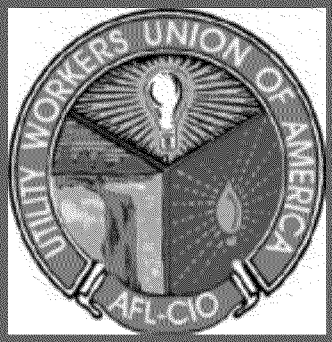


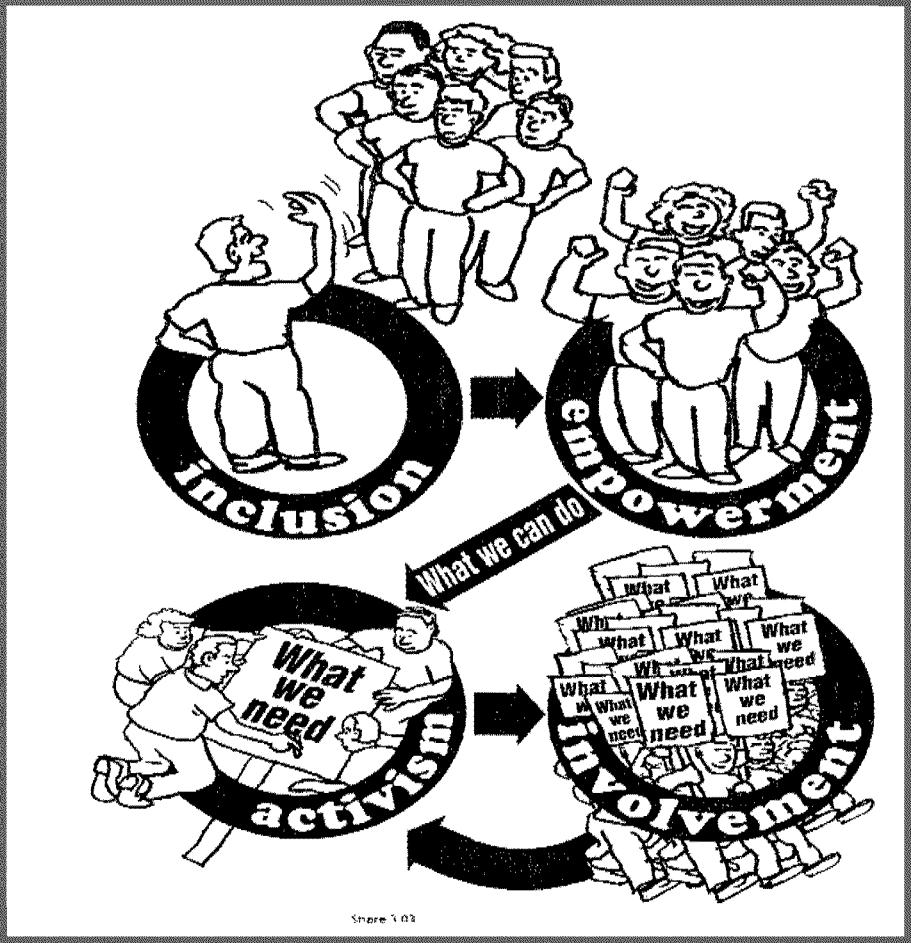
Systems of Safety

Presented by

John Devlin
Safety Director
Utility Workers Union of America, AFL-CIO

Share the power by involving workers in the learning process. We believe in overcoming apathy by sharing the power.

EMPOWERING workers as health and safety activists creates changes in a plant's health and safety culture and institutions

