Rethinking Serious Injury and Fatality Prevention

James Grant
Vice President
BST

Larry Simmons, CMSP, CSP
Senior Director, Safety & Health
PotashCorp
How Could This Happen?

• Four months ago we celebrated our safety success. Our recordable rates were lower than ever. Our leaders got bonuses.
• This quarter we had a fatal injury, and a severe burn.
• Our safety leaders are perplexed and our plant manager and his boss are angry.
The Current Paradigm – Are We Stuck On This?

• SIFs and Non-SIFs have the same causes and correlates.
• You can impact the top of the triangle by working on the bottom of the triangle (the triangle is predictive).
• TRIR and audit information are reliable indicators of SIF Exposure Potential.
• When SIFs occur, they are one-offs.
• Accident investigations are transactional and good enough.
All Injury Frequency Rate (3 Month Rolling Average) and Fatality Rate 2000 – 12-2008.08
Definition of Serious Injury

Any injury or illness that resulted in:

1. Life-threatening injury or illness: one that if not immediately addressed is likely to lead to the death of the affected individual, and will usually require the intervention and/or external emergency response personnel to provide life-sustaining support.

2. Life-altering injury or illness: one that results in permanent or long-term impairment or loss of use of an internal organ, body function, or body part.
Objective: Develop knowledge that will inform strategies to prevent serious injuries and fatalities

1. Develop a model to understand the occurrence of SIF’s.

2. Study three questions:
   - Is the traditional Safety Triangle accurately descriptively?
   - Is the traditional Safety Triangle predictive?
   - Can precursor events be identified that will inform intervention strategies?

3. Construct a new paradigm for prevention of SIF’s.
Data Collected – Phase 1

- Injuries and Near-Misses From Six Organizations.
  - Representing approximately 1,000,000 Employees & Contractors.
- Our analysis compared two groups of incidents:
  - SIF’s, injuries, and near misses with serious injury potential.
  - Injuries and near-misses that did not have SIF potential.
Question 1

• The traditional safety triangle is accurate descriptively.

• This triangle represents the data from all six organizations between 2008-2009.

<table>
<thead>
<tr>
<th></th>
<th><em>Average Rate</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Injuries and Fatalities</td>
<td>0.0014</td>
</tr>
<tr>
<td>Restricted and Lost Workday Cases</td>
<td>0.30</td>
</tr>
<tr>
<td>Medical Treatment</td>
<td>0.98</td>
</tr>
</tbody>
</table>
Question 2

• The traditional safety triangle is *not* accurate predictive.

Not all injuries have SIF potential.

A reduction of injuries at the bottom of the triangle does not correspond to an equivalent reduction of SIF’s.
Question 3

Can precursors be identified that will inform intervention strategies?
Precursor Event

“A high risk situation in which the management controls are either absent, ineffective, or not complied with, and if allowed to continue or repeat, could reasonably result in a serious injury or fatality.”

What categorizes a precursor event is not its immediate outcome, but its potential to produce a serious outcome.
Muck At Its Finest
A History of Broken Glass

• In 2010, 22 Incidents of Broken Glass on Heavy Equipment

• 19 of the Incidents were Due to Impact (86%)
Cultural Blindness

“If you move muck and clear trees with heavy equipment, you’re going to break some glass now and then—it’s just a part of what we do”

– Anonymous Heavy Equipment Operator at this site
Interesting Findings

- 42% - Performing a routine operations/production or a maintenance/repair task, connected with a deviation from an established life safety/key procedure.

- 29% - Performing a routine operations/production or maintenance/repair task, (not governed by an established key procedure), connected to an exposure that changed from a “normal state”, was not anticipated/recognized/controlled and likely could have been prevented by a proper Pre-Task Risk Assessment.

- Based on the qualitative analysis, 70% of the SIFs or SIF- potential injuries involved these themes. Team members expressed this in a different way: “If you experience a SIF, there is a 70% chance it would have involved either of these themes.
Further Analysis

SIF's are disproportionately related to certain activities and to activities ‘managed’ by certain safety controls.

**Activities**

When the injury was related to: operation of mobile equipment or watercraft, working under suspended loads, or working at heights:

90% were SIF's  \( N=126 \)

**Safety Controls**

When the injury was related to: lock-out/tag-out, machine guarding and barricades, confined space entry, use of hot work permits, equipment and pipe opening of hazardous chemicals:

100% were SIF's  \( N=47 \)
A New Paradigm

- The causes and correlates of SIFs are different from Non-SIFs
- You will not impact the top of the triangle by just working on the bottom of the triangle
- The SIF blind spot is significant
- Our accident investigation processes are not getting the job done

High-risk situations in which management controls are either absent, ineffective, or not complied with, and which will result in a serious or fatal injury if allowed to continue.
One major issue: failure to recognize SIF potential is in our measurement system.

