IMPROVING YOUR ORGANIZATION'S ABILITY TO PREVENT LIFE-ALTERING INJURIES AND OTHER CATASTOPHIC EVENTS

APTA Bus & Paratransit Conference

Long Beach, CA

May 7, 2012

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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 an amputation.
- Our safety leaders are perplexed and our manager and her boss are angry.

A Common Situation for Leading Companies in 2011

- Our recordable and lost time injury rate are both declining steadily, but our fatality rate is level or increasing.
- How can this be? HSE people have been telling us for years about the Safety Triangle, and the idea that smaller injuries predict larger ones is embedded in our culture.
- We have spent time and resources on improving safety, yet the most important safety events, serious injuries and fatalities, are not improving.

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. Examples include, but are not limited to:
    a. Laceration or crushing injuries that results in significant blood loss;
    b. An injury involving damage to the brain or spinal cord;
    c. An event which requires the application of cardiopulmonary resuscitation or an external defibrillator;
    d. Chest or abdominal trauma affecting vital organs;
    e. Severe burns

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. Examples include, but are not limited to:
    a. Significant head injuries
    b. Spinal cord injuries
    c. Paralysis
    d. Amputations
    e. Broken or fractured bones

Old Paradigm

- As injuries increase in severity, their number decreases in frequency.
- All injuries of low severity have the same potential for serious injury.
- Injuries of differing severity have the same underlying causes.
- One injury reduction strategy will reach all kinds of injuries equally. Reduce minor injuries by 20% and you will also reduce major injuries by 20%.