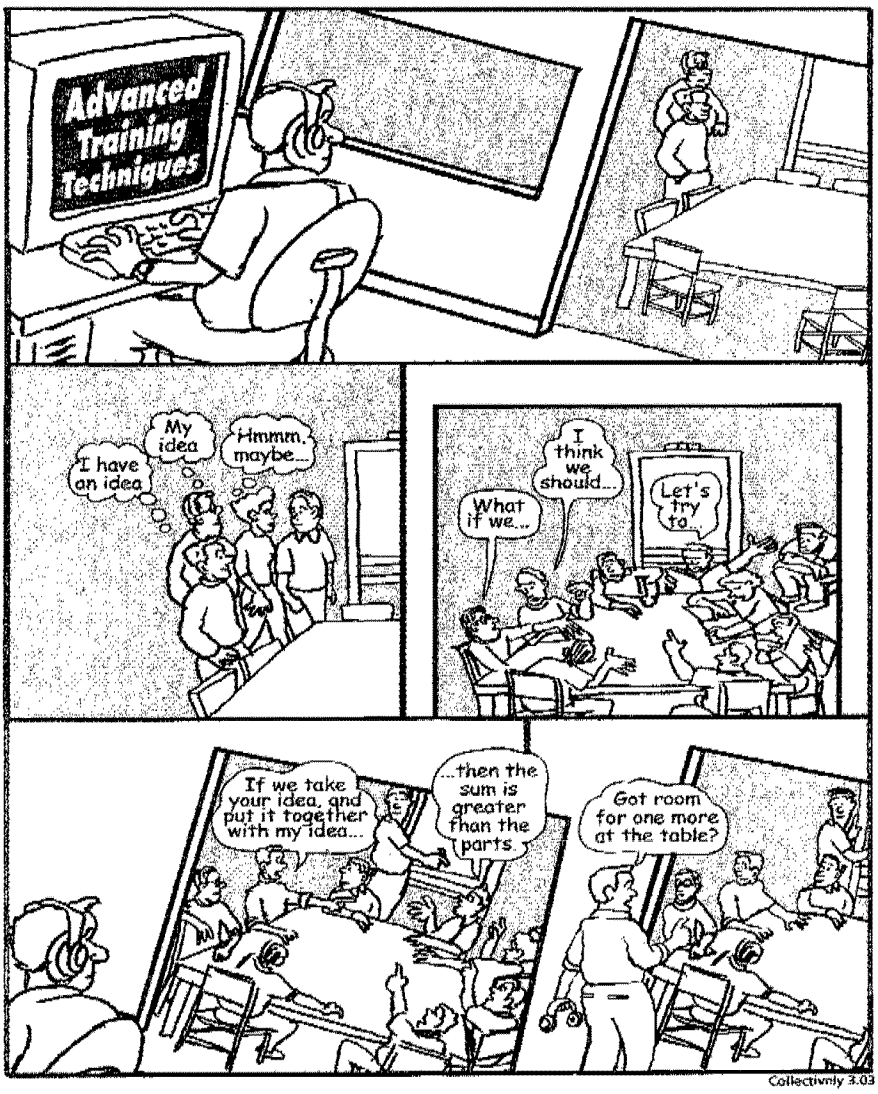


"Education is not filling the bucket, it is lighting the fire."
Yeats

We believe in worker centered training. Adults bring a vast array of knowledge, experience and expertise to the table. We *RESPECT* that contribution and make it the center of our learning process

We believe that more heads are better than one.

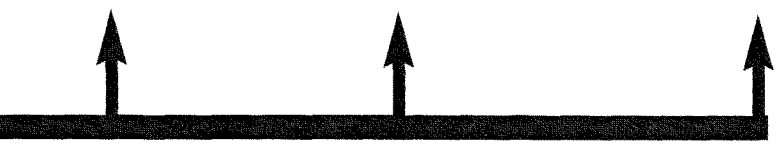
Workers *WORKING TOGETHER* to solve problems are always more productive, efficient and creative than individuals working alone.

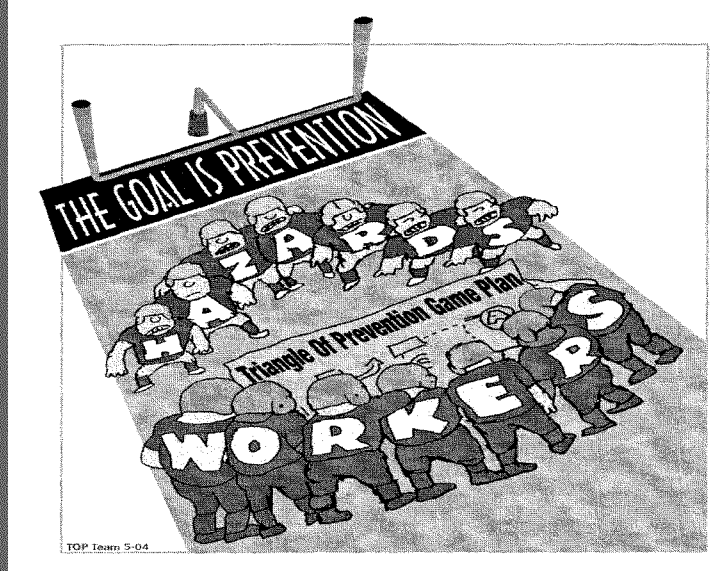


Goals for Systems of Safety

Each Systems of Safety has a goal in prevention

Major Safety Systems	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Levels of Prevention	Highest—the first line of defense	Middle—the second line of defense				Lowest—the last line of defense
Goal	*To eliminate hazards*	*To further minimize and control hazards.*				*To protect when higher level systems fail.*





What are *Systems of Safety?*

- Systems of Safety are proactive systems that actively seek to identify control and/or eliminate workplace hazards.