It creates a blind spot, not giving visibility to SIF precursors.
SIF Intervention Strategy

• Leader education
  • Don’t overlook anything

• SIF Exposure visibility
  • SIF exposure metric

• Know your precursors
  • Mine your data
  • Discover thru observation and interview
SIF Intervention Strategy (contd)

- Interventions integrated into existing SHE systems
  - Injury/Incident reporting
  - Pause work climate – Stop Work Obligation (SWO)
  - Pre-task risk assessments (RA/JSA)
  - Life Saving Rules – quality, integrity, and reliability
  - Accident handling system
PotashCorp Summary

• Established SIF Work Group
• Developed the criteria for determining SIF potential with decision matrix and definitions
• Each site reviewed incidents for SIF potential based on the decision matrix and definitions developed and flagged
• Developed a SIF Incident Rate overall and by location based on the incidents identified as having SIF potential
• Extracted the buckets or categories of activities blended by nutrient - Identified the associated precursor events
PotashCorp Serious Injury/Fatality (SIF) Decision Matrix

1. Fatality or life altering/threatening injury/illness resulted or could reasonably have resulted?
   - YES → SIF or SIF Potential
   - NO → Involves Failure of a Key Procedure?
2. Involves Failure of a Key Procedure?
   - YES → SIF or SIF Potential
   - NO → Fire, explosion, or acute chemical exposure including near misses or incidents and PSM/RMP incidents?
3. Fire, explosion, or acute chemical exposure including near misses or incidents and PSM/RMP incidents?
   - YES → SIF or SIF Potential
   - NO → Loss of control, struck by/caught between vehicle or powered mobile equipment?
4. Loss of control, struck by/caught between vehicle or powered mobile equipment?
   - YES → SIF or SIF Potential
   - NO → Fall from height > 48° or activation of a fall arrest system?
5. Fall from height > 48° or activation of a fall arrest system?
   - YES → SIF or SIF Potential
   - NO → Pinched between or in the line of fire with release of significant mass or energy including fall of ground/cave in of material?
6. Pinched between or in the line of fire with release of significant mass or energy including fall of ground/cave in of material?
   - YES → SIF or SIF Potential
   - NO → Dropped or falling objects? Consider distance/weight
7. Dropped or falling objects? Consider distance/weight
   - YES → SIF or SIF Potential
   - NO → Electrical shock and/or damage/contact with electrical conductors?
8. Electrical shock and/or damage/contact with electrical conductors?
   - YES → SIF or SIF Potential
   - NO → No SIF Potential
Data Collection

• Reviewed 2010 and 2011 Incidents

• 502 incidents identified with SIF Potential

• Work Group established Categories

• Extracted Precursors and then standardized them
Analysis and Findings

• SIF Frequency Rate

• Conducted workshop with Safety Professionals and Senior Management to assist them in analyzing the data in order to develop intervention strategies
Quick Successes

• Identified SIF Potential by site in order for each site to develop its own intervention strategies that will improve existing management or safety systems

• Standardized Categories and Precursors
Challenges

• Recognized the need for a very concrete definition and decision matrix for determining SIF Potential

• Limited resources to investigate SIF potential incidents due to the existing requirements for investigating all recordable incidents regardless of their SIF potential

• Consistently determining SIF potential across sites
Next Steps

- Start collecting data in the SHE data management system going forward
- Engaging site leadership teams to analyze the data on a set frequency
- Evaluate each site’s intervention strategy
- Analyze the data to determine if there is a need for a corporate wide intervention strategy for some of the existing management or safety systems
- Determine how we can use other data streams (BAPP, KPA’s, etc.) to see upstream of SIF potential incidents?
SIF Network – Phase 2 Interventions
SIF Network Update – Phase 2

- Review member SIF Intervention Strategies and impact.
- Sharing of best practices on SIF Intervention design and implementations from the Corporate to the site level.
- Develop a model for intervention strategies.
- Development of SIF Intervention research papers for the benefit of everyone.
What Leaders Are Doing

- Less about TRIR/LTIR, more about what happened, personal impacts, feelings.
- Keep case management vigor behind closed doors.
- Climate supports and encourages near-miss reports.
- Gather more info with live conversations, site visits.
- Zero tolerance for deviation from centerline.
- Question critical exposures and controls.
- Never walk past.
Final Thoughts

As senior executives, we can’t “not know” about our SIF potential

SIF exposure recognition and mitigation: a core operational responsibility
Thank you

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