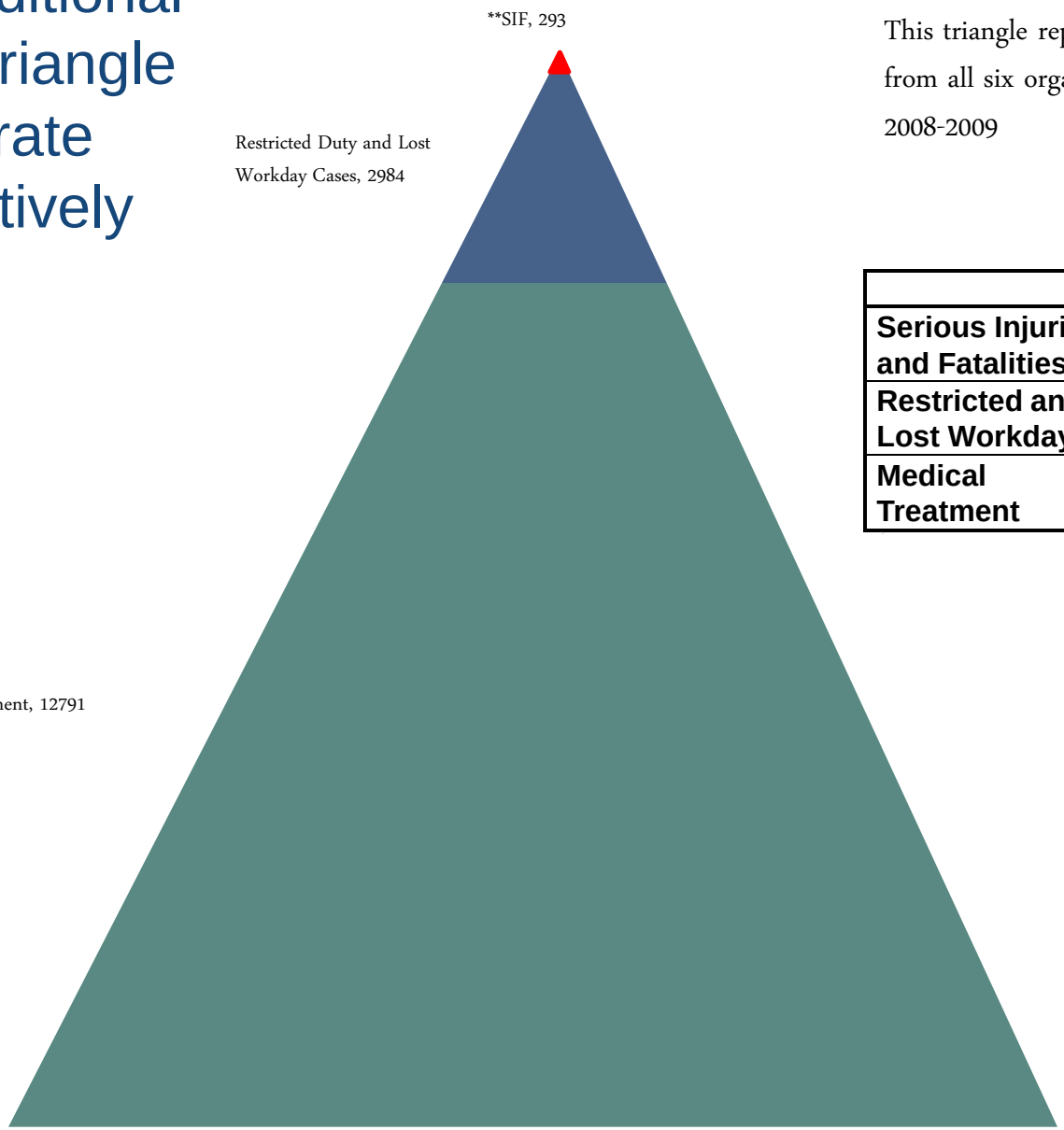
Effects of the Old Paradigm

- This paradigm has been useful but it has also raised issues:
  - Elevation of the trivial.
  - Creative classification of injuries.
  - Loss of credibility with labor organizations.
  - Cynicism in the organizational culture.
  - Lack of effectiveness in fatality prevention.

Question 1

- Is the Safety Triangle Accurate Descriptively?

The traditional safety triangle is accurate descriptively



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

	Average Rate
Serious Injuries and Fatalities	0.014
Restricted and Lost Workday Cases	0.30
Medical Treatment	0.98

*Approximations of rates based on 2008-2009 data, company populations, and using a basis of 100 employees

