

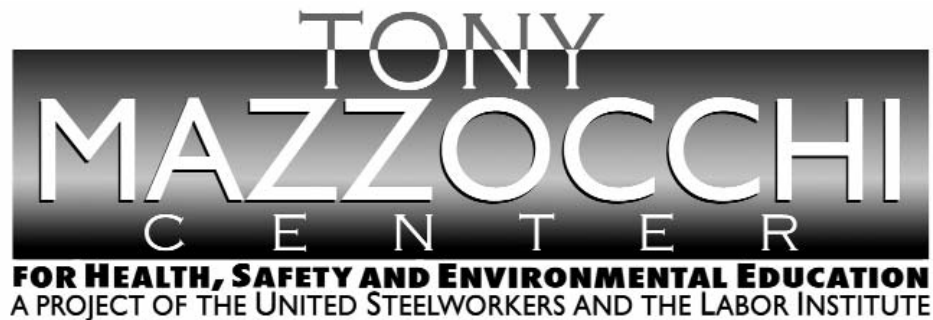


## Forklift Incident Causes Machine Shutdown

### 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**

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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 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

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A lack of refresher training, poor location of an (E-Stop) cable<sup>1</sup> and an unclean environment led to machine downtime. *Systems of Safety* are utilized to prevent this type of incident.

Failure to locate the E-Stop cable on the No. 2 Line Former away from forklift traffic allowed for this incident to occur. Following the **Design and Engineering System of Safety** would have placed the cable in a better location.

The Baler Relief<sup>2</sup> had to maneuver the forklift and cullet bin<sup>3</sup> through tight quarters. A better location may be available for either the cullet bin or the No. 2 Line Former. The **Design and Engineering System of Safety** would eliminate the risk of this type of incident.

The area around the E-Stop reset was dirty and covered in debris. Utilization of the **Maintenance and Inspection System of Safety** would have provided a much cleaner environment. Designing a protective cover for the reset would be utilizing the **Mitigation System of Safety**.

<sup>1</sup> E-Stop — an emergency stop device that shuts off all moving parts immediately upon being tripped.

<sup>2</sup> Baler Relief — a material handling position a worker holds. A relief fills in for the normally scheduled baler in their absence. Part of the daily tasks of a baler may include emptying broke, scrap, garbage and bins.

<sup>3</sup> Cullet Bin — used to hold recyclable glass, cans, plastic or cardboard.

The forks on the forklift shifted during transportation of the cullet bin. Forks on a lift should not move unless the lift operator has caused them to do so. A Preventive Maintenance Program (**Maintenance and Inspection System of Safety**) for all forklifts would have caught this problem before it led to machine downtime.

Inadequate refresher training for the Baler Relief allowed for greater risks while performing this task. The Training and Procedures System of Safety should be utilized whenever a worker has not been on a job for an adequate period of time.

