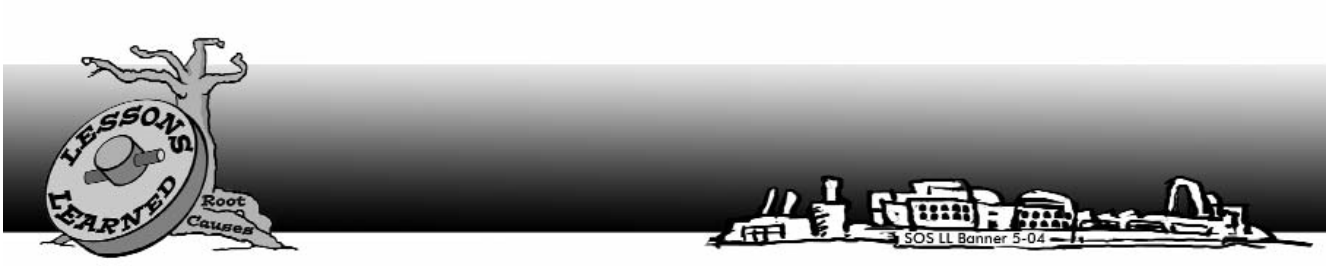

Worker Splashed with Caustic Soda

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.

TONY MAZZOCCHI CENTER
FOR HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION
A PROJECT OF THE UNITED STEELWORKERS AND THE LABOR INSTITUTE

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Lessons Learned

Volume 08, Issue 67

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** 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 Work Load Allocation of Resources Buddy System Codes, Standards, and Policies**	Inspection and Testing Maintenance Quality Control Turnarounds and Overhauls Mechanical Integrity	Enclosures, Barriers Dikes and Containment Relief and Check Valves Shutdown and Isolation Devices Fire and Chemical Suppression Devices Machine Guarding	Monitors Process Alarms Facility Alarms Community Alarms Emergency Notification Systems	Operating Manuals and Procedures Process Safety Information Process, Job and Other Types of Hazard Assessment and Analysis Permit Programs Emergency Preparedness and Response Training Refresher Training Information Resources Communications Investigations and Lessons Learned Maintenance Procedures Pre-Startup Safety Review	Personal Decision-making and Actions HF Personal Protective Equipment and Devices HF Stop Work Authority

HF - Indicates that this subsystem 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 Engineering. These subsystems may also be relevant to other systems; for example, Mitigation Devices. When these subsystems relate to systems other than Design and Engineering, they should be considered as part of those other systems, not Design and Engineering.

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Title: Worker Splashed with Caustic Soda

Identifier: Volume 08, Issue 67

Date Issued: December 28, 2008

Lessons Learned Statement:
The contact of caustic chemicals to the eyes and face of a worker could have been prevented with an effective combination of the **Training and Procedures** and the **Personal Protective Factors** ***Systems of Safety***.

Operating Procedures are clearly defined in the ***Systems of Safety*** as a line of defense in preventing chemical contact injuries. Implementing a *Standard Operating Procedure* for workers to visually inspect that all tote-tank covers are in place and secured prior to transporting them, would prevent the caustic chemicals from splashing out of the tote-tank while the tote-tank is being moved. The proper *Communication* of this procedure (a subsystem of the **Training and Procedures** ***System of Safety***) will ensure the safety of workers transporting caustic chemical tote-tanks.

The tote-tank cover is a **Mitigation Devices** ***System of Safety*** that protects workers from inadvertently coming into contact with the caustic chemicals. By providing tote-tank covers and maintaining extras for replacement, workers will be provided this protection to prevent future incidents.

To reduce employee exposure to hazards when engineering and administrative controls are not feasible, *Personal Protective Equipment*, a subsystem of the **Personal Protective Factors *System of Safety,*** can be used to protect workers. By providing effective PPE and training workers on the PPE, recurrence of this incident can be avoided.

Discussion:

A worker was in the process of moving a chemical tote-tank, which contained a solution of 20 percent caustic, located in the Mill Stores basement. The current policy required the employees using the chemical to wear D-rated PPE (Fig. 8-4) when handling caustic chemicals but did not specify that workers who transport the caustic chemical must wear this PPE rating. The tote-tank was stored on top of another tote-tank. The worker removed the tote-tank with a forklift truck (Fig. 8-1) and proceeded to transport it to the storage area.

While going up a ramp (Fig. 8-2), the worker felt a slight splash to his face. At first he thought it was condensate that had dripped from sweating water pipes just below the ceiling. As he approached the top of the ramp, he again felt a slight splash to his face and that's when he noticed that the 2½" cap on top of the tote-tank was missing (Fig. 8-3).

The caustic chemicals from the chemical tote-tank that had splashed in the worker's eyes and face started to burn. He immediately went to an eye-wash station to rinse his eyes and face. After spending a considerable amount of time rinsing, he then made his way to the Medical Department for further medical attention.

