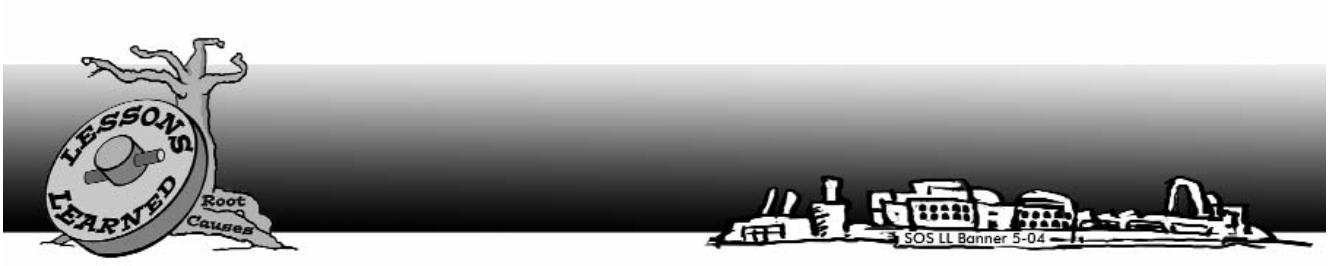

Arm Caught in Moving Conveyor Belt

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 24

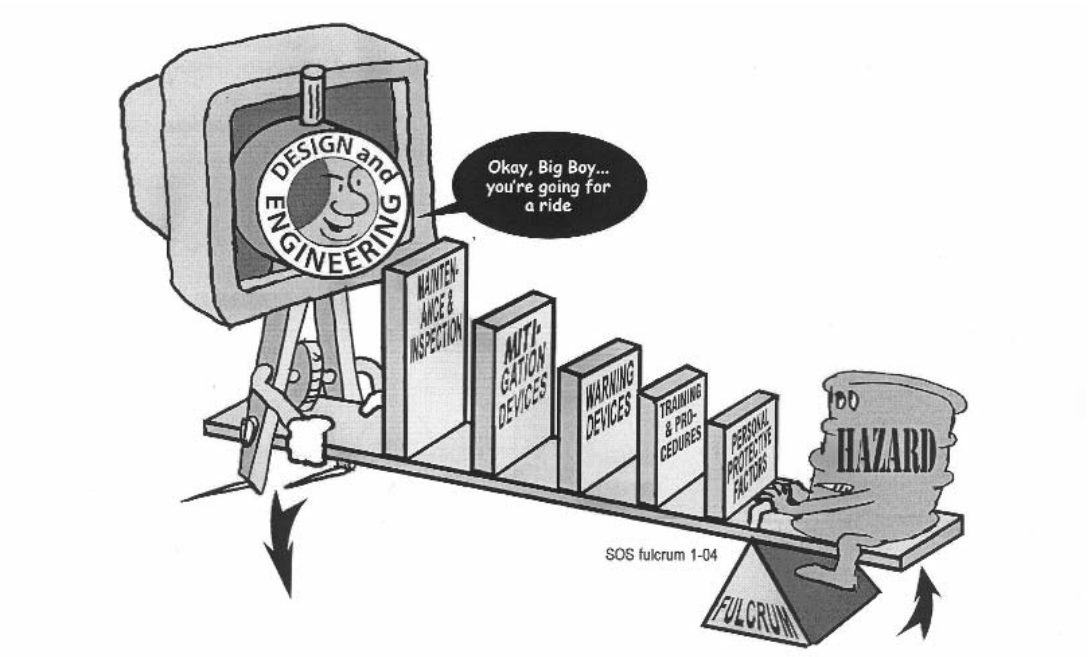
Background Information

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: Arm Caught in Moving Conveyor Belt

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Lessons Learned Statement

When truck drivers are waiting for their trucks to be loaded or unloaded, it is common for them to want to be productive while waiting, especially drivers that are familiar with the site or the people who work there. In this Lessons Learned, we will see that, although trying to be helpful, it is dangerous to try to work with moving equipment.

When utilizing ***Systems of Safety*** "thinking" processes, we can break down each task and eliminate the hazards by **Designing and Engineering** the job to be safe. Conveyor systems, or any equipment, must have some type of material controls to prevent buildup of materials and eliminate the need for manual cleaning during operation.

The total lack of any **Mitigation Devices** led to this incident. The **Mitigation Devices** ***System of Safety*** protects us from hazards when the unexpected happens. The fact that workers have access to small areas with lots of moving parts is a major source of danger. The lack of guarding on equipment leads to disaster. Conveyors, shafts, rotating equipment, etc., must have guards that render the machines idle when removed. In this case, the worker put out his hand to regain his balance and came into contact with the unguarded conveyor belt.

The **Training and Procedures** ***System of Safety*** also failed in this incident. There are no procedures for cleanup of this equipment. The procedures cover startup and shutdown only. There are no clear guidelines on the scope of the driver's duties.

Discussion

A truck driver was helping to clear debris from a conveyor belt while his truck was being loaded with coke in a refinery. It was common for the drivers to help clean up the area while their trucks were being loaded.

There was a gap that was big enough for people to move around in between the conveyor belt and the machinery that was running. This gap has never had a barricade and it was a common and accepted practice to clean up in the area while the machinery and conveyor were running. Additionally, the guard for the conveyor belt itself had been removed for cleaning and had not been reinstalled. Leaving the guard off while the machine and conveyor were running had become an acceptable practice.

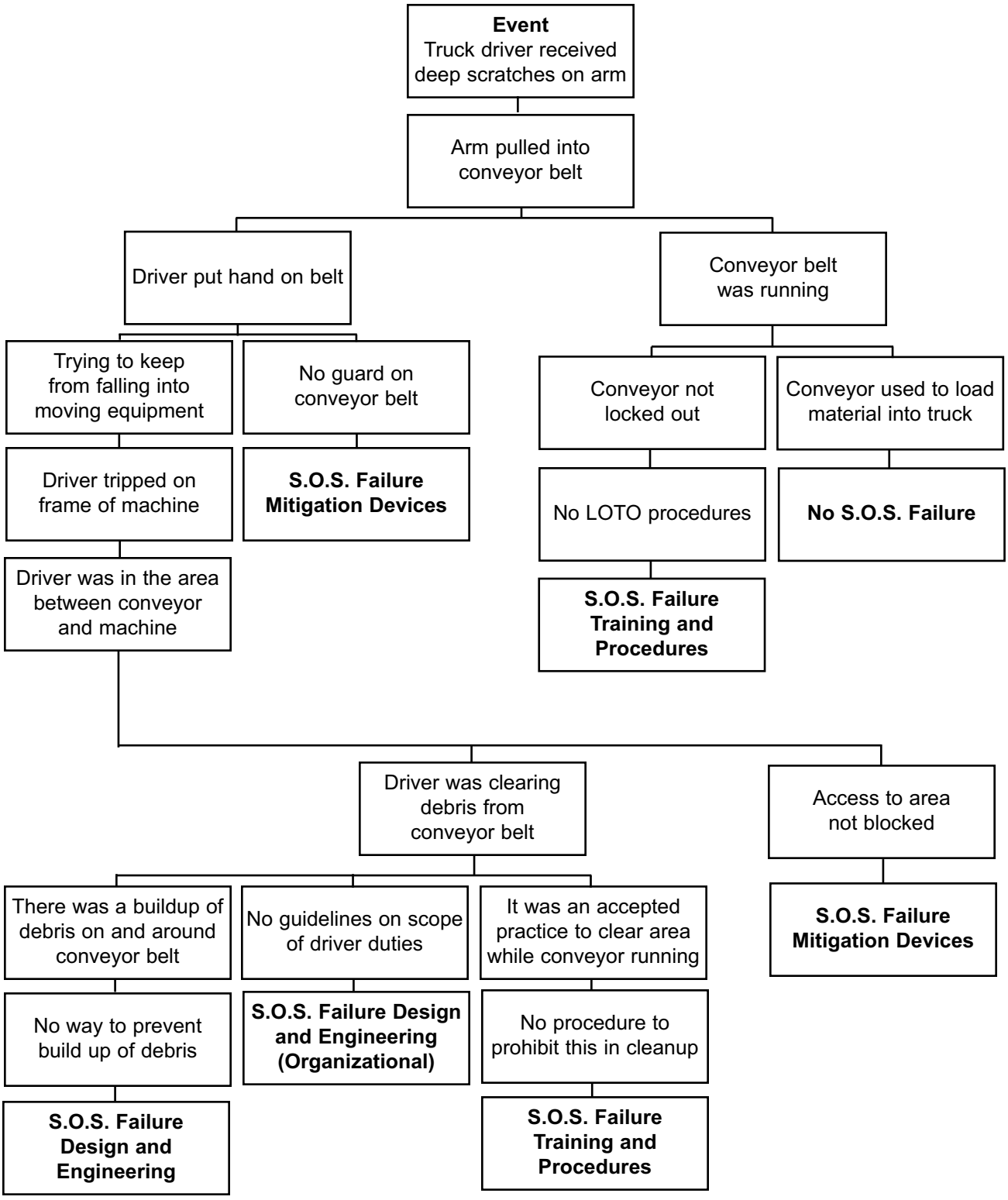
The driver, who was helping clear the conveyor, tripped on part of the machine and tried to reach out to save himself from falling. When he did, his hand contacted the bottom of the conveyor belt. The belt pulled his arm into the bottom roller of the conveyor assembly.

Fortunately, the operator was close by and heard the driver shout for help. The operator shut down the conveyor belt and contacted emergency responders. They were able to get the driver out of the belt and helped him to the first aid room. The driver had many deep scratches, none serious. Although the injuries were minor, the driver was very shaken up.

It was noted that the procedures for running this equipment only addressed basic startup and shutdown. Nothing about cleanup, lockout/tagout or the scope of the delivery driver's duties is even mentioned in the procedures.

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. Manufacture a barrier to block access to machinery and conveyor while running. This barrier must have an interlock that will shut down any equipment when the barrier is opened.

2. Reinstall guard on conveyor. Add interlock that disables conveyor when removed.

3. Revise cleanup procedures. Demand mandatory shutdown before cleanup and all machinery is to be locked out. Lockout/tagout instructions must be written up and reviewed regularly.

4. Look into different types of conveyors, focusing on ones with shields, vacuum systems and barriers to prevent materials from building up on and under conveyor.

5. Determine the scope of the truck drivers' duties and limitations. If the duties include helping to clean up the area, train drivers in LOTO of the equipment and the procedures for cleanup and operation, including all emergency stops and controls.

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: Arm Caught in Moving Conveyor Belt

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 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.

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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			
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