## **Discussion**

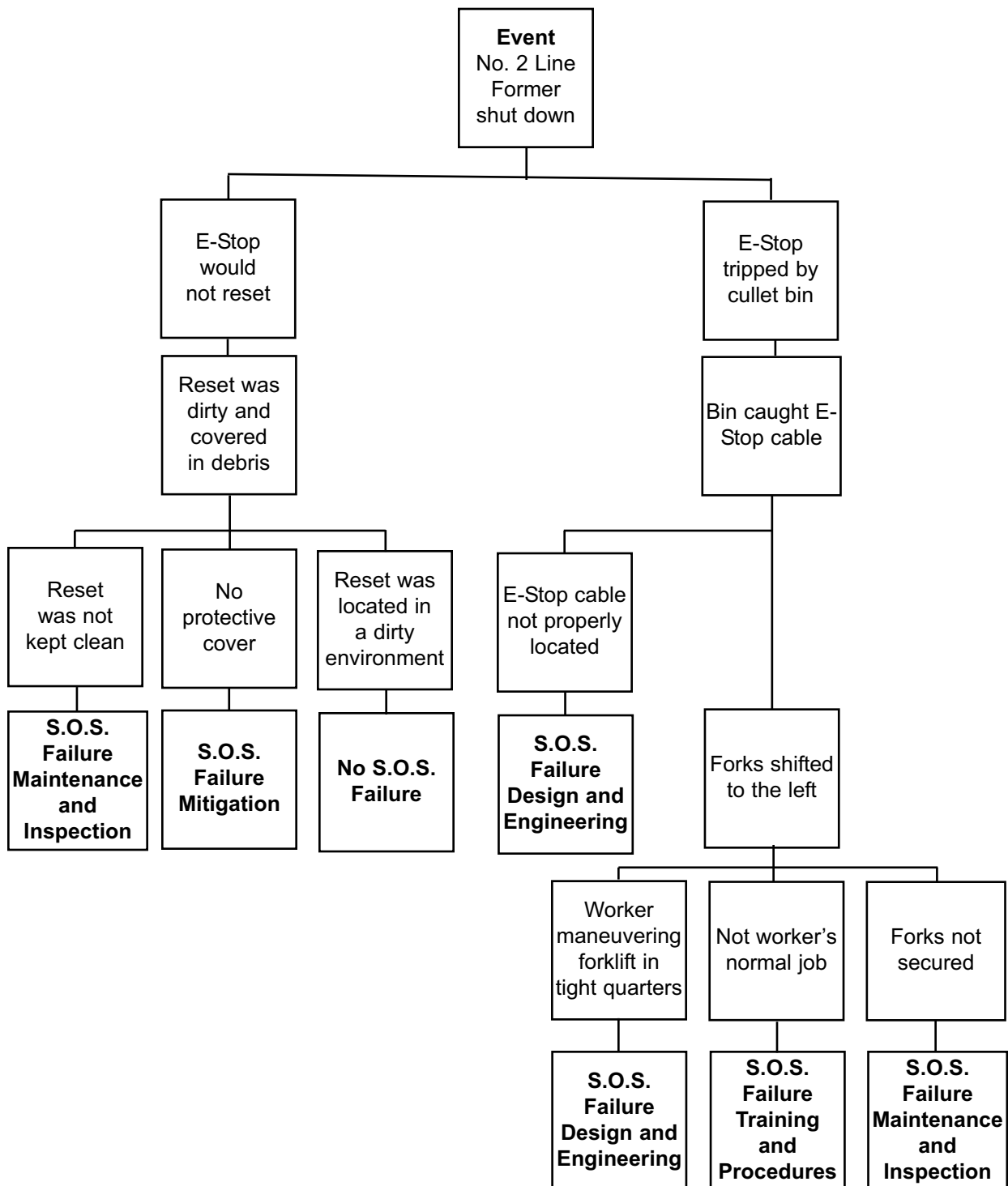
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A Baler Relief was using a forklift to remove a cullet bin from the No. 2 Line Former. While backing out with the cullet bin, the forklift forks shifted to the left, causing the bin to shift as well. When this occurred, the bin caught the E-Stop cable around the East end of the No. 2 Line Former. This action tripped the E-Stop, shutting down the Former.

The E-Stop would not reset and an electrician was called to work on the damaged equipment. Because of layoffs, the worker had not done this job in quite a while. This area is very tight, making forklift traffic difficult. The E-Stop reset and cable are located in a dirty environment that is not kept clean.

## 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**

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1. Install protective covers over E-Stops located in dirty environments.
2. Move E-Stop cable to a more protected area. A joint safety review team should be formed to ensure that while moving an E-Stop cable, another hazard is not created and that machine operators are still capable of reaching the cable to disable the machine.
3. Install an inspection plan to ensure that E-Stop area is kept clean.
4. Install a Preventive Maintenance program for forklifts to ensure safe operation.
5. Refresher training should be required for any tasks being done by workers that do not routinely perform them.















