



Potential Steam Burns Due to Lockout/Tagout (LOTO) Failure

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.



This material was produced by the Labor Institute and the United Steelworkers International Union under grant number SH-17045-08-60-F-42 Susan Harwood Training Grant Program, for the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products or organizations imply endorsement by the U. S. Government.

Lessons Learned

Volume 08, Issue 54

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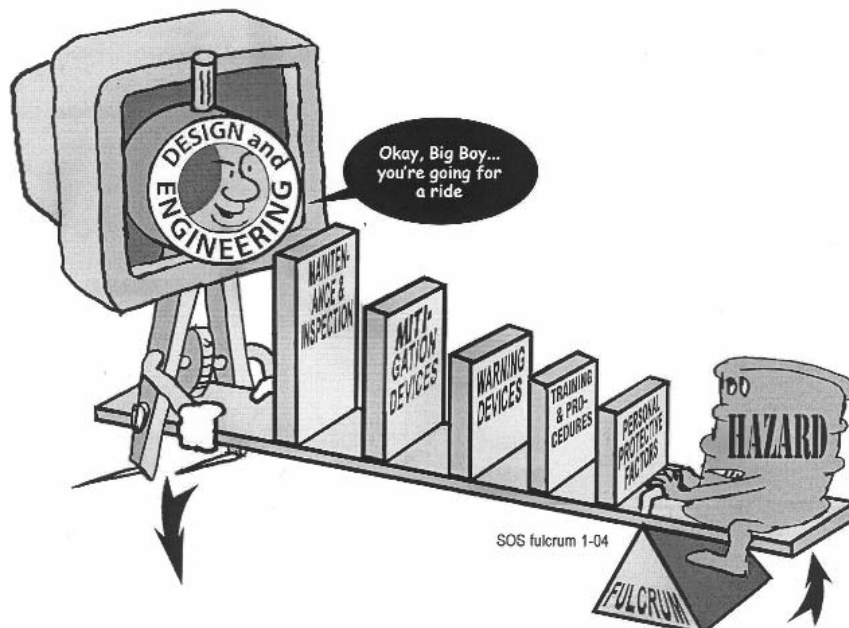
Background Information

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.



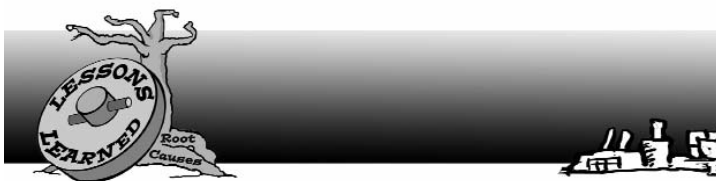
Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	Highest—the first line of defense	Middle—the second line of defense			Lowest—the last line of defense	
Effectiveness	Most Effective	←————→				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.

Revised October 2006



Title: Potential Steam Burns Due to Lockout/Tagout (LOTO) Failure

Identifier: Volume 08, Issue 54

Date Issued: December 28, 2008

Lessons Learned Statement:

If not for a maintenance worker “questioning the norm,” this incident during a steam shutdown process created the potential for a worker to be seriously burned or even killed. A good **Maintenance and Inspection** program will include LOTO procedures, which bring all sources of energy to a zero state before beginning work. Using the **Design and Engineering System of Safety** and its subsystems, policies and procedures can be developed which will allow all workers to work safely.

Through the **Training and Procedures System of Safety**, workers understand what is expected of them and receive proper training on topics such as LOTO. In this incident, it was apparent that many were depending on one worker to look out for their safety. The **Systems of Safety** approach teaches us that more heads are better than one. Every person working on the job must visually and physically do his/her own LOTO. Workers new to the job may not always understand the importance of proper LOTO. These worker benefit greatly when mentored by more senior workers, especially in on-the-job training situations.

