



## Hot Water Burn

### 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 07, Issue 20**

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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    |
| <b>EXAMPLES OF SAFETY SUB-SYSTEMS**</b> | <b>Technical</b>  | 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   |  |
|   | <b>Organizational (must address a root cause)</b>           |   |  |                                | 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:**

When the investigation of a burned forklift driver was completed, failed *Systems of Safety* were found.

A *Systems of Safety Design and Engineering* fix would redesign the air intake to keep it from drawing air from below the forklift.

Using *Systems of Safety Mitigation*, guards installed for the overfill bottle and the bottom of the forklift to prevent paper from blowing up from underneath the forklift could reduce the chance of this injury happening.

Using a *Systems of Safety Training and Procedures* fix for a routine inspection and cleaning procedure for the forklifts this incident should not be repeated.

**Discussion:**

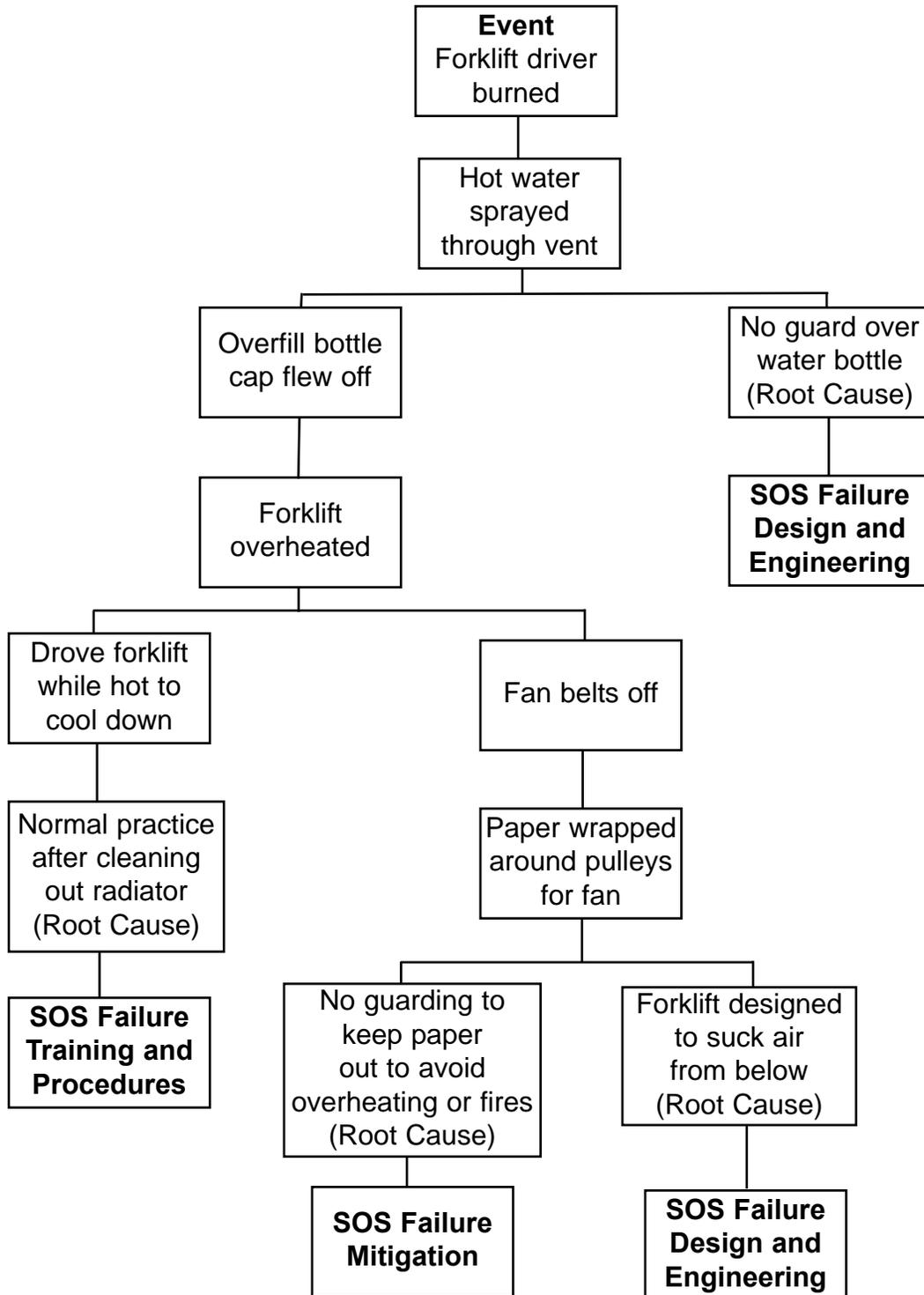
A forklift driver was burned on his arm and back when hot radiator water sprayed out the forklift vent.

The forklift is designed to pull intake air from below. This caused paper to be sucked up from the floor. Paper had wrapped around the fan pulleys causing the fan belts to come off. The driver, thinking that the over heating was caused by fiber plugging the radiator, cleaned the radiator. Not knowing the belts were off, he then drove the forklift around to cool it down after cleaning. With the belts off, the forklift overheated. This caused the overflow bottle cap to blow off, spraying hot water through the vent.

There is no guard over the water bottle.

**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. Design and install guard on overflow cap.
2. Redesign forklift intakes to draw air from above.
3. Install guard to keep paper from blowing up from underneath.
4. Allow overheated forklifts to cool down while parked; then make sure you know the caused the heating.
5. Forklift inspections at the start each shift.

### **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.

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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.)

# EVALUATION

## Lessons Learned: Hot Water Burn

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?

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**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 this page **plus the Education Exercise and Evaluation for each participant and the Sign-in sheet** to:

**Doug Stephens  
United Steelworkers International Union  
3340 Perimeter Hill Drive  
Nashville TN 37211**

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



