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Fundamentals of SH&E: Risk Management 101F

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Objectives

- **Learning What is Meant by Risk**
- **Learning How Risk Management Differs from Safety Management**
- **Learning the Risk Management Process**
- **Know Where to Go for Help with the Process**



Definitions - Safety

- The control of recognized hazards to achieve an acceptable level of risk.¹
- The condition of being safe; freedom from danger, risk, or injury.²

1. Wikipedia and Safety Professionals Handbook
2. The Free Dictionary



Definitions - Hazard

- A situation that poses a level of threat to life, health, property, or environment.¹
- An unsafe condition that, if left uncontrolled, may contribute to an accident.²
- Any biological, chemical, mechanical, or physical agent that is reasonably likely to cause harm or damage to humans, other organisms, or the environment in the absence of its control.³
- Source of potential harm.⁴

1. Wikipedia
2. Safety Professionals Handbook
3. Wikipedia (risk)
4. ANSI/ASSE Z690.1-2011



Definitions - Risk

- The potential that a chosen action or activity (including the choice of inaction) will lead to a loss (an undesirable outcome).¹
- The chance of physical or personal loss. Hazard. Danger. Peril. A subjective evaluation of relative failure potential.²
- Effect of uncertainty on objectives.³

1. Wikipedia
2. Safety Professionals Handbook
3. ANSI/ASSE Z690.1-2011



Definitions – Risk Management

- Coordinated activities to direct and control an organization with regard to risk. ¹
- A decision process using core management tools in logical sequence to manage risk. ²

1. ANSI/ASSE Z690.1-2011
2. Essentials of Risk Management, George Head, Insurance Institute of America



Business Risk Factors

Employees	Good Hire – Bad Hire
Fleet	Crash – No Crash
Vendors	Good Hire – Bad Hire
Buildings & Equipment	No Fire – Fire
Cyberspace	Reboot – Blue Screen of Death
Reputation	Good – Not So Good
Raw Materials & Suppliers	Good Quality – Bad Quality

Risk Management is solely concerned with *PURE* Risk



Definitions – Risk Management Process

Includes the four functions of planning, organizing, leading and controlling the organization's activities to minimize the adverse effects of accidental and business losses on that organization at a reasonable cost.¹

1. Essentials of Risk Management, George Head, Insurance Institute of America



Risk Management Process

Management
Plan
Organize
Lead
Control

Risk Management
Identify – Analyze
Develop Controls
Select
Implement
Monitor



Visualizing The Risk Management Process

Monitor & React

Identify & Analyze Exposures

Select & Implement Technique

Examine Alternative Risk Management Techniques





Visualizing The Risk Management Process

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Examine Alternative Risk Management Techniques





Risk Assessment – Identification - Exposures

- Buildings
- Equipment
- Vehicles
- Net Income
- Liability
- Employee



Risk Assessment – Identification - Exposures

- Use Trailing and Leading Indicators
- Involve as many people as possible. One person can't fully understand every aspect of the project well enough to identify all the risks alone.
- Never considered complete.



Risk Assessment - Analysis

- **Growth**
- **Profit Levels**
- **Customer Satisfaction**
- **Branding**

Risk Assessment - Analysis



Probability			
Descriptor	Scenario	Probability	Score
Very Low	Not Expected to Occur	<1%	1
Low	Small Likelihood	1-20%	2
Medium	Occurs quite often	21-49%	3
High	Common Occurrence	50-85%	4
Very High	Very Frequent	>85%	5

Risk Assessment - Analysis



IMPACT							
Descriptor	Financial	Regulatory	Injury	Environmental	Reputational	Operational	Score
Negligible	0-\$49,999	Not regulated	no injury or illness possible	No Impact, internal or external	negative internal impact, short term	Disrupts single lab operation, but normal functions able to resume quickly	5
Marginal	\$50,000-\$249,999	non-compliance with Standard/Guidelines	first aid	Minor or localized internal impact and internal clean up crew	negative internal impact, long term	Disrupts operation of a floor, but normal functions able to resume quickly; or disrupts operations of a single lab for longer periods	10
Substantial	\$250,000-\$999,999	non-compliance with Internal Policy	minor injury possible	Minor or localized external impact and internal clean up crew	negative external impact, short term	Disrupts operation of a bldg but normal operations resume quickly; disrupts operations of a floor; extensive renovations to a lab	15
Severe	\$1,000,000-\$3,000,000	potential violation of Act / Regulation	critical injury possible	Serious external impact and external cleanup crew, required notification to authorities	negative external impact, long term	Disrupts more than one bldg, not resume quickly; disrupts one bldg for longer period	20
Disastrous	<\$3,000,000	potential violation of external Permits / Certificates / Licences	fatal injury possible	Significant external impact requires external crew & has long lasting impact requiring authority and community notification	significant negative external impact, long term	wide scale disruption of more than one bldg for longer periods, major disruption to a bldg requiring major renovations	25



Risk Prioritization

		Probability				
		VLO	LO	MED	HI	VHI
Impact	Disastrous	5	4	3	2	1
	Severe	5	4	3	2	1
	Substantial	5	4	3	3	1
	Marginal	5	5	4	3	1
	Negligible	5	5	4	3	1

Risk Categories

- 1 Critical
- 2 Severe
- 3 Significant
- 4 Minor
- 5 Possible Concern



Visualizing The Risk Management Process

Monitor & React

Identify & Analyze Exposures

Select & Implement Technique

Examine Alternative Risk Management Techniques





Risk Management Alternatives

Risk Control

- Avoidance
- Reduce Frequency
- Reduce Severity
- Segregation
- Duplication
- Contractual Transfer

Risk Financing

- Retention
- Contractual Transfer
 - Insurance
 - Hold Harmless Agreements



Visualizing The Risk Management Process





Evaluating the Alternatives

- Forecasting effect of options on organization objectives
- Measuring how well alternatives contribute to organizational objectives



Evaluating the Alternatives

Financial Criteria

- Profits
- Cash flow

Other Objectives

- Stability vs. maximization of profit
- Legal
- Humanitarian



Implement the Selected Technique

Measures & Benchmarks developed early

Whichever method you select, have an implementation strategy that informs the stakeholders and affected parties, anticipates roadblocks and is able to be analyzed and modified.

Continuous Improvement



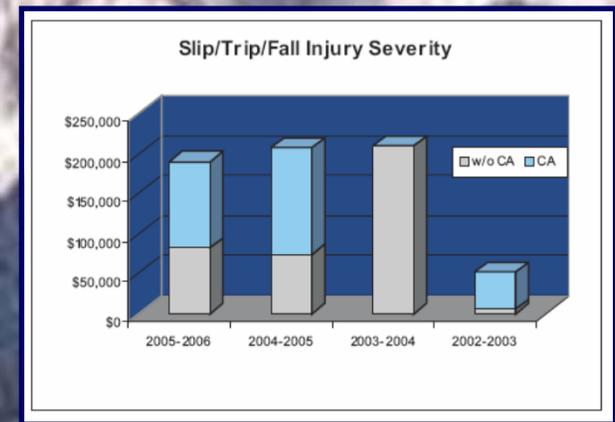
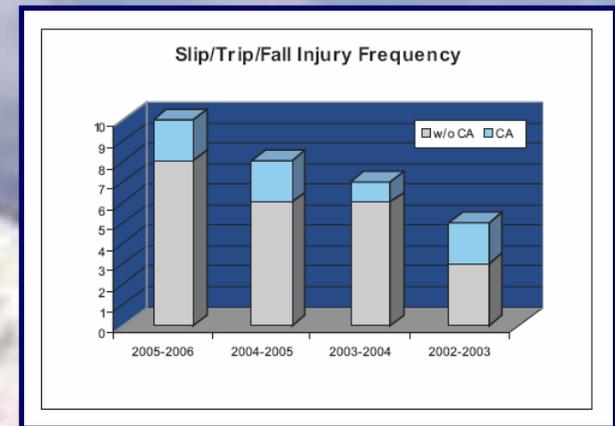
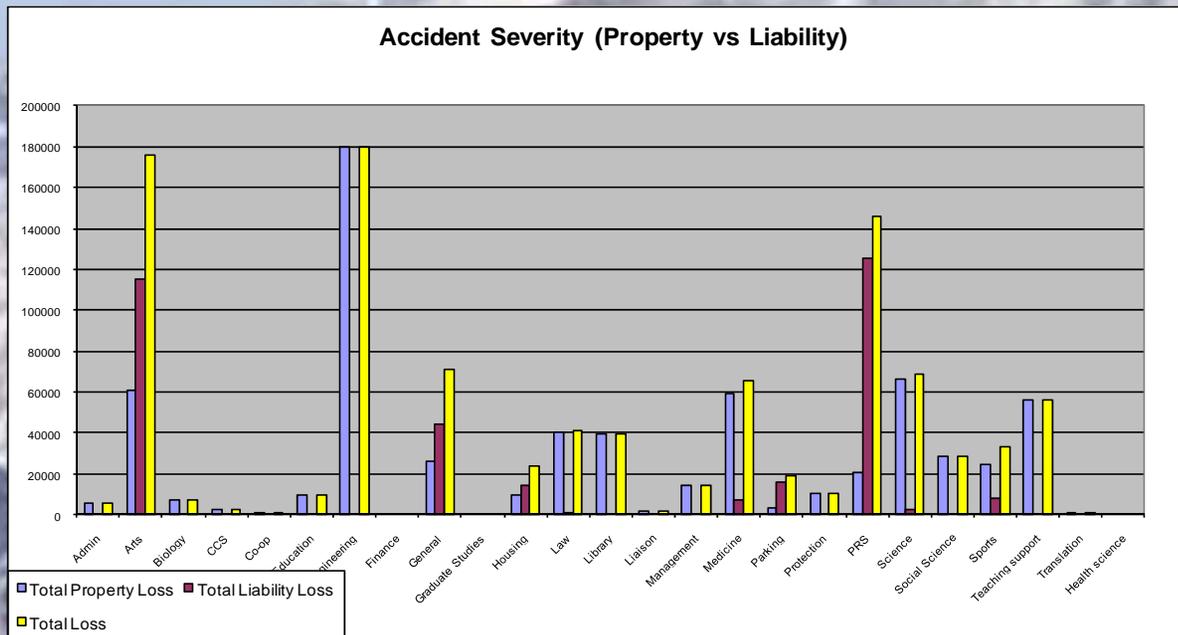
Visualizing The Risk Management Process





Risk Monitoring

Data analysis Discussions





Risk Monitoring

- Results
- Activities
- Comparison with standards

Visualizing The Risk Management Process



Monitor & React

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Feedback Looping

Continuous Improvement

Overall package and individual items

“As a Result....” Statements

Organizational Impacts

Symptomatic Impacts



Visualizing The Risk Management Process

**Monitor &
React**

**Identify & Analyze
Exposures**

**Select &
Implement
Technique**

**Examine Alternative
Risk Management
Techniques**





Tools and Resources

Inductive analysis

