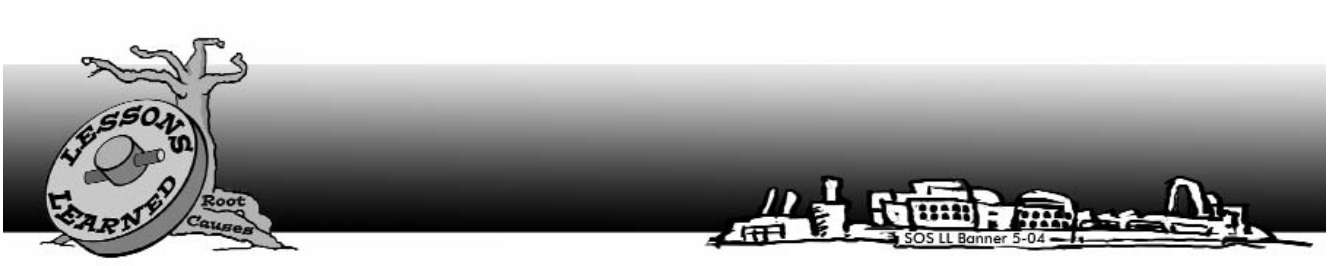

Worker Receives Electrical Burn at Food Warming Station

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

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Lessons Learned

Volume 10, Issue 19

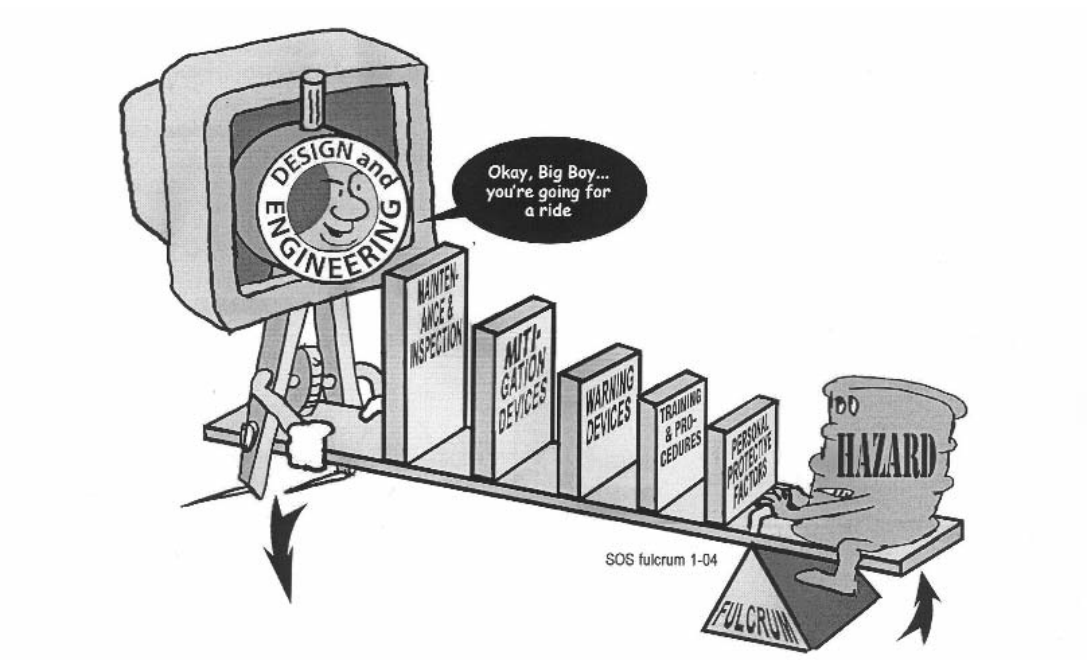
Background Information

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*				T*o 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 Receives Electrical Burn at Food Warming Station

Identifier: Volume 10, Issue 19

Date Issued: April 2010

Lessons Learned Statement

A worker was injured by an electrical arc burn when he placed his hand on an arm which supported four heat lamps used to keep food warm. From the support, electrical wiring runs from the base unit to the switches in the arm. Inspection of the warmer revealed that one of the switches was apparently replaced in the past with a switch that was larger than the original switch. It was also discovered during the course of the investigation, that no Ground Fault Circuit Interrupter (GFCI) was present.

Using a food warming station designed with a well-insulated metal casing to protect from the potential for electrical components to come into contact with exposed metal, would eliminate the possibility of shock and be working within the **Design and Engineering** ***System of Safety***.

The **Maintenance and Inspection** ***System of Safety*** would have made the fact that the replacement switch was too large for the unit apparent, and the properly sized switch could have been used.

Working within the **Mitigation Devices** ***System of Safety*** will make the unit safer by allowing GFCIs to be installed to protect workers from an electrical arc.

Utilizing the **Training and Procedures** ***System of Safety*** would provide the workers with a means to recognize the hazard of using replacement parts that are not designed for the food warming station.

Discussion

A worker received an electrical shock while preparing food at a hot food bar. The worker stated that he placed his hand on the heat lamp support and leaned down to view the items on the warmer. The worker received an electrical shock that arced and burned the palm of his hand.

The investigation revealed that the warmer consists of a warming base tray and four heat lamps supported by an arm. The arm is formed from sheet metal that deflects, or gives, when force is applied. There are two 110-volt switches on the support under the location where the worker's hand was located. From there, electrical wiring runs from the base unit to the switches in the arm. Inspections revealed that one of the switches in the warmer had apparently been replaced in the past with a switch that was larger than the original switch.

