

**Hazard Analysis and Risk Assessment
meet at the Crossroad for a Safe
Outcome**

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Learning Objectives

My Goals for the session

To look at Hazards Differently

To look at Risk Differently

To take them to the Crossroads and see where they go

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Numbers we can impact

No excuses

The Bureau of Labor Statistics provides information on recordable injuries as well. In 2014 there were:

2,953,400 Recordable Injuries

916,400 Cases with days away from work

9 days was the median number of days away

331,180 Injuries/illnesses were strain/sprain related

162,729 Involved Injuries to the Back

247,120 Injuries were slip/trip/fall related



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“Safety Differently”

Sidney Dekker

We need to transition from seeing people as a problem to control, to seeing people as a solution to harness.

We need to transition from seeing safety as a bureaucratic accountability up, to seeing it as an ethical responsibility down.

We need to transition from seeing safety as an absence of negatives to seeing it as the presence of a positive capacity to make things go right. A focus on safety and risk should become a focus on resilience.

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Compliance is not the total answer

New Guidelines

- **The core elements of the Guidelines are as follows:**

- **Management Leadership**
- **Worker Participation**
- **Hazard identification and Assessment**
- **Hazard Prevention and Control**
- **Education and Training**
- **Program Evaluation and Improvement**
- **Coordination and Communication on Multiemployer Worksites**



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Hazard Identification and Assessment

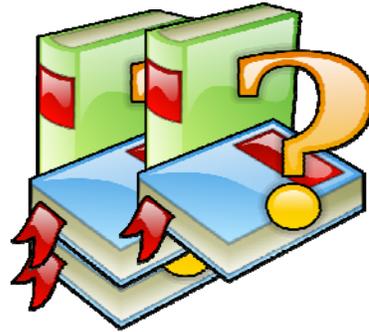
Risk is in there

- **Collecting and reviewing information about the hazards**
- **Periodically inspecting the workplace to identify new hazards or recurring hazards**
- **Investigating injuries, illnesses, incidents and near misses to identify the underlying hazards**
- **Identifying and addressing any injury or illness trends**
- **Consider hazards associated with emergency or non-routine tasks or situations**
- **Determine the severity and likelihood of incidents that could result from each hazard identified**

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Hazards are the enemy – They can be found in the Books of Hazards

They are like whack a mole



Hazard Defined

Clifton Ericson II in his book – Hazard Analysis Primer

Merriam-Webster Desk Dictionary defines hazard as a “source of danger”

NASA Software Safety Guidebook opines hazard as “The presence of potential risk situation caused by an unsafe act or condition. A condition or changing set of circumstances that presents a potential for adverse or harmful consequences; or the inherent characteristics of any activity, condition or circumstance which can produce adverse or harmful consequences”.

Internet based Wikipedia, “a hazard is a situation that poses a level of threat to life, health, property, or environment. Most hazards are dormant or potential, with only a theoretical risk of harm; however, once a hazard becomes “active” it can create an emergency situation. A hazard does not exist when it is not happening. A hazardous situation that has come to pass is called an incident. Hazard and vulnerability interact together to create risk

Hazard Analysis not Hazard Identification

Safety Engineering , Fourth Edition

“technique used to systematically identify, evaluate and resolve hazards.”

It is interesting to note that this definition encompasses the identification of hazards

Not a separate process.



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Benefits of Hazard Analysis

JSA, JHA, SJP, SOP, Work Instructions, etc Task not Job

It forces those conducting the analysis to view each operation as part of a system.

In doing so, they assess each step in the operation while keeping in mind the relationship between steps and the interaction between workers and equipment, materials, the environment, and other workers.

National Safety Council Accident Prevention Manual

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Hazard Analysis additional Benefits

Some things you may not have considered

- **It identifies hazardous conditions and potential incidents.**
- **It provides information with which effective control measures can be established.**
- **It determines the level of knowledge and skill as well as the physical requirements that workers need to execute specific shop tasks.**
- **It discovers and eliminates unsafe procedures, techniques, motions, positions, and actions.**



Did we forget about controls?

Hierarchy of Controls



Defining Risk and Risk Management

In the Context of Safety

ANSI/ASSE/ISO 31000 (Z690.2-2011), Risk Management Principles and Guidelines the term “risk” is defined as “effect of uncertainty on objectives”.

In five subsequent Notes the definition is broken down as follows:

An effect is a deviation from the expected-positive and/or negative.

Objectives can have different aspects (such as financial, health and safety, and environment goals) and can apply at different levels (such as strategic, organization-wide, project, product and process).

Risk is characterized by reference to potential events and consequences, or a combination of these.

Risk is often expressed in terms of a combination of consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequences, or likelihood.

