blinds used to isolate the PSV that had been removed the previous shift.
Key Piper Alpha lessons

The official report highlighted the following key lessons:

- Poor adherence to the Permit to Work System.
- Poor quality of safety management within the company.
- Disabling of protective equipment by the explosion - fire walls not built to withstand explosion.
- Inadequate safety training in emergency procedures, particularly in management leadership during a crisis.
- Safety audits not performed with adequate diligence or follow up. (Deluge system corroded)
- Improper isolation of plant. (non use of slip plates).
- Excessive inventory.
- Location of emergency shut off valves.
- Fire and explosion protection and mitigation since no outside assistance is available.
- Temporary safe refuge complete with breathable atmosphere, fire protection, escape routes and embarkation points.
- Prevention of smoke ingress into the safe refuge through use of smoke dampers.
- More than one alternate evacuation and escape route to helicopter pad and lifeboats to be provided.
- Escape routes to be equipped with luminous strips, heat shields.
- Secondary escape facilities to include ropes, ladders, and nets as back up.
- Use of wind tunnel testing in design to assist in ventilation, gas testing, and blast wall effectiveness.

The 1992 Guadalajara disaster

On Wednesday April 22nd 1992 the city of Guadalajara in Mexico experienced a series of ten massive explosions in the downtown Reforma district. The blasts measured up to 7.1 on the Richter scale at the University of Mexico in Mexico City some 200 miles away.
The official report detailed the following:

- 206 fatalities
- 1460 injured
- 1148 buildings damaged or destroyed
- 350 businesses destroyed
- 505 vehicles destroyed.

**Cause of the disaster**

The disaster was caused by an underground corroded fuel pipe and corroded water pipe. Leaking fuel contaminated the soil and eventually contaminated the municipal sewer system which became flooded with flammable gas.

**Corrosion**

Petroleus Mexicanos (Pemex) accident record

It is of interest to review the PEMEX disaster record prior to the Guadalajara disaster:

- 1991 – Sewer explosion Colonia Valled del Alamo
- 1984 – Explosion Mexico City 500 dead at Pemex storage facility in San Juan Ixhuatepec
- 1979 – Exploratory well explosion Gulf of Mexico – enormous environmental damage.

Two key Guadalajara disaster observations:

- The local residents and the municipal authorities were aware of the flammable gas problem prior to the explosions but no one in authority acted decisively to evacuate the area.
- Decisive leadership is required in order to ensure evacuation of people and identification and rectification of the problem.

Tips on improving the corporate memory

- When compiling codes, standards and procedures, make a note of why and list the related incidents and accidents that prompted the need for the document.
- Include accident and incident training for all new and existing employees on a routine basis.
- Hold regular safety meetings and discuss accidents and incidents regularly.
- Hold discussions on important accidents that have occurred both within the company and to third parties.
- Follow up to ensure recommendations following accidents and incidents are implemented.
- Never remove or modify equipment until you establish why it was installed and manage the change safely by following safety procedures.
- Devise easy information retrieval using computerized systems to aid the workforce.
• Spread the message wide, publish the findings, do not restrict the circulation to people who need to know.
• Interactive discussion is probably more productive than a lecture if one is to impart experience and knowledge.
• Ask people what they think and how they would solve a problem rather than blindly instruct them and perhaps miss getting the point across.

Piper Alpha discussion

Group participation

In your view:

What are the three most serious safety shortcomings leading to the Piper Alpha disaster.

How could the disaster have been prevented.

Who has the authority to turn off the gas.

“It’s not hard to make decisions when you know what your values are”

Roy Disney

Guadalajara discussion

Group participation

In your view:

• What are the three most serious safety shortcomings leading to in the Guadalajara disaster.

• How could the disaster have been prevented.

• Who has the authority to evacuate.

“There is never a wrong time to do the right thing”

Unknown author

Some safety topics for discussion purposes.

• Permit to work systems.

• New employees and contractors.

• Sewer systems.
- Pressure safety valves and discharge to atmosphere.
- Flammable gas detectors.
- Line of fire.
- Knowledge not in the right place.