Accident/Incident Investigation and Root Cause Identification
Purpose of Incident Investigation

To fix blame or prevent the reoccurrence?

Prevent the reoccurrence
Prevent the reoccurrence
Prevent the reoccurrence!
Root Causes will Resurface in Additional Incidents if left Unaddressed!

Symptoms

Incident

Incident

Incident

Incident

Same Group of Root Causes

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Definition of Root Cause

The most basic causes or reasons for the event

(that is within our control to prevent/fix)
Accident Causation

Things People Do
- Decisions
- Choices
- Risk Taking
- Abilities
- Attitudes
- Focus
- …etc

Things The System Does
- Physical Conditions
- Production Pressure
- Policies
- Procedures
- Training
- Authority
- …etc.

Errors

Incident

Injury or Loss
Accident Pyramid

Heinrich:
1 Major Injury
29 Minor Injuries
300 No-Injury Events

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The Game of Chances

1 Fatality

10 Serious Injuries

100 Minor Injuries

1,000 Near Miss Incidents

10,000 At Risk Behaviors
Exercise # 1 - M&M Game


**M&M Score Sheet**

- ✅ Red Peanut: Fatality
- ✅ Green: Lost Time Accident
- ✅ Blue: Recordable Incident
- ✅ Yellow: Near Miss Incident
- ✅ Orange, Red & Brown: At Risk Behavior

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Culture - Behavior - Management Systems

Culture

Behaviors

Risk Mtg S&HMS Behaviors Culture

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**Culture is all encompassing**

- The atmosphere that sets the way we really do things around here
- Socializes newcomers
- Defines the organization’s values

Comprised of:
- Beliefs
- Assumptions
- Group Norms
Cultural Barriers

- Fear
- Lack of Knowledge
- Lack of Systems
- Negative & Limiting Beliefs
- Obsolete or Lack of SOP’s

S&H Performance?

- Distrust
- Us vs Them
- Lack of Consistency
- Poor Leadership
- Past Betrayals
- Lack of Responsibility
- Poor Communication

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Cultural Strengths

- Contributing
- Knowledge
- Systems & Continuous Improvement
- Supportive & Empowering Beliefs
- Clear SOP’s

S&H Excellence

- Trust & Respect
- We: Win-Win
- Consistency
- Positive Leadership
- Letting go of Past
- Personally Responsibility
- Communication

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Interdependence of Culture-Behavior & Attitudes

Culture

Attitudes

Behavior

What is your cycle driving? (Is it Positive or Negative?)

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Barriers to Safe Performance - Ease

Should I lock it out?

Which do you Choose?

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Barriers to Safe Performance - Speed

Should I go back and get the correct tool?

Which do you Choose?

FAST

RISK

SLOWER

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Barriers to Safe Performance - Comfort

Should I wear the respirator?

Which do you Choose?

Comfortable

Uncomfortable

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Risk Perception is a Barrier to Safe Performance

The problem is that it is part of our nature to accept these types of risks. All too often what we ask people to do for safety goes against human nature!

The exception is when our perception of the risk is high.
Incident Investigation & Root Cause System

Incident Notification → Incident/Emergency Response

Establishing the Event Sequence ← Incident Investigation (Data Collection)

Identifying Causal Factors → Root Cause Analysis

Implementing Solutions & Closing the Loop
Gathering Data

The goal is to obtain verifiable & objective data.
4 P’s

PEOPLE

PARTS

Sources of Data

POSITION

PAPER
People (all of us) Are Poor Observers & we are Typically Biased
What do you see?

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Describe Picture
Event Sequence
Event Chain

Event & Causal Factor Charting

**Events** – These are *action steps* that occurred (verb & a subject), e.g., “Operator pushed start button”. Placed in rectangle

**Incident** – Description of the incident being investigated. Placed in circle.

Operator pushed start button → Table Saw started → Blade strikes scrap wood → Op struck by scrap
Event & Causal Factor Charting

**Conditions** – Descriptors that provide amplifying information about the event step. Place in Ovals, e.g., “operator had never operated equipment before”.

- Operator pushed start button
- Used right hand
- Left hand on table top 4” from blade
- Table Saw started
- Scrap wood in contact w/ blade
- Left hand in line of fire
- Blade strikes scrap wood
- Op struck by scrap

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Identifying Causal Factors

- Causal Factors are conditions that could have prevented the incident
- Ask the question: “if this condition was controlled or did not occur would the incident have occurred?”
Identifying Root Causes

- Root Cause is the most basic source or origin of the Causal Factors
- Root Causes are the reasons “why” the Causal Factors existed.
Root Cause

- Five Why’s
- Cause & Effects Charts
- Behavioral Analysis
Five Why’s

- Ask “Why” at least Five times for each of the Causal Factors … Why? But Why…

- The Answer at each Level will Drive you Down Closer to a Root Cause
**Cause & Effects Chart**

Structured way of charting 5 Why’s

Start at causal factor ask “why” and/or “what was this caused by”

Each level may result in one answer or multiple answers

For each answer continue to ask why until there is no longer a useful answer.
Example Cause & Effect Chart

- Poor lead placement → Oil spill at ideal location
- Fork lift dropped drum → Driving too fast
- Oil not cleaned up or reported → Poor work habits & driver was in hurry
- Employees & Supervisors saw but didn’t report or clean up → Weak safety culture
- Safety audit found spill & reported day before incident → No system to track issues to closure
- Poor accountability

Why:
- Production Pressures
- Weak safety culture

Driver was in hurry due to production pressures
Example

Behavioral Analysis
Developing Interventions

Each Causal Factor and Root Cause must have an intervention identified that will fix the issue.

Identify system failures – fix the system not the symptom. Link back to failures in the safety management system.

Generalize the lessons learned - Ask where else might these issues cause a problem?
Pulling it all Together

• Don’t blame
• Seek to learn what happened
• If you stop at the employee you haven’t gone far enough
• Supervisors & managers need to look whether they contributed to the incident
• Go beyond blame!