**SIF count is somewhat deflated because not all participants provided counts specific to serious injuries

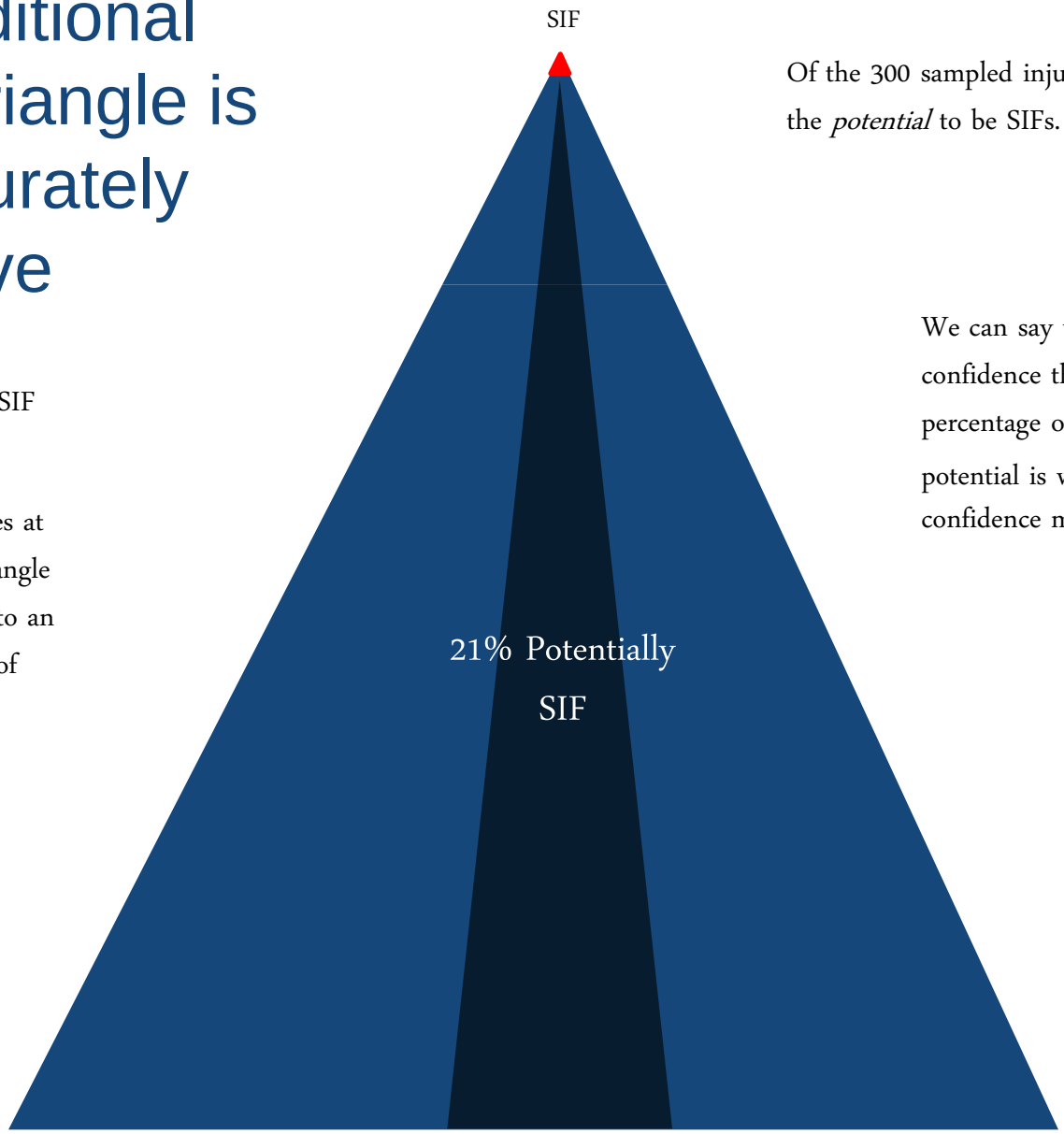
Question 2

- Is the Safety Triangle Accurate Predictively?
  - A. Do less serious injuries have similar or different potential to be SIFs?
  - B. Do SIFs have different kinds of characteristics and causes than less serious injuries?

The traditional safety triangle is *not* accurately 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 SIFs.



Of the 300 sampled injuries, 64 had the *potential* to be SIFs.

We can say with 95% confidence that the true percentage of injuries with SIF potential is within a ±5.61 confidence margin.

Question 3

- Do SIFs have different kinds of characteristics and causes than less serious injuries?

Results of Quantitative Analysis

- SIFs are disproportionately related to certain types of activities and also to activities related to certain types of safety control.

- Type of Activity
  - Out of 126 incidents that occurred in connection with these activities, 114 were SIFs: operation of mobile equipment or watercraft, working under suspended loads.

- Type of Safety Control
  - Out of 47 cases that occurred in connection with these types of safety control, all 47 were SIFs: lock out tag out, machine guarding & barricades, confined space entry, use of hot work permits, equipment and pipe opening of hazardous chemicals.

Results of Qualitative Analysis

- Analysis contrasting SIFs and non SIFs found that 71% of SIFs and 17% of non SIFs are related to Safety Absolutes.

Definition of Precursor

- A precursor is an unmitigated high risk situation which will result in a serious or fatal injury if allowed to continue.

Examples of Activities that May Have High Proportions of Precursor Events

- Mobile equipment (operation and interaction with pedestrians)
- Confined space entry
- Jobs that require lock-out tag-out
- Lifting operations
- Working at height
- Caustic liquid handling
- Manual handling

New Paradigm

- All minor injuries are not the same: a sub-set of low severity injuries are associated with precursors to serious injuries and fatalities.
- Injuries of differing severity have differing underlying causes.
- Reducing serious injuries requires a different strategy than reducing minor injuries.
- The strategy for reducing serious injuries should use precursor event data drawn from all available sources of data: accidents, injuries, near misses and exposures.

Summary of Findings

1. Reducing less serious injuries will not reduce serious and fatal injuries proportionately, because a) the causes and correlates of each category are different b) the potential for serious injury is radically different across injuries.
2. These facts contradict the accepted model many organizations use to understand and prevent serious and fatal injuries.
3. As a result, many organizations are predisposed to pay disproportionate attention to smaller injuries.
4. SIF precursors can be identified but existing safety data systems will not see them. It is necessary to do causal analysis of individual exposures longitudinally in order to identify precursors.
5. The root cause of this problem is in the measurement system that creates a blind spot, not giving visibility to the events necessary to see in order to prevent SIFs.
6. Intervention should focus on leadership-driven processes to identify and address precursors.

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