



Employee Burned With Spent Acid

Purpose

To share “lessons learned” gained from incident investigations through a small group discussion method format.

To understand “lessons learned” through a Systems of Safety viewpoint.



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Lessons Learned

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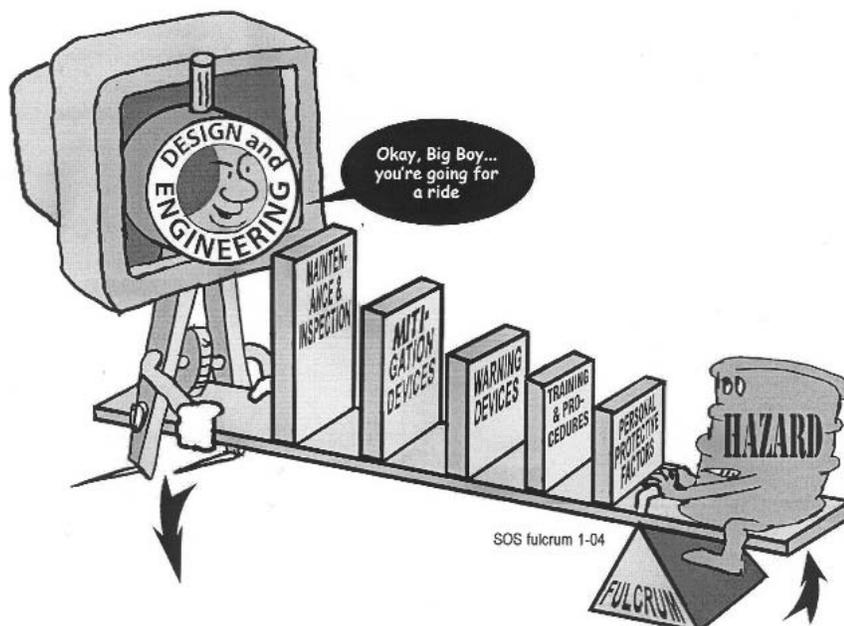
Background Information

Before beginning this Lessons Learned, please review this and the next page which contain information that will introduce the concepts of Lessons Learned and Systems of Safety.

Creating a safe and healthy workplace requires a never ending search for hazards that sometimes are not obvious to us. These hazards exist in every workplace and can be found by using various methods. Lessons Learned are just as the name suggests: learning from incidents to prevent the same or similar incidents from happening again.

Systems Are Not Created Equal: Not equal in protection and not equal in prevention.

Using our Systems Focus to uncover system flaws or root causes is only one part of controlling hazards. We also need to look at the systems involved to decide on the best way to deal with the problem. The most effective way to control a hazard is close to its source. The least effective is usually at the level of the person being exposed. The system of safety in which the flaw is identified is not necessarily the system in which you would attempt to correct the flaw.



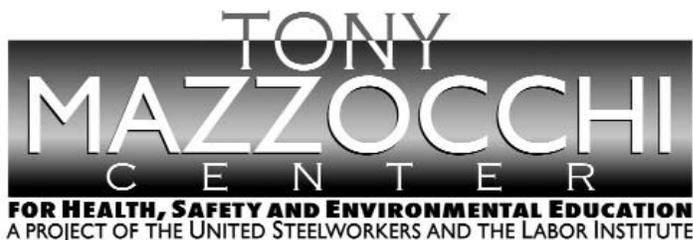
Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	Highest—the first line of defense		Middle—the second line of defense			Lowest—the last line of defense
Effectiveness	Most Effective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

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 sub-systems listed here are related to Design and Engineering. These subsystems may also be relevant to other systems; for example, Mitigation Devices. When these sub-systems relate to systems other than Design and Engineering, they should be considered as part of those other system, not Design and Engineering.

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Lessons Learned Statement:

Without a quality assurance program an employee on the Alky Unit was burned with Spent Acid. Operators had reported previous problems with this type of assembly. Utilizing a **Maintenance and Inspection System of Safety** approach would provide prevention from this type of incident. The practice of rodding out plugged bleeders by operators puts them at risk. Despite previous reports of the condition of the double check assemblies, there was no action taken within the **System of Safety** to clean or repair the equipment.