Because of the close proximity of the two switches to each other, the larger replacement switch had to be mounted at an angle within the trough, bringing the switch connections close to the metal case. To attempt to prevent contact with the metal case, one layer of electrical tape was placed on the metal case in an attempt to insulate the exposed wiring from the case. When the worker leaned on the support, the wiring shorted through the layer of tape to the case, resulting in the worker receiving a shock and burn.

continued

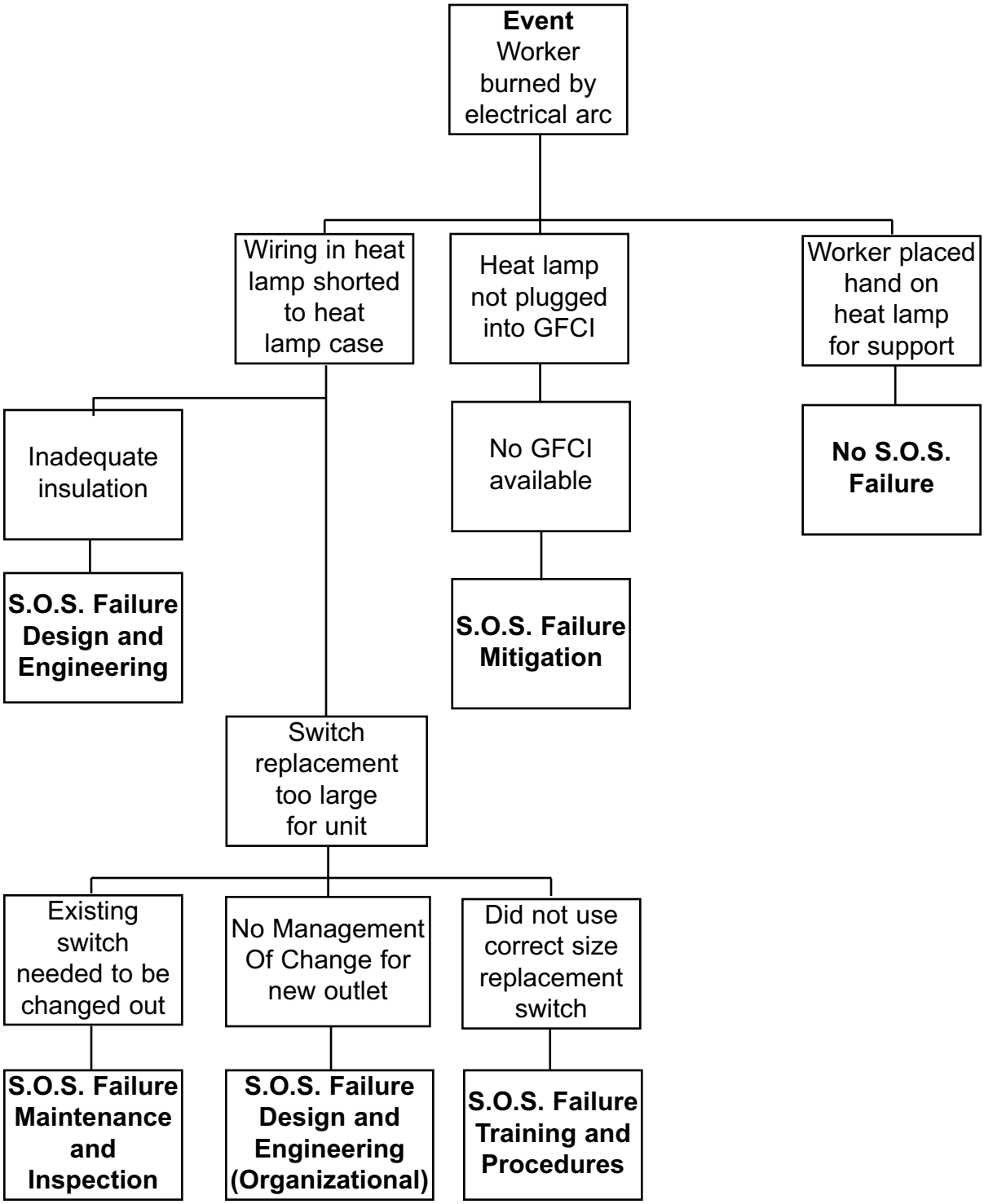
Discussion *(continued)*

Further inspection of the area revealed that the outlet into which the warmer was plugged did not have a Ground Fault Circuit Interrupter (GFCI). A review of the *National Electrical Code* revealed that "GFCI protection shall be provided for receptacle outlets serving counter tops in kitchens and receptacle outlets within 1.8 meters (six feet) of a wet bar sink." While the warmer was plugged into an electrical outlet near the floor in a pole drop from the ceiling, and not a kitchen counter top, the application is similar and it was therefore recommended by Engineering that the plug be upgraded to include a GFCI.

In addition, an extensive walkdown of other areas within the building revealed that the GFCI outlets in other areas would not trip, and that other outlets in that area did not appear to be protected by GFCIs. Furthermore, GFCIs did not protect some of the outlets in the main serving counter.

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. Replace existing outlets near the salad bar with outlets containing Ground Fault Circuit Interrupters.
2. Replace or repair the existing food warmer using a suitable replacement switch that provides adequate air space to isolate the switch connectors from the food warmer case.
3. Provide training on the importance of using the correct replacement parts on equipment.

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.

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 Receives Electrical Burn at Food Warming Station

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 9);
3. The Trainer's LL Success Inventory form (pages 10 and 11);
4. The evaluation for each participant (page 12); and
5. The Sign-in sheet (page 14) 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.

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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			
5			
6			
7			
8			
9			
10			
11			
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