Discussion:

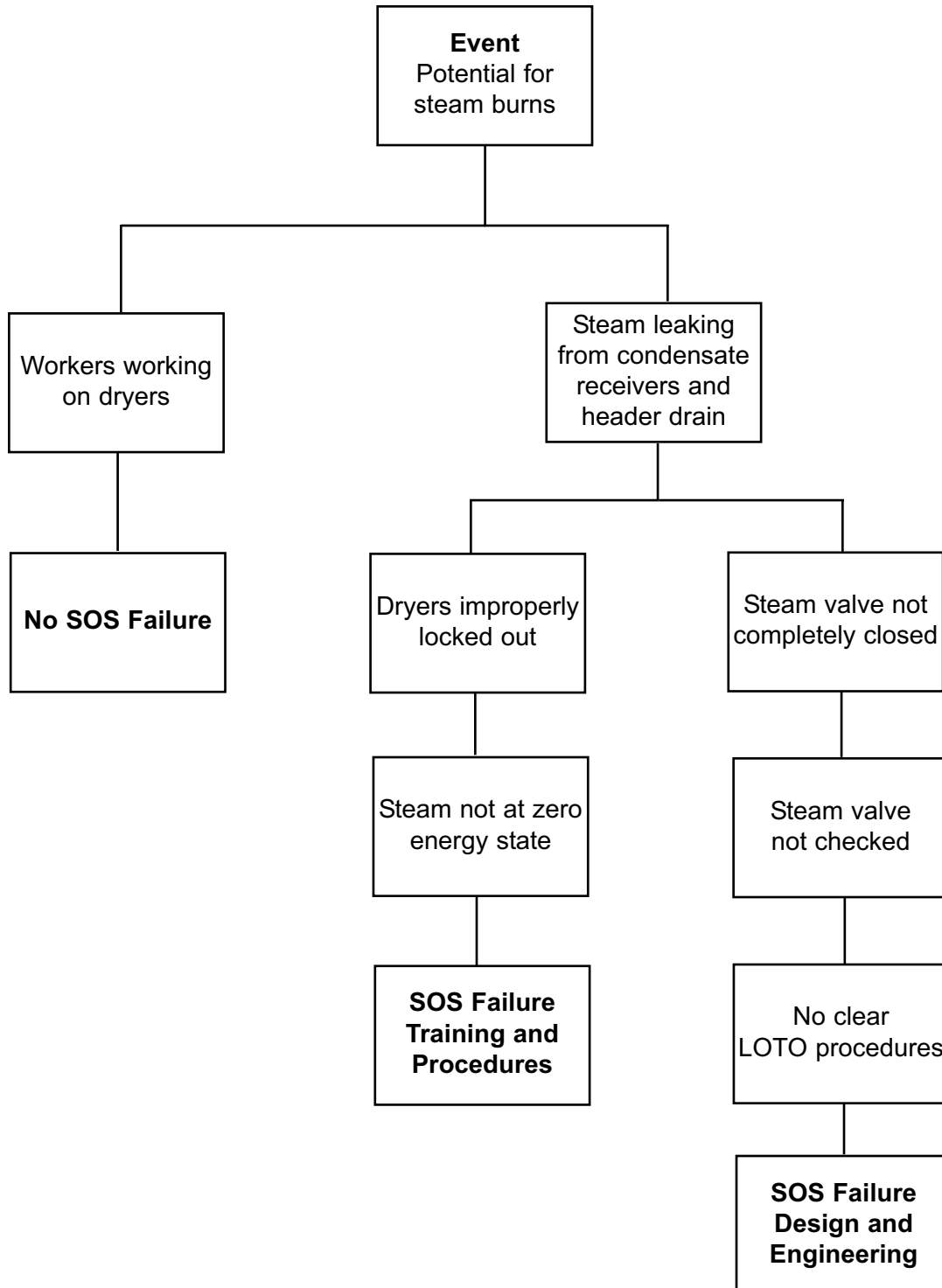
A maintenance worker noticed that a high amount of steam was coming out of the two condensate receivers in the basement of the No. 4 paper machine. Upon further investigation, he found that a lockout/tagout had been performed on the system and one lock was on the LOTO box in preparation for doing work in the dryer sections of the machine. But a steam valve carrying 60 pounds of pressure was not fully closed, leaving the system pressurized.

An investigation disclosed the following facts:

1. There was potential for severe steam burns.
2. Steam was leaking from a header drain.
3. Steam was leaking from condensate dryers.
4. The steam valve was not completely closed.
5. Lock was on the LOTO box.

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. LOTO procedures must require all persons working on equipment, or affected by the work, to visually and manually verify that all energy sources have been brought to a zero energy state.
2. LOTO procedures must identify all energy sources and lockout points present in an area and include them in the work plans.
3. Each person must place a lock on their LOTO box to ensure that the equipment will not be brought online without their knowledge.
4. No work to begin before all locks have been placed on box and LOTO verified by all.
5. Train all workers in LOTO.

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: Potential Steam Burns Due to Lockout/Tagout Failure

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:

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

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