No review was made within the **Maintenance and Inspection System of Safety** to review the drawings and requirements in one procedure. All the drawings should be available for the employees and contractors use when these types of assemblies are to be used.

Although this type of assembly is commonly used, it is important that lessons learned be developed and shared from a task involving this type of assembly. Despite past experiences with faulty assemblies, emphasis on **Training and Procedures System of Safety** is needed to incorporate “in the line of fire” event review.

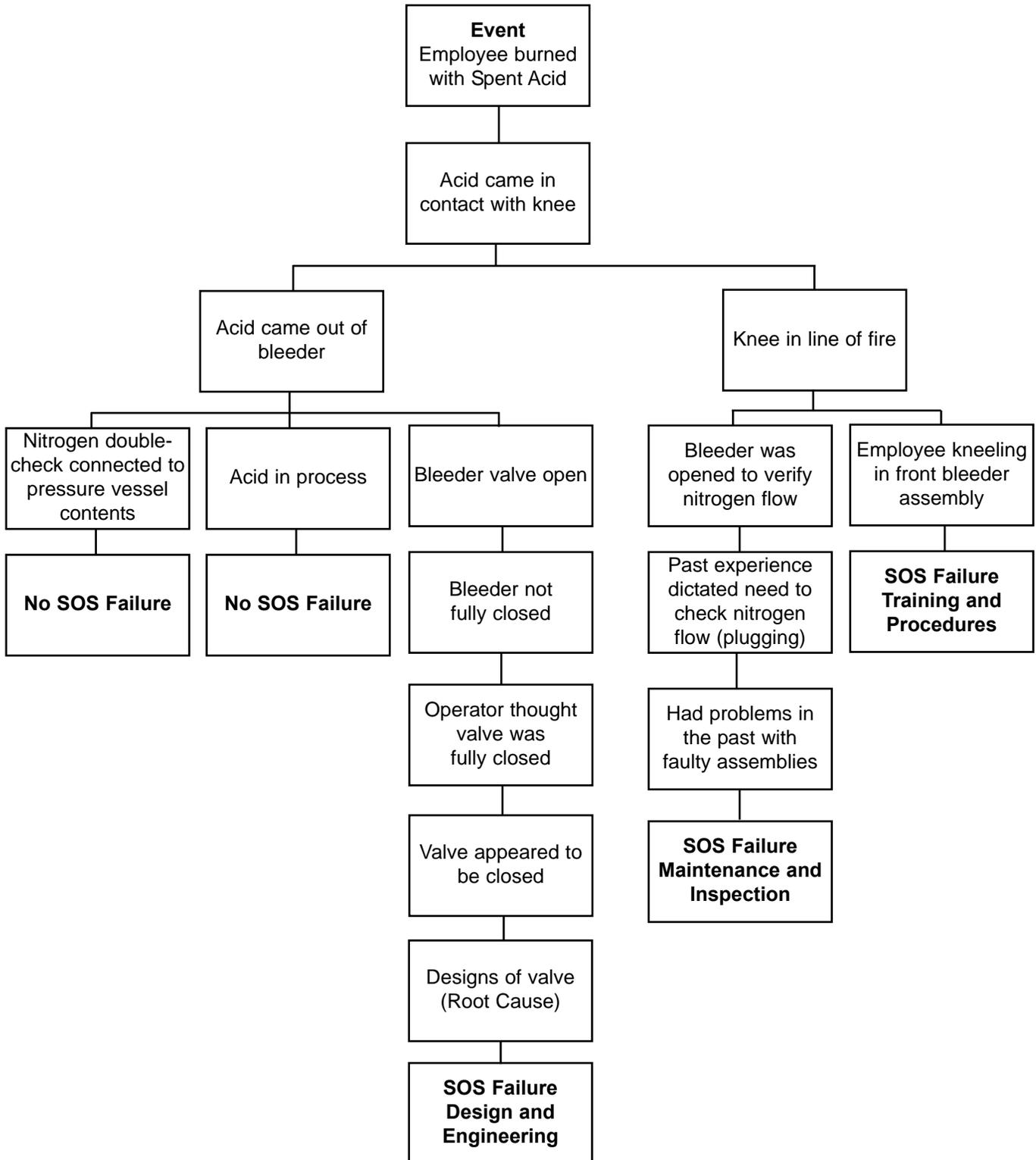
Discussion:

An employee was burned on the inside right knee with spent acid while operating the valves on a N₂ (nitrogen) double-check detail connected to a 2-inch temporary pipe being used to push spent acid from the Alky Reactors. Prior to opening the nitrogen to the temporary piping, the employee attempted to verify that there was a flow of nitrogen coming out of the bleeder and pressure gauge on the double-check assembly. This action was taken because of past experiences with faulty assemblies. The employee opened the bleeder valve and nitrogen did not come out of the bleeder. The nitrogen was then turned off and the bleeder valve was rodded out. Upon establishing flow, the Operator then closed the bleeder valve but did not verify the valve was completely closed.

While kneeling next to the assembly, the employee opened the 2-inch valve to the temporary piping system. Acid came out the bleeder valve and came in contact with the employee's right knee. The employee immediately closed the bleeder valve and entered the safety shower to wash off the acid. The employee was transported to the medical center where he was put in the shower again. Burn gel was applied; the burn was wrapped; and the employee was sent out to see a doctor. The employee was treated there and released back to work.

Analysis

The Logic Tree is a pictorial representation of a logical process that maps an incident from its occurrence, “the event,” to facts of the incident and the incident’s root causes.



Recommended Actions

1. Explore development of assurance system for double-check assemblies that tests functionality of assemblies and types of valves prior to use.
2. Consolidate reference drawings and requirements in one procedure. Make isometric drawings of both types of check valve assemblies readily available to employees and contractors.
3. Share information in Lessons Learned format regarding both the focusing on task and training for line-of-fire issues while staging any work or task.

Education Exercise

Working in your groups and using the Lessons Learned Statement, Discussion, Analysis and Recommended Actions, answer the two questions below. Your facilitator will give each group an opportunity to share answers with the large group.

1. Give examples of ways to apply the Lessons Learned Statement at your workplace.

2. Of the examples you generated from Question 1, which will you pursue in your workplace? (**Note:** When we say something you may pursue, we mean a joint labor-management activity or a union activity rather than an activity carried out by you as an individual.)

Trainer’s Lessons Learned Success Inventory

Following a Lessons Learned (LL) session, **the trainer who led the LL** should complete this form. This information will: 1) Help you reflect on the successes and challenges of the session; 2) Help USW with new curriculum development; and 3) Help USW as a whole better understand how the LL Program is supporting their workers.

By reviewing LL from different sites or from other areas of their workplaces, workers are able to analyze the information and apply these lessons to their own workplaces in order to make their workplaces healthier and safer.

1. Site name (if there are participants from ore than one site, please list all).

2. Date of LL training _____

3. LL number used in today’s Training _____

4. Your name _____

5. **Summary of Education Question 1:** Please summarize participants’ examples of ways to apply this LL Statement to their workplace.

Please continue on reverse side.

- 6. Summary of Education Question 2:** Please summarize which actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Employee Burned with Spent Acid

Please answer the two questions below:

1. How important is this lessons learned to you and your workplace? (Circle one.) Rate on a scale of 1 to 5, with 5 being the most important.

1	2	3	4	5
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2. What suggestions would you make to improve this Lessons Learned?

End of Training Trainer's Instructions

Please complete the information below.

Trainer's Name _____
(Please Print)

Date of training: _____

No. of Participants: Total _____ Hourly _____ Management _____

Location of Training: _____

USW Local # _____

Send:

1. This page;
2. The Education Exercise (page 8);
3. The Trainer's LL Success Inventory form (pages 9 and 10);
4. The evaluation for each participant (page 11); and
5. The Sign-in sheet (page 13) to:

Doug Stephens
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3340 Perimeter Hill Drive
Nashville TN 37211

Thank you for facilitating the sharing of this
Lesson Learned with your coworkers.

