



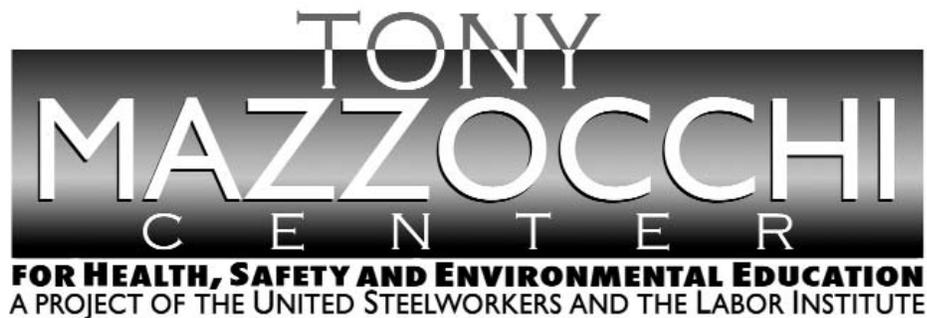
## Chemical Spilled into Sewer

### Purpose

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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 6**

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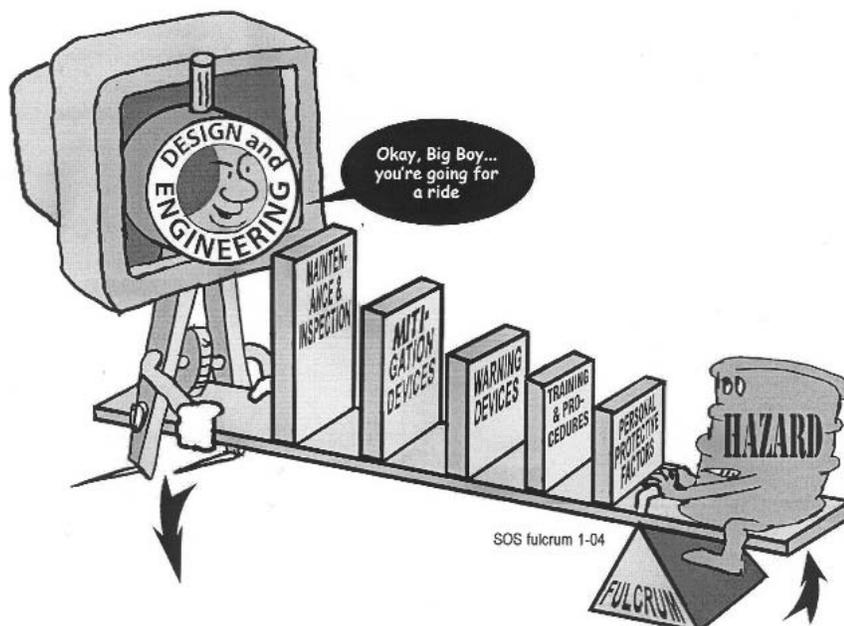
## Background Information

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.

**Revised October 2006**



**Title:** Chemical Spilled into Sewer

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**Lessons Learned Statement:**

This is a prime example of a liquid chemical that is spilled onto the ground and ends up in the sewer system. *Systems of Safety* are utilized to provide prevention for this type of incident. The protection provided by a well-designed metering system and the site being designed for safe loading and unloading of chemicals provides a well-defined **Design and Engineering Systems of Safety** approach.

Because of the failures in **Design and Engineering**, the potential for a major environmental violation was present. If loading and unloading systems are designed with the proper metering and the site is designed for safe loading and unloading of chemicals, this type of incident can be eliminated. This will provide maximum protection through the proper implementation of **Design and Engineering**.

