Strategies to Prevent Serious Injuries & Fatalities

Brent Cooley
University of California
• The event is a surprise
• The event has a major impact
• In hindsight, the event could have been predicted
Serious Injury & Fatality Prevention

- Understanding the challenge
- Dislodging Safety Myths
- Identifying SIF exposures
- Preventing SIF events
Understanding the Challenge

• National Council on Compensation Insurance (NCCI); 2005, 2006, 2009
  • Frequency of WC cases is down, greatest reductions for less serious injuries.
  • Cases valued at $50,000 or greater, the reduction is about 1/5 of that for less costly cases.
Understanding the Challenge

Occupational Fatalities and Nonfatalities

- Fatalities (per 100,000 Employees)
- Nonfatal Injuries/Illnesses (per 100 Employees)
Understanding the Challenge

• BST & Mercer ORC 2011 study along with 7 global companies, Shell Oil, Exxon Mobile, Cargill
  • Don Martin BST, ASSE Fatality and Severe Loss Prevention Symposium Nov 2013
  • Thomas Krause, Co-founder of BST, ASSE Denver meeting 2012
Dislodging Safety Myths

Myth #1

*Reducing accident frequency will equivalently reduce severe injuries.*

H.W. Heinrich
Pioneer in field of accident prevention,
1930’s – 1960

Fred A. Manuele; *Reviewing Heinrich, Dislodging Two Myths From the Practice of Safety.* ASSE Professional Safety October 2011
Dislodging Safety Myths

Heinrich’s pyramid

1 Major Injury
29 Minor Injury
300 Incidents (near miss)
Dislodging Safety Myths

Heinrich’s premises is…

“the predominant causes of no-injury accidents are, in average cases, identical with the predominant causes of major injuries, and incidentally of minor injuries as well”
Dislodging Safety Myths

• Many safety practitioners have misused this information or have been misinformed
  - 300 unsafe acts, 29 serious injuries, 1 fatality
Dislodging Safety Myths

Myth #2

Unsafe Acts of workers are the primary causes of occupational incidents.
Dislodging Safety Myths

- Heinrich’s Causation Theory
  - 88% unsafe acts
  - 10% unsafe mechanical or physical conditions
  - 2% are unpreventable

- “man failure is the heart of the problem”
- “unsafe acts, unsafe tools and willful disregard of instruction”
Dislodging Safety Myths

• Columbia Accident Investigation Board (NASA 2003)
  • Accident investigations do not go far enough
  • Identify a technical cause and connect it to “operator error”
  • Limits the investigation
    • typical corrective actions – fix technical error, retrain worker
Dislodging Safety Myths

“The team did not identify any single action or inaction that caused this incident. Rather, a complex and interlinked series of mechanical failures, human judgments, engineering design, operational implementation and team interfaces came together to allow the initiation and escalation of the accident”
Dislodging Safety Myths

- False sense of security
- Insufficient incident investigations
  - Misdirected prevention
  - Lack of focus and recognition of other causes

Fred A. Manuele; Reviewing Heinrich, Dislodging Two Myths From the Practice of Safety. ASSE Professional Safety October 2011
Descriptive Perspective

Safety pyramid is generally accurate from a descriptive perspective.
Predictive Perspective

A reduction in injuries at the bottom of the triangle does not correspond to a proportionate reduction in SIFs.

21% of injuries have SIF potential (BST research)
Things We Need to Do

- Identify potential SIFs
  - Define SIFs
  - Incident reports & injury logs
  - SIF Decision tree

- Prevent SIF events
  - Audits, Inspections, SOPs & JHA
  - Management controls, Life Safety Rules,

- Educate organization
  - Define SIFs
  - Inform about SIF exposures
  - Report SIF near miss events
Identify SIFs - Define

• Define Serious injury
  • Life threatening - one that if not immediately addressed is likely to lead to the death
    • Severe burns
    • Event that requires CPR
    • Laceration / cut with significant loss of blood
    • Damage to brain or spinal cord
  • Life altering injury - one that results in permanent or long-term impairment or loss of use of an internal organ, body function, or body part.
    • Head injuries
    • Amputation
    • Paralysis
    • Fractured bones
    • Brain / spinal cord injuries
Identify SIFs – Injury Review Teams

- Injury review teams
  - Injury logs, incident reports
- SIF Decision Tree
SIF Decision Tree

- Did the event involve LOTO? 
  - YES: SIF Exposure: 1. Report to affected groups
  - NO: Did the event involve a confined space?
    - YES: Did the event involve pinched between or in the line of fire with the release of significant energy or mass?
      - NO: Did the event involve a vehicle collision?
        - YES: Did the event involve working at height?
          - NO: Did the event involve barricades or machine guards?
            - YES: Did the event involve an NFPA 70E arc flash?
              - NO: Did the event involve working below a suspended load?
                - YES: Was it an SIF event? Could a fatality or life altering/threatening injury or illness reasonably have occurred?
                  - NO: NO SIF Exposure
                - NO: NO SIF Exposure
Injury Logs & SIFs

• First Aid Only
  • A vehicle mechanic was cleaning the residue and dirt from the top of a garbage truck, slipped and bruised his elbow.
  • *The top of the truck is 12 ft off the ground and there was no fall protection in place to prevent the worker from falling off the vehicle to the concrete below.*

• First Aid Only
  • An Administrative Assistant tripped and bruised their elbow when their shoe caught on a loose portion of the carpet.
Injury Logs & SIFs

