



Sodium Chlorite Solution Causes Fire

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

Volume 09, Issue 16

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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 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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Lessons Learned Statement:

Fire can be one of the most terrifying and damaging things to happen in a paper mill. All too often, the fires could have been prevented by adherence to *Systems of Safety* principles.

First and foremost, the properties of all the materials and chemicals that are used in a paper mill should be known by all who work in the mill. Individual materials may be very safe on their own; but disaster can strike when the materials are mixed together. The **Training and Procedures System of Safety** is too often ignored, and workers can be totally unaware of the hazards of the materials with which they work every day.

When we do maintenance work in any area, part of the job is to clean up after repairs or preventive work is done. Cleaning up after a job is part of the **Maintenance and Inspection System of Safety**. Leaving the debris on the floor after cleaning out filters for equipment is just trouble waiting to happen. In this case, the organic materials left on the floor were dormant until accidentally mixed with an oxidizing agent.

The **Design and Engineering System of Safety** lists *Management of Change* as one of the subsystems. When drain pipes are rerouted or removed, the whole line has to be inspected and tested before being put back into use. The **Design and Engineering** of storage tanks has to take into consideration the material that will be stored in the tank, along with the properties of that material. A fine powder, like starch used in papermaking, presents its own unique problems. Steps need to be taken to contain the powdery substance and not allow it to filter into other areas where it can be mixed with incompatible substances.

Discussion:

The basement floor in a paper mill caught fire while a worker was walking through the area. The fire started due to friction from a worker's boots and the accumulation of starch, dried paper pulp and sodium chlorite.

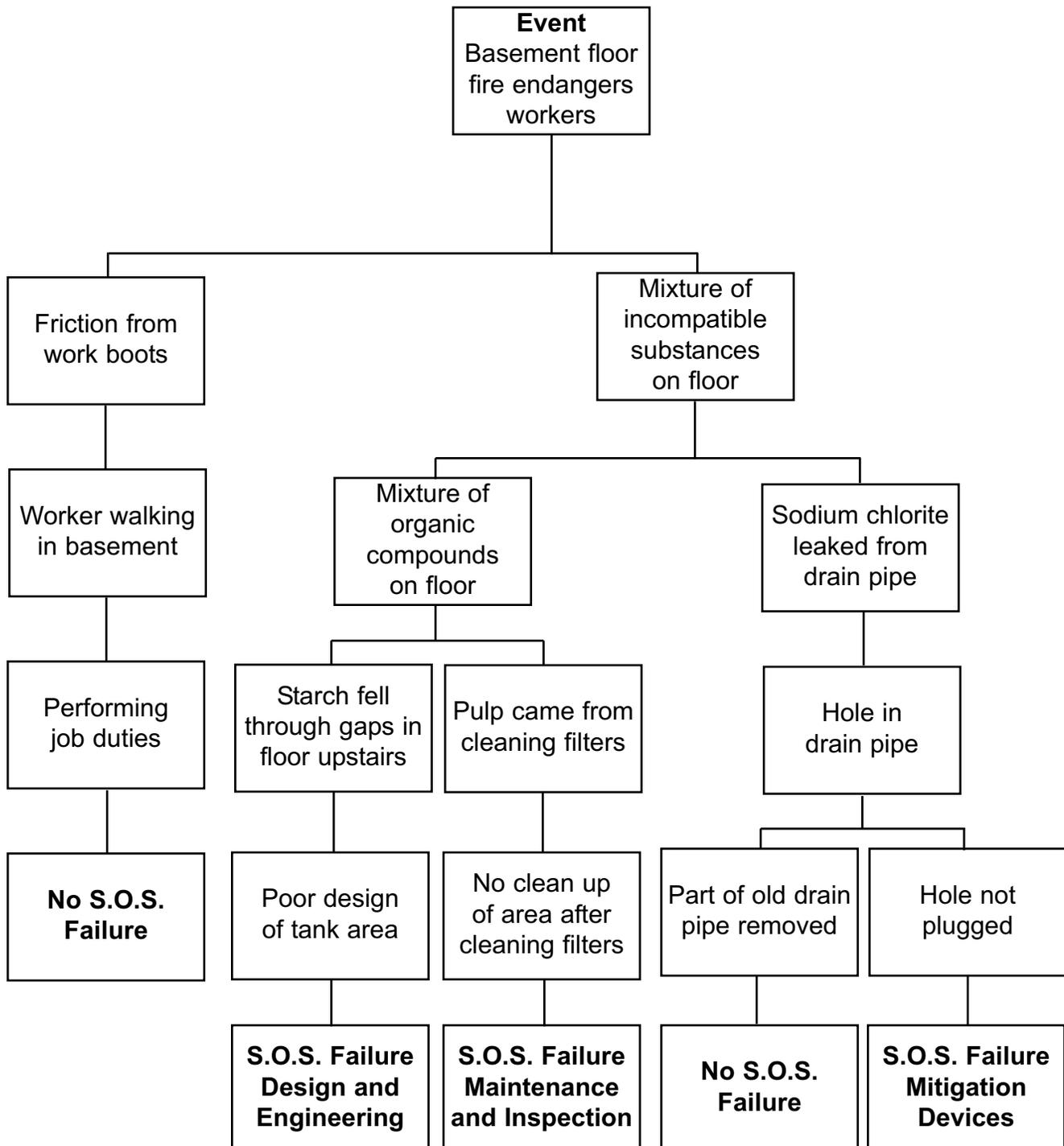
The dried paper pulp was from a previous cleanup of screen filters. The starch accumulation in the basement was due to small gaps around the tank upstairs. The sodium chlorite entered the area through a pipe that was missing a plug after maintenance work had been performed.

A drain pipe had been removed when some filters were replaced, but the hole that was left was never plugged. This went unnoticed until a representative from the supplier of the sodium chlorite had to rinse out a catch basin due to a small leak. The representative rinsed out the basin and let the residue run into the drain (which was the plan). However, the sodium chlorite ran out of the hole in the drain pipe and settled on the floor, mixing with the old pulp and starch. This too went unnoticed; allowing the sodium chlorite to dry up and become mixed with the organic compounds already on the floor.

When a worker walked into the area the next day, the friction from his boots sparked a fire which was fueled by all the incompatible substances that had accumulated on the basement floor. Fortunately, the fire burned itself out quickly; no one was hurt; and no equipment was damaged.

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. Inspect all drain pipes; then plug all holes in drain pipes.
2. Seal all gaps around starch tank to prevent buildup in the basement.
3. Improve housekeeping practices in basement area.
4. Provide static control boots for workers doing housekeeping in basement area.

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: Sodium Chlorite Solution Causes Fire

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:

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 *(Please print clearly.)*

Class Title: _____ **Class Completion Date:** _____

Location (City, State)/Facility: _____

Grant Program: _____ **Dist. & LU #:** _____

Instructors: 1) _____ **2)** _____

3) _____ **4)** _____ **5)** _____

Name (print first and last)

Check one:

		Hourly	Management
1			
2			
3			
4			
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11			
12			
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