



Heat Stress-Related Head Injury

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 19

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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 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:

Elevated temperatures in a workplace, a lack of available, potable water and a lack of portable work devices contributed in the close succumbing of a worker. This, too often, occurs in a workplace because the *Systems of Safety* approach has not been implemented.

By utilizing a **Design and Engineering** approach towards these overlooked items, this entire situation could have been avoided. The simple life-sustaining basics; such as water and its availability, would have entirely mitigated the dehydration of this worker; therefore eliminating the oncoming of heat stress.

By utilizing ***Systems of Safety Design and Engineering*** in this situation, we could have foreseen the flawed outcome and provided for the required workplace devices. This would have allowed the worker to ensure not only his safe being but that of his fellow workers.

Discussion:

A maintenance mechanic had been assigned to assist in an asbestos material cleanup project. The mechanic left the regulated, asbestos cleanup area to take a break after sweeping and cleaning up the asbestos materials for approximately one hour. Once he had completely removed all of the required Personal Protective Equipment (PPE)—total encapsulating, impermeable clothing and a Powered Air Purifying Respirator (PAPR), he sat down on a staircase to rest. He was overcome by dizziness and faintness which caused him to fall backwards, striking the back of his head on the metal staircase. This resulted in a laceration to the back of his head. Emergency personnel were summoned and the mechanic was transported to the plant medical facility where he was evaluated and received sutures to close the wound.

After further review of the incident, it was determined by the Industrial Hygienist that this particular job location temperature was approximately 91.9° F. A slight increase in temperature can be directly attributed to the fact that this job location is situated directly above heat generating, process equipment in this facility.

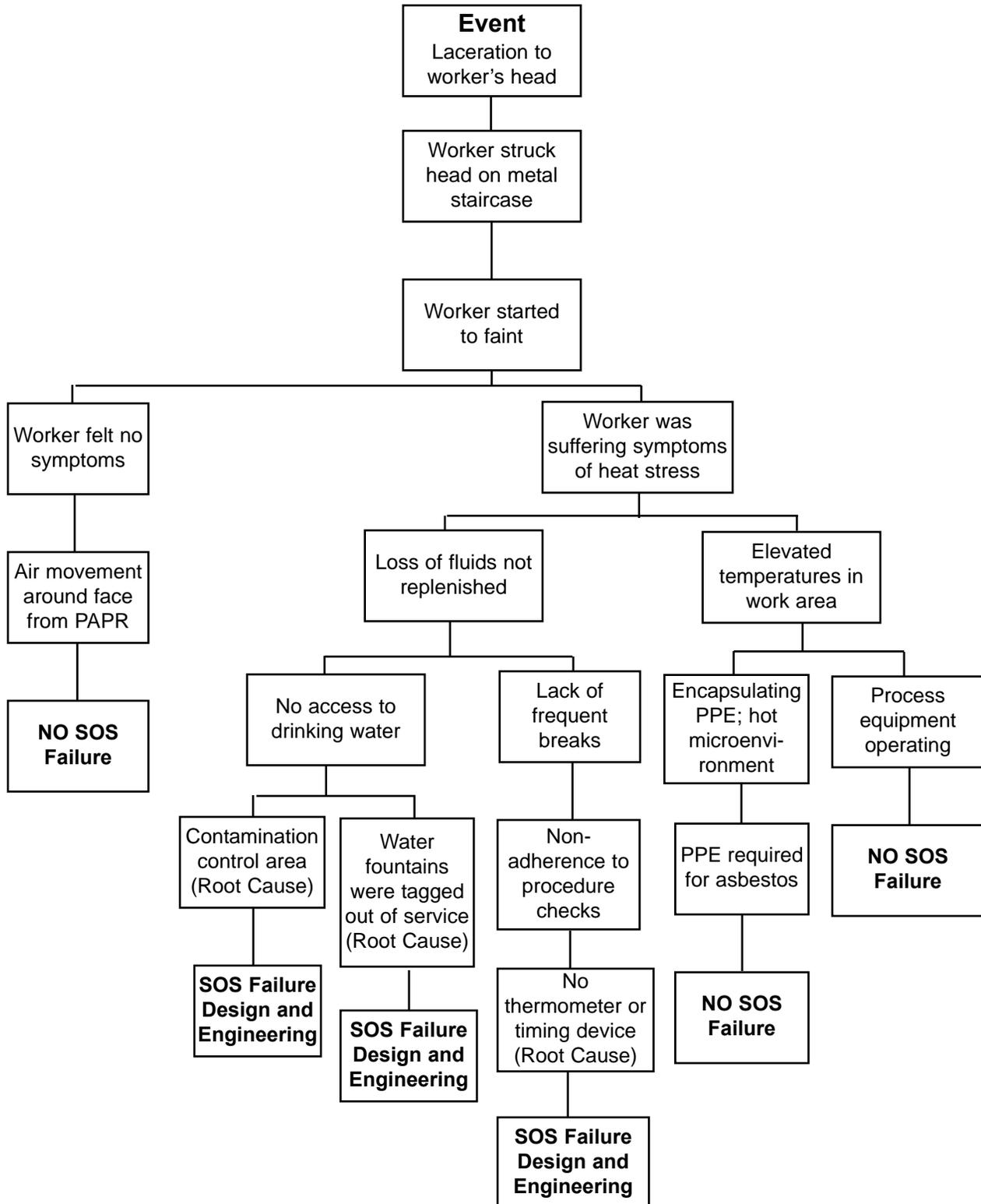
Further determination revealed that the mechanic felt that the PPE prevented him from feeling overheated due to the PAPR providing a continuous flow of air, which made him feel cooler than he actually was.

The established procedures related to working in extreme temperatures stated that “employees need to be aware of the temperatures and length of work time to determine Check and Recheck time intervals.” This procedure allows for specified work breaks dependent upon specific temperature ranges and work time allotments. This job location did not have a thermometer or clock which would have enabled the mechanic to adhere to the procedure. Accordingly, on this particular day, with the conditions present, the check time would have been 20 minutes with a recheck interval of every five minutes.

Another notable issue in this case is the fact that the mechanic was unable to properly rehydrate himself due to the fact that no potable water was available. The water fountains in the vicinity had been contaminated due to the asbestos and the water fountains had been tagged out of service.

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. Implement the use of portable thermometer and timing devices at work locations that have potential for extreme temperature conditions and work time allotments. This will enable adherence to policy
2. Ensure that an adequate supply of cool, potable water is available in all work locations, especially in locations where extreme temperature environments exist.
3. Communicate and review like-situated heat stress incidents to all employees with exposure or potential exposure to extreme temperature conditions.

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.)

EVALUATION

Lessons Learned: Heat Stress-Related Head Injury

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 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.