• Near Miss
  • An electrician was working in an attic installing new wire. The worker became light-headed and was taken outside to fresh air. No lost time or recordable injury occurred and he returned to work.
  • A flooring contractor was using a solvent to strip away old mastic from the concrete floor below the attic. Vapors from the mastic remover concentrated in the attic, the electrician became light-headed and partially fell through the sheetrock ceiling becoming wedged between two beams.
Other incident logs

• Property damage
  • A forklift operator was unloading supplies for the Dining Hall. They were backing up going approximately 5 MPH, struck a pedestrian walkway guardrail and damaged it. No pedestrians were in the walkway.
Incident Investigations

- Conduct incident investigations
  - Train Supervisors / Managers
  - Targeted SIF investigations

Root Cause Analysis Basics

Symptom of the problem.
“The Weed”
Above the surface (obvious)

The Underlying Causes
“The Root”
Below the surface (not obvious)

The word root, in root cause analysis, refers to the underlying causes, not the one cause.
UC SIF Potential

- UC 2010 – 2014 (April 30)
- 188 Claims of $150K or greater
  - 21 SIF exposures
  - ~ 11% have SIF potential
- 4 of top 10 highest incurred costs, SIFs
  - 2012 = #1 Fall from roof – 8 ft (over 5.5 million total incurred)
  - 2013 = #3 Vehicle incident (2.2 million)
  - 2009 = #4 Vehicle incident – employee hit by vehicle (1 million)
  - 2014 = #8 Fall from aerial lift (600K)
UC SIF Potential

Vehicles 8
Falls 7
Confined Space 2
Pinched 2
Chemical 1
Electrical 1

vehicles
falls
confined space
pinched between
electrical
chemical
SIFs More Likely in Certain Areas
Prevention - SIF Checklists

- High percentage (81%) of SIF events occur during routine operations & maintenance
  - Facilities & Physical Plant
  - Transit & vehicle operations
  - Designated custodial activities
- Target audits and inspections
Prevention – Hierarchy of Controls

- Management Controls
  - Life Safety Rules
- Pre-task Risk Assessments
  - SIF Audits
  - JHA & SOPs

<table>
<thead>
<tr>
<th>Control Measure</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination</td>
<td>• redesigning a job to remove an unsafe work practice</td>
</tr>
<tr>
<td>Substitution</td>
<td>• substituting a heavy piece of equipment for a lighter piece of equipment</td>
</tr>
<tr>
<td>Isolation</td>
<td>• using electronic swipe cards to restrict access to work areas</td>
</tr>
<tr>
<td>Engineering means</td>
<td>• installing ramps to provide safer access to buildings</td>
</tr>
<tr>
<td>Administrative means</td>
<td>• providing training on the use of equipment or work practices</td>
</tr>
<tr>
<td>Personal Protective Equipment</td>
<td>• providing gloves etc to prevent exposure to blood and body substances</td>
</tr>
</tbody>
</table>
Educate the Organization

• Dislodge the Myths
  • Traditional Safety triangle is accurately descriptive, but not accurately predictive
  • Incident investigations must go beyond single point failure of worker
• Define SIFs, review challenges, potential impacts
• Inform Senior Leaders of SIF exposures
• Develop SIF metrics & report
Summary

• Recognize the Challenge
• Dislodge Safety Myths
• Identify potential SIFs
• Prevent SIF events
• Educate organization

✓ Frequency
✓ Severity
➢ Measure potential to SIFs
Don’t be the Turkey 😊

1. The event is a surprise
2. The event has a major impact
3. In hindsight, the event could have been predicted
Injury Prevention in Theaters

- Manual Material Handling
- Portable Ladders
- Shop Safety
- Aerial Work Platforms
- Mobile Scaffolds
- Fall Protection
  - Stage Edge
  - Fixed Vertical Ladders
  - Loading Gallery
  - Attic Work Positions
- Electrical Safety
## UC ERM Claims Data
### 2014-15 – Injury Types

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>UC Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struck by Object</td>
<td>12</td>
</tr>
<tr>
<td>Work Duties</td>
<td>6</td>
</tr>
<tr>
<td>Lifting</td>
<td>5</td>
</tr>
<tr>
<td>Struck an Object</td>
<td>5</td>
</tr>
<tr>
<td>Cuts/Scraps/Bruises (Not BBP)</td>
<td>4</td>
</tr>
<tr>
<td>Slip/Fall Same Level</td>
<td>4</td>
</tr>
<tr>
<td>Stairs/Steps</td>
<td>3</td>
</tr>
<tr>
<td>Air Quality (Indoor)</td>
<td>2</td>
</tr>
<tr>
<td>Equipment</td>
<td>2</td>
</tr>
<tr>
<td>Tripped</td>
<td>2</td>
</tr>
<tr>
<td>Walking</td>
<td>2</td>
</tr>
<tr>
<td>Body Position</td>
<td>1</td>
</tr>
<tr>
<td>Chemicals - Inhalation / mucous membrane</td>
<td>1</td>
</tr>
<tr>
<td>Fall Between Levels</td>
<td>1</td>
</tr>
<tr>
<td>Puncture Wounds</td>
<td>1</td>
</tr>
<tr>
<td>Reaching/Over Extension</td>
<td>1</td>
</tr>
<tr>
<td>Struck by Patient/Person</td>
<td>1</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>53</strong></td>
</tr>
</tbody>
</table>

Lost Days = 633

Total Incurred Cost = $236,000
Manual Material Handling
Portable Ladders
Shop Safety
Aerial Work Platforms
Mobile Scaffolds
Fall Protection – Stage Edge
Fall Protection – Fixed Vertical Ladders
Fall Protection – Loading Gallery & Grid
Fall Protection – Attic Work Positions
Electrical Safety
Questions

Brent Cooley
bcooley@ucsc.edu
831-459-1877