



Hoist I-Beam Trolley Failure

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

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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		
Workload						
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 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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Lessons Learned Statement

This near-miss revealed that the **Maintenance and Inspection System of Safety** element was missing from this equipment in normal plant operations. Using the **Training and Procedures System of Safety/ Operating Manuals and Procedures** to write a Hoisting and Rigging Manual would act to minimize and control hazards.

The hoist trolley experienced a complete failure under load due to missing retainer pins not identified in the pre-use inspection. The **Personal Protective Factors System of Safety/ Stop Work Authority** should have been used to stop the job and place it in a safe condition when the trolley was discovered under load and near failure.

A **Mitigation Devices System of Safety/Enclosures, Barriers** could have been used to set up a safe perimeter to further protect the workers if the lid fell. Again, **Systems of Safety** could be used to develop an emergency response plan. The emergency response plan would be an example of using the **Design and Engineering System of Safety/ Codes, Standards and Policies**, to perform a Job Hazard Analysis (JHA). The JHA would then be used in the **Training and Procedures System of Safety/Emergency Response/Pre-job Briefing**. Finally, the emergency response workers could then proceed with recovery of the failing trolley and suspended load.

Discussion

Workers were performing an annual inspection of the Beneficial Uses Shipping System (BUSS) cask lid. After a pre-job meeting in the field, they began removing the lid according to approved procedures. The workers rolled an A-frame gantry (Wallace Gentry, Model A2T15-15) over the lid; installed a one-ton chain hoist on the A-frame trolley; and inspected the entire lifting mechanism. The plant Hoisting and Rigging Manual does not address inspections of trolleys and A-frames. The workers removed the lid and rolled the trolley to move the lid to the side of the cask in preparation for lowering. As the trolley was rolling, the worker on the job observed the trolley beginning to spread and realized there was a danger of the load falling.

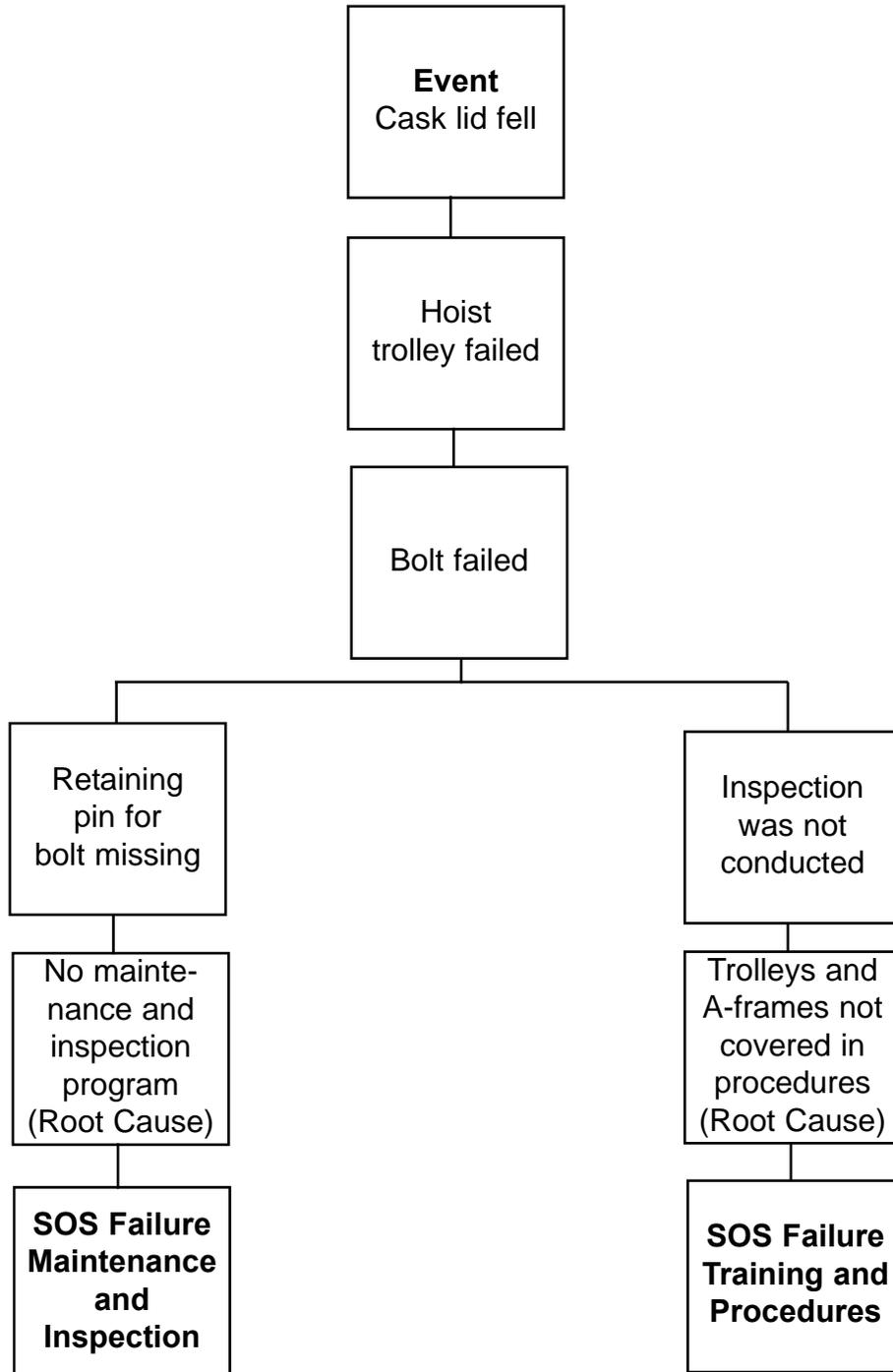
The workers immediately stopped the trolley movement and carefully placed a plastic pallet under the cask lid. While standing well back from the load, they began to lower the load to reduce the potential hazard. The load was lowered from approximately 3 ½ feet high to 2 ½ feet when the trolley separated, disengaged from the I-beam and dropped the 1,500-pound lid onto the pallet.

No injuries occurred because the alert employee recognized the potential hazard and because all personnel were well away from the load when it fell. No equipment was damaged.

The one-ton I-beam trolley is a budget* Model # 509148-1.

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. Remove all hoisting and rigging equipment from service until inspected by qualified personnel according to manufacturer's written instructions for the specific equipment.
2. Develop and institute a Maintenance and Inspection program.
3. Give fast-track crew briefing on this near-miss and what actions to take on future off-normal, near-miss situations.
4. In emergencies:
 - Stop the job;
 - Set up safe boundaries;
 - Do a JHA *System of Safety* review to develop an emergency action plan to resolve the emergency;
 - Give new pre-job briefings; and
 - Then follow the new plan.

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

Thank you for completing this form.

EVALUATION

Lessons Learned: Hoist I-Beam Trolley Failure

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

