



Falling Tote Injures Worker

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 58

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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.



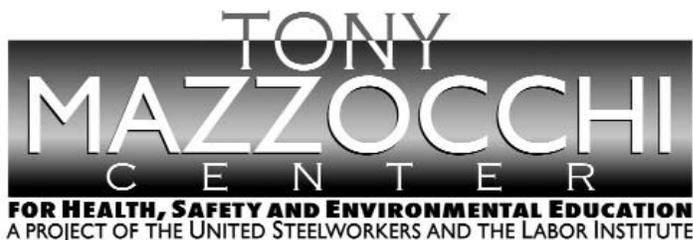
Major Safety System	Design & Engineering	Maintenance & Inspection	Mitigation Devices	Warning Devices	Training & Procedures	Personal Protective Factors
Level of Prevention	Highest—the first line of defense	Middle—the second line of defense			Lowest—the last line of defense	
Effectiveness	Most Effective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

The poor design of the tote and the lack of a procedure for unloading totes contributed to the worker suffering a very serious injury. *Systems of Safety* are utilized to provide prevention from this type of incident.

The protection provided by the proper design of the tote provides a well-defined **Design and Engineering Systems of Safety** approach. An even better **Design and Engineering Systems of Safety** approach would be to hard pipe the chemical to the Perchloroethylene (Perc) storage tank.

Eliminating the chemical from the process would also eliminate the need to perform this chemical transfer. If this would not be feasible a procedure to address the unloading of totes would provide a well defined **Training and Procedures Systems of Safety** approach to reduce the hazards associated with this incident.

Discussion:

Maintenance was issued a work order to transfer Perchloroethylene (Perc) from a stainless steel portable chemical tote to a unit storage tank. Two craftsmen were assigned to the job. The job consisted of moving the Perc tote into the unit using a forklift, connecting the tote to the storage tank and elevating the tote to gravity fill the storage tank. During the operation, one craftsman operated the forklift and the other connected the hoses and directed the forklift operator. A unit operator was present during the transfer operation.

During the transfer, the forks and tote were tilted approximately 5-10 degrees to the north to facilitate complete draining of the tote.

The transfer operation was completed and the tote lowered. The craftsman on the ground determined that the loading hose contained some chemical; so he directed the forklift operator to raise the tote again to allow the hose to drain into the storage tank. The craftsman was positioned immediately south of the Perc storage tank.

When the tote reached a height of approximately 13 feet, the craftsman on the ground signaled the forklift operator to stop raising the tote.

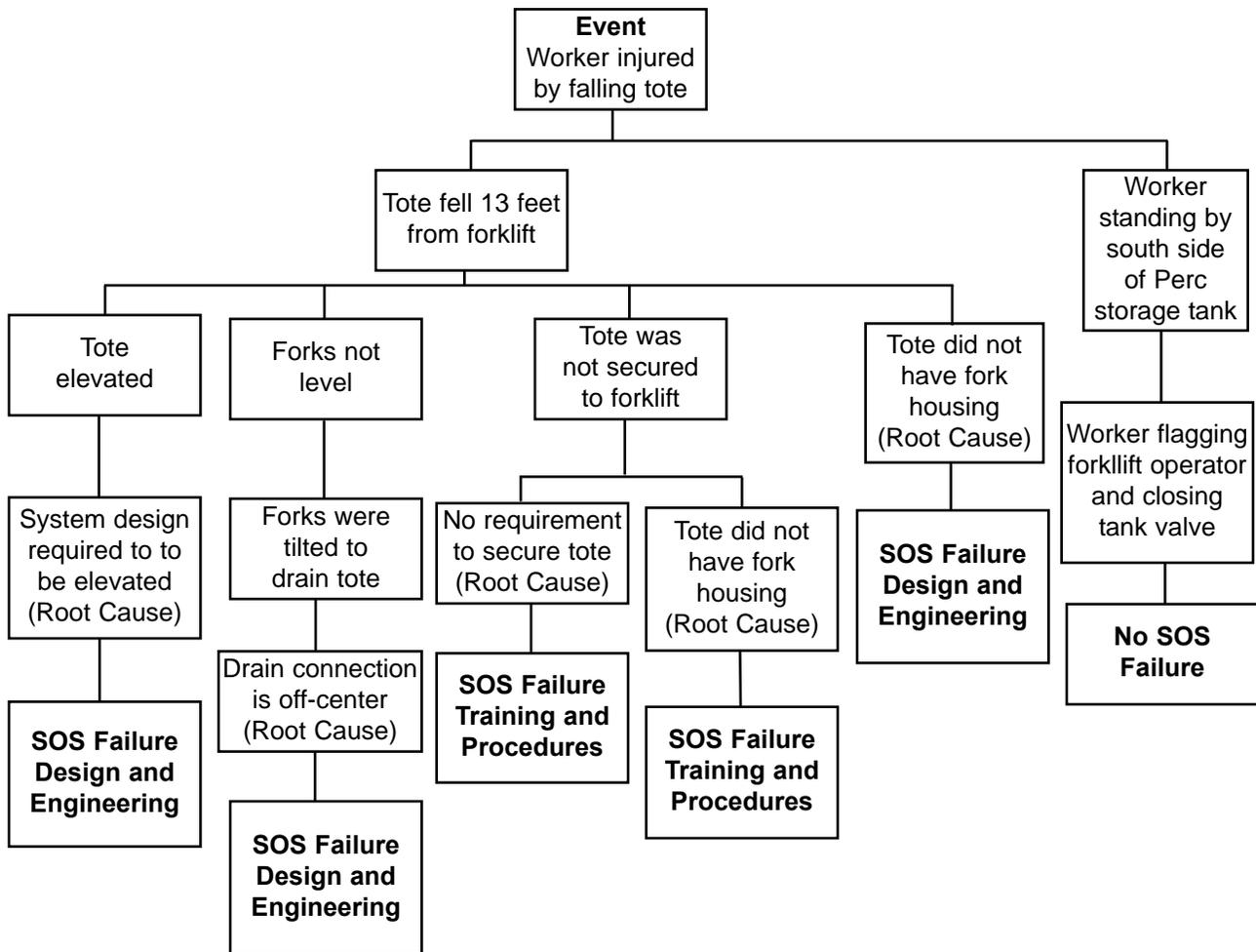
The tote became unstable and tipped off the north side of the forks and in the process of falling to the ground, struck the craftsman. The craftsman was struck in the upper back; knocking him to the ground. The craftsman suffered crack vertebrae, cracked ribs, a fractured shoulder blade and a bruise to the back. The weight of the empty tote was 600 lbs. The distance from the tote nozzle to the Perc storage tank nozzle was approximately 11 feet at the time of the accident. The loading hose was 12 feet long.

There is no written procedure for this transfer operation.

According to the chemical supplier, these totes are designed to be moved with a forklift. However, the bottom of the tote is not fitted with fork housings or guides. The tote is not fitted with lifting lugs or lifting brackets.

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. If Perchloroethylene is required for the process, determine if an alternate method of filling the Perc storage tank can be used. Consider methods to eliminate the use of a forklift to transfer the chemical. Options could include a fixed platform for the tote or transferring the chemical with a pump to prevent lifting the tote overhead.
2. Contact the chemical supplier to determine if totes can be modified.
 - a. Install fork housings on bottom of the tote.
 - b. Modify the drain connection on the tote to eliminate the need to tip the tote during transfer. If the supplier will not change the configuration of the totes, consider purchasing totes to meet our requirements.
3. Conduct a survey to determine if there are other installations in the plant where chemical unloading and transfers are done using forklifts or similar equipment. Determine if similar hazards exist and whether these hazards can be eliminated or reduced.
4. Develop a procedure for the unloading of chemical totes in the plant. This procedure should include guide lines for securing loads to a forklift

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 ore 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 which actions or recommendations participants discussed pursuing at their workplace(s).

Thank you for completing this form.

EVALUATION

Lessons Learned: Falling Tote Injures Worker

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:

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.