- Let's look at an incident where a worker bumped his head on a low pipe. How could this hazard be addressed by each of our ***Systems of Safety***?

The Personal Protective Factors System

- **Personal Decision Making and Actions:**
  - Look & think critically at the workplace
  - Work collectively to identify hazards
  - Contribute ideas, experience and know-how that will lead to correcting the system flaws

- **Personal Protective Equipment (PPE) and Devices**
  - Wear PPE as necessary and required when higher levels of protection are unfeasible

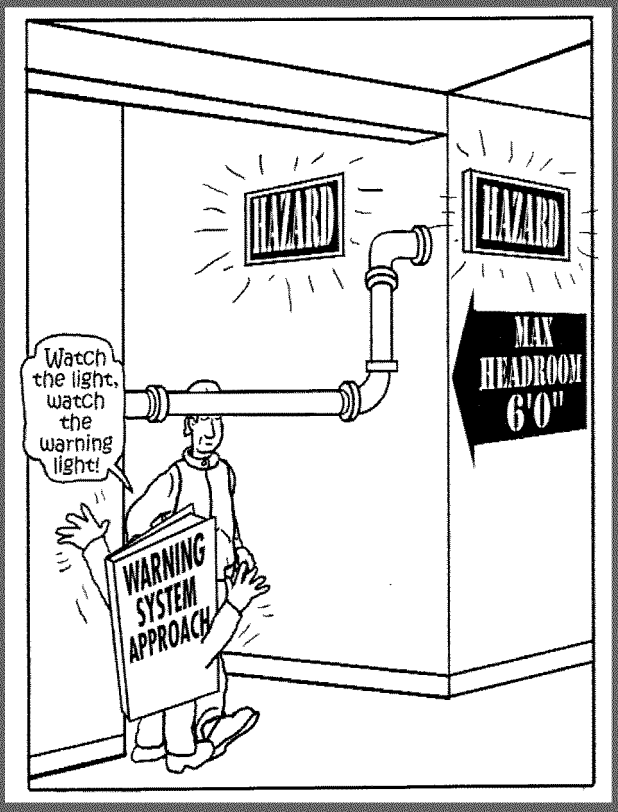
- **Stop work authority**
  - Authority is given to all individuals, encouraged, to stop work, equipment or processes due to unsafe conditions until a thorough Hazard Analysis can be performed

The Procedures and Training System

- The operation and maintenance of processes that are dangerous require a system of written procedures and training.
- The greater the hazard the greater is the need for Procedures and Training.

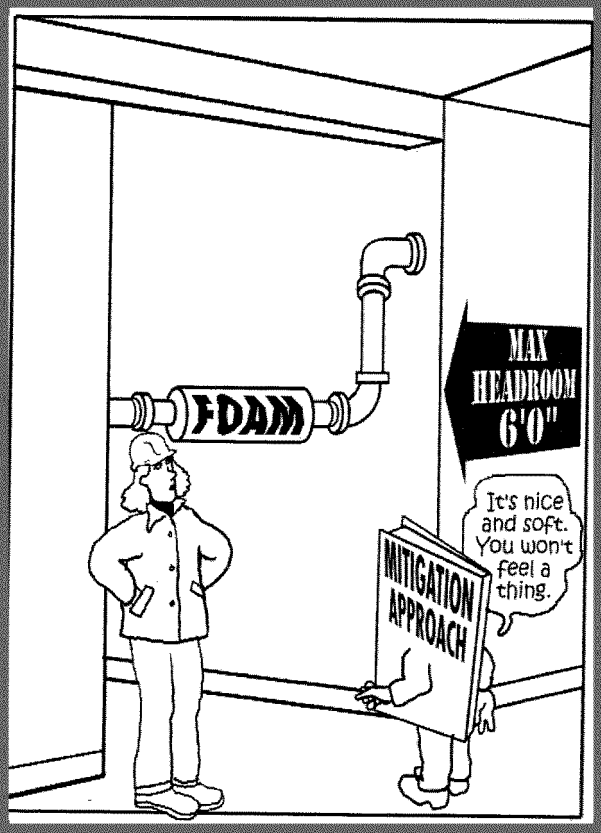
The Warning System

- Includes the use of devices that warn of a dangerous or potentially dangerous situation.
- These devices require a person's intervention to control or mitigate the hazardous situation.