Fig. 8-1 Worker removing tote tank

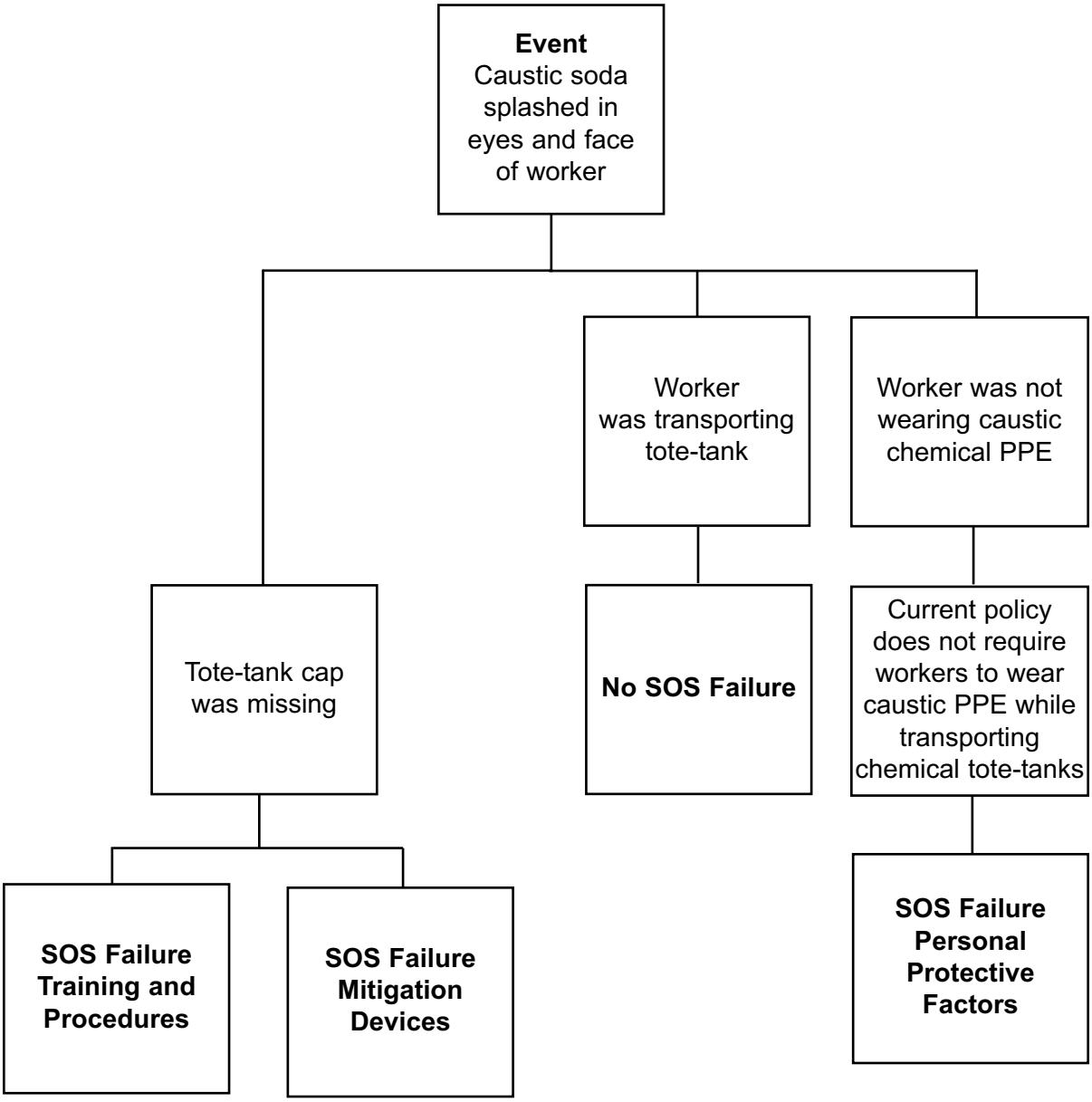
Fig. 8-2 Worker going up the ramp with tote tank

Fig. 8-3 2 1/2" cap

Fig. 8-4 PPE requirement for workers handling this chemical

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. Provide extra tote-tank caps at tote-tank storage site.
2. Develop an inspection procedure and train workers to visually inspect chemical tote tanks before transporting them.
3. Revise language in current PPE Policy to include the requirement of wearing caustic chemical PPE when transporting caustic chemicals.

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 more 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 actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Worker Splashed with Caustic Soda

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

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 10);
3. The Trainer's LL Success Inventory form (pages 11 and 12);
4. The evaluation for each participant (page 13); and
5. The Sign-in sheet (page 15) to:

If you are a TOP Site (excluding DOE TOP Sites)	**Send to: Steve Cable 2915 Gradient Drive St. Louis, MO 63125**
All other sites (including DOE TOP Sites)	**Send to: Doug Stephens United Steelworkers 3340 Perimeter Hill Drive Nashville, TN 37211**

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

Sign-in Sheet

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Name of Class_____ Date of Class_____

Instructors: _____

Please Check One* H	M	Print Name	Signature

***H = Hourly Worker**
M = Management or Salaried Worker