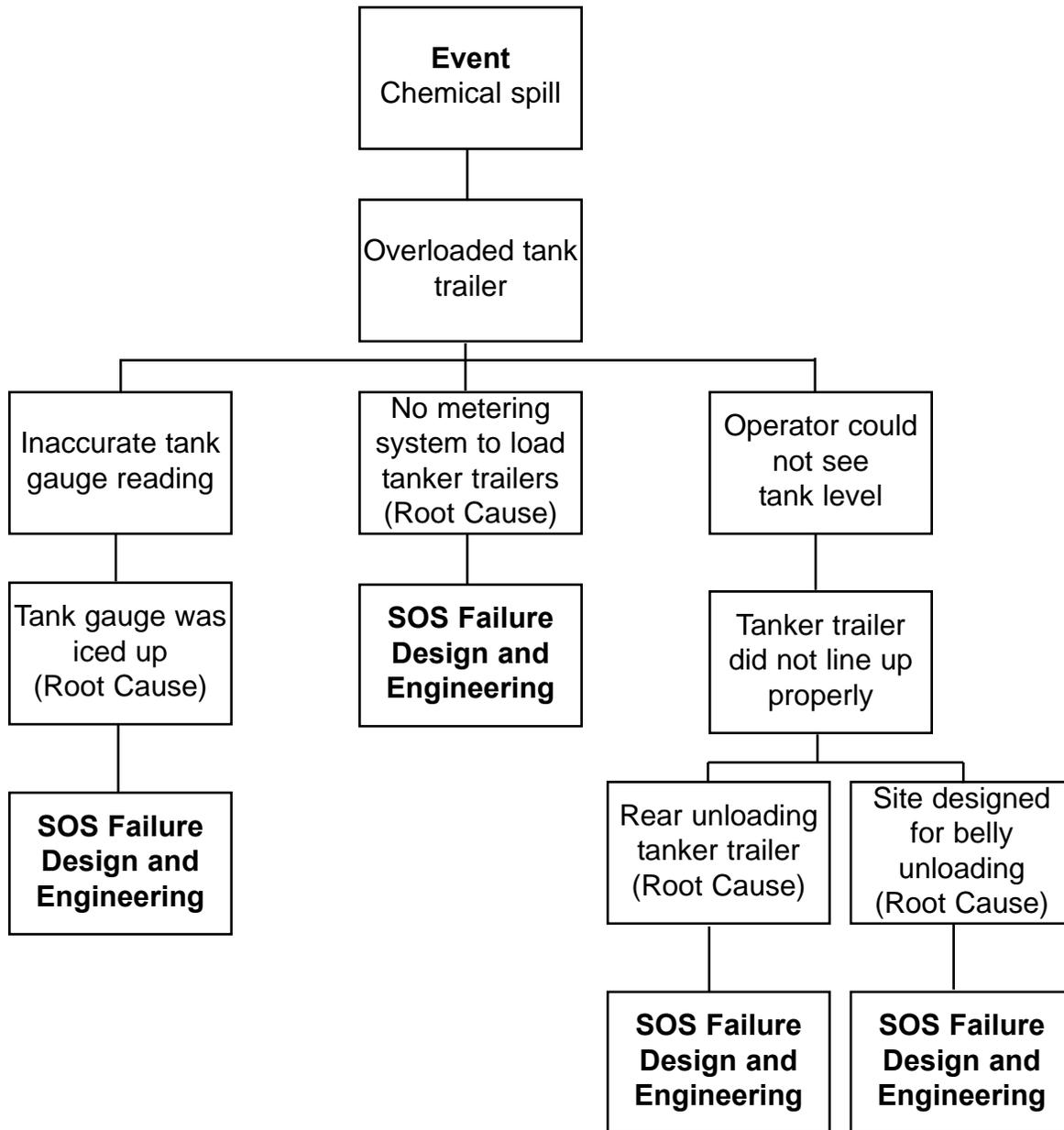
**Discussion:**

The loading dock person (Material Handler) was assigned to load Amines liquid chemical into a tank trailer. He took the readings on the tank gauge before starting and subtracted the amount needed for a full load. While filling the tanker, the Material Handler noticed product spraying out of the vent on the tanker, onto the loading pad and into the parking lot. The product that sprayed into the parking lot went into the sewer. The investigation revealed the following additional facts:

- Tank gauge reading was inaccurate.
- Cold weather had caused ice in the instrument.
- There was no metering system to load tanker trailers.
- Operator could not look into the tanker trailer to check the level because it did not line up properly.
- Trailer was being loaded from the rear.
- Site was designed for belly loading.

**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. Install new tank gauge that is not affected by the weather.
2. Install level transmitter.
3. Install an in-line metering device for all tank trailer loading.
4. Design site for both rear and belly tanker trailer loading.
5. Do not load rear-loaded tanker trailers until the site has been designed to do so safely.

## 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: Chemical Spilled into Sewer

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?

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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.