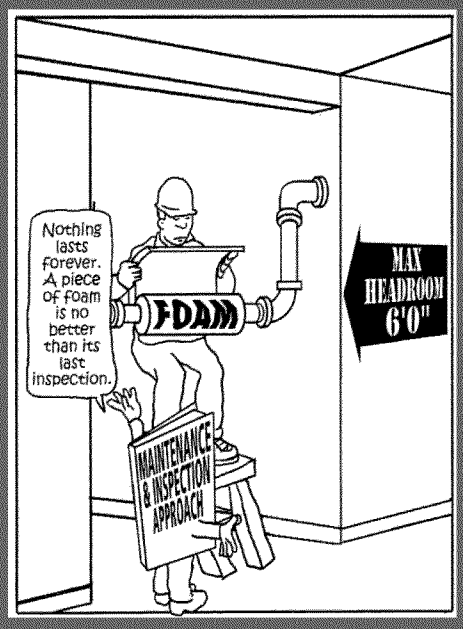
The Mitigation System

- Involves the use of equipment that automatically acts to control or reduce the harmful consequences of hazardous incidents.
- Mitigation should be automatic and reliable



The Maintenance and Inspection System

- Properly designed equipment can turn into unsafe junk if it isn't properly maintained, inspected and repaired.
- If the phrase *"if it ain't broke, don't fix it"* is used within a plant, the Maintenance and Inspection System is a failure.
- If you don't use preventative maintenance, then you end up doing breakdown maintenance.



Design & Engineering System of Safety

- A central purpose of the Design System of Safety is to eliminate hazards through the selection of safe or low-risk processes and chemicals whenever possible.

- One example of good design safety is the substitution of a less hazardous chemical such as sodium hypo-chlorite (bleach), for chlorine in treating cooling water. A release of toxic chlorine gas can travel in the wind for miles, whereas a spill of bleach is inherently less dangerous.

Systems of Safety

Practical Application of OSHA's Hierarchy of Controls

Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	**Highest—the first line of defense**		**Middle—the second line of defense**			**Lowest—the last line of defense**
Effectiveness	**Most Effective**					**Least Effective**
Goal	*To eliminate hazards*	*To further minimize and control hazards*				*To protect when higher level systems fail*
EXAMPLES OF SAFETY SUB-SYSTEMS**	**Technical** Design and Engineering of Equipment, Processes and Software Management of Change (MOC)** Chemical Selection and Substitution Safe Siting Work Environment HF **Organizational *(must address a root cause)*** Staffing HF Skills and Qualifications HF Management of Personnel Change (MOPC) Work Organization and Scheduling HF Workload Allocation of Resources Buddy System Codes, Standards, and Policies**	Inspection and Testing Maintenance Quality Control Turnarounds and Overhauls Mechanical Integrity	Enclosures, Barriers and Containment Relief and Check Valves Shutdown and Isolation Devices Fire and Chemical Suppression Devices	Monitors Process Alarms Facility Alarms Community Alarms Emergency Notification Systems	Operating Manuals and Procedures Process Safety Information Process, Job and Other Types of Hazard Analysis Permit Programs Emergency Preparedness and Response Training Information Resources Communications Investigations and Lessons Learned Pre-Startup Safety Review	Personal Decision-making and Actions HF Personal Protective Equipment and Devices HF Stop Work Authority

HF - Indicates that this sub-system is often included in a category called Human Factors.

* There may be additional subsystems that are not included in this chart. Also, in the workplace many subsystems are interrelated. It may not always be clear that an issue belongs to one subsystem rather than another.

** The Codes, Standards and Policies and Management of Change subsystems listed here are related to Design and Organization. These subsystems may also be relevant to other systems; for example, Mitigation Devices. When these subsystems relate to systems other than Design and Organization, they should be considered as part of those other system, not Design and Organization.

October 2006