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Risk Management Defined

This is not about insurance

1. Identification and analyzing loss exposures.
2. Selecting the technique or combination of techniques to be used to handle the exposure.
3. Implementing the techniques.
4. Monitoring the decisions made and implementing changes where appropriate.



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Risk Assessment

ANSI/AIHA Z10-2012

Occupational Health and Safety Management System standard has a requirement that states “the organization shall establish and implement a risk assessment process(es) appropriate to the nature of hazards and level of risk.” The methodology an organization uses will vary based on the risk and the associated hazards.

The standard provides several assessment tools in the Appendix F to the document.

Risk Assessment Institute - ASSE

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Risk Assessment in Action

Five good objectives

Risk Assessment Objectives

- 1. Quantify the Nature of Probability & Severity Variables**
- 2. Identify Common Hazards**
- 3. Evaluate Control Techniques**
- 4. Prioritize Corrective Actions**
- 5. Enhance Worker Safety through Risk Awareness**

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Hazards and Exposures

An Ergonomic Example

Hazard Descriptions & Exposures

Task : Picking Boxes from a Floor Position Pallet

Hazard Description	Exposure	Probability	Severity	Risk Score
Ergonomics Exposures	Excessive Force			
	Repetitive Motion			
	Posture			

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It is all in your numbers

You decide

Probability Evaluation

Examining probability relates to estimating the frequency of the event and rating it numerically:

Example:

Low Frequency = 1 (Activity conducted occasionally)

Medium Frequency = 2 (Activity conducted routinely)

High Frequency = 3 (Activity conducted continuously)

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A good rule of thumb

All three still hurt

Severity Evaluation

Examining Severity relates to estimating the consequences of the possible outcome and rating it numerically:

Example:

Low Severity = 1 (First Aid / Near Miss)

Medium Severity = 2 (Requiring Medical Treatment and or physical job restrictions but employee recovers completely)

High Severity = 3 (Requires Medical Treatment but employee could suffer long term disability, hospitalization, or extended lost time.)

The Score is only an indicator based on input

Multiple do not add

Risk Scoring

The values assigned for probability and severity are multiplied together and the resulting value represents the risk score.

For example:

(Probability = 2) X (Severity = 2) the resulting score = 4

The higher the risk score the greater potential for employee injury. The strategy here is to assess risk and develop a strategy for lowering the potential for employee injury for those tasks with the greatest risk potential.

Of Acceptable Risk

We all like to keep score

Acceptable Risk

Acceptable Risk is defined by management as to the level of risk which is acceptable in site operations.

If the site has injury experience which is unacceptable, or desires to improve their safety performance, then the level of acceptable risk should be reduced from historical levels.

Example: Using a ranking of 1-3 for probability & severity

Risk Score of 1-3 = Low Risk

Risk Score of 4-6 = Medium Risk

Risk Score of 6+ = High Risk (viewed to be unacceptable)

Risk Reduction will minimize injuries and illness

Strategies not tactics

Risk Reduction Strategies

Should the Risk Score be viewed to be unacceptable a variety of measures could be used to reduce risk.

Examples Include:

- Establishing Standard Operating Procedures (forklift license)
- Guarding (protect the point of operation)
- Tool Substitution (knife configuration)
- Personal Protective Equipment (to prevent exposure)
- Material Substitution (less hazardous material)
- Employee Rotation (for repetitive motion exposures)

The Current Situation

Before Controls are implemented

Risk Assessment Example

Task : Picking Boxes from a Floor Position Pallet

Unacceptable Risk Defined as any Risk Score 6 or higher

Hazard Description	Exposure	Probability	Severity	Risk Score	Control / Corrective Action
Ergonomics Exposures	Excessive Force	2	2	4	Lift Table & Conveyor
	Repetitive Motion	3	2	6	Employee Rotation
	Posture	2	2	4	Redesign Station

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Using Controls

Reducing the Risk

Re-Assessment w/ Control

Task : Picking Boxes from a Floor Position Pallet

Unacceptable Risk Defined as any Risk Score 6 or higher

Hazard Description	Exposure	Probability	Severity	Risk Score	Control / Corrective Action
Ergonomics Exposures	Excessive Force	2	1	2	Lift Table & Conveyor
	Repetitive Motion	2	1	2	Employee Rotation
	Posture	2	1	2	Redesign Station

Shaded Cells Denote Revised Values

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Follow up to make sure

Communication is the key

Follow-up

Select those tasks which have the highest potential for injury and develop a corrective action strategy to reduce the potential for injury.

Communicate the results of the risk assessment to affected employees and staff.

Use injury investigations, inspection data and employee suggestions as inputs to validate the risk assessment.

Standing at the Crossroads

Your Direction will depend on your desired outcome



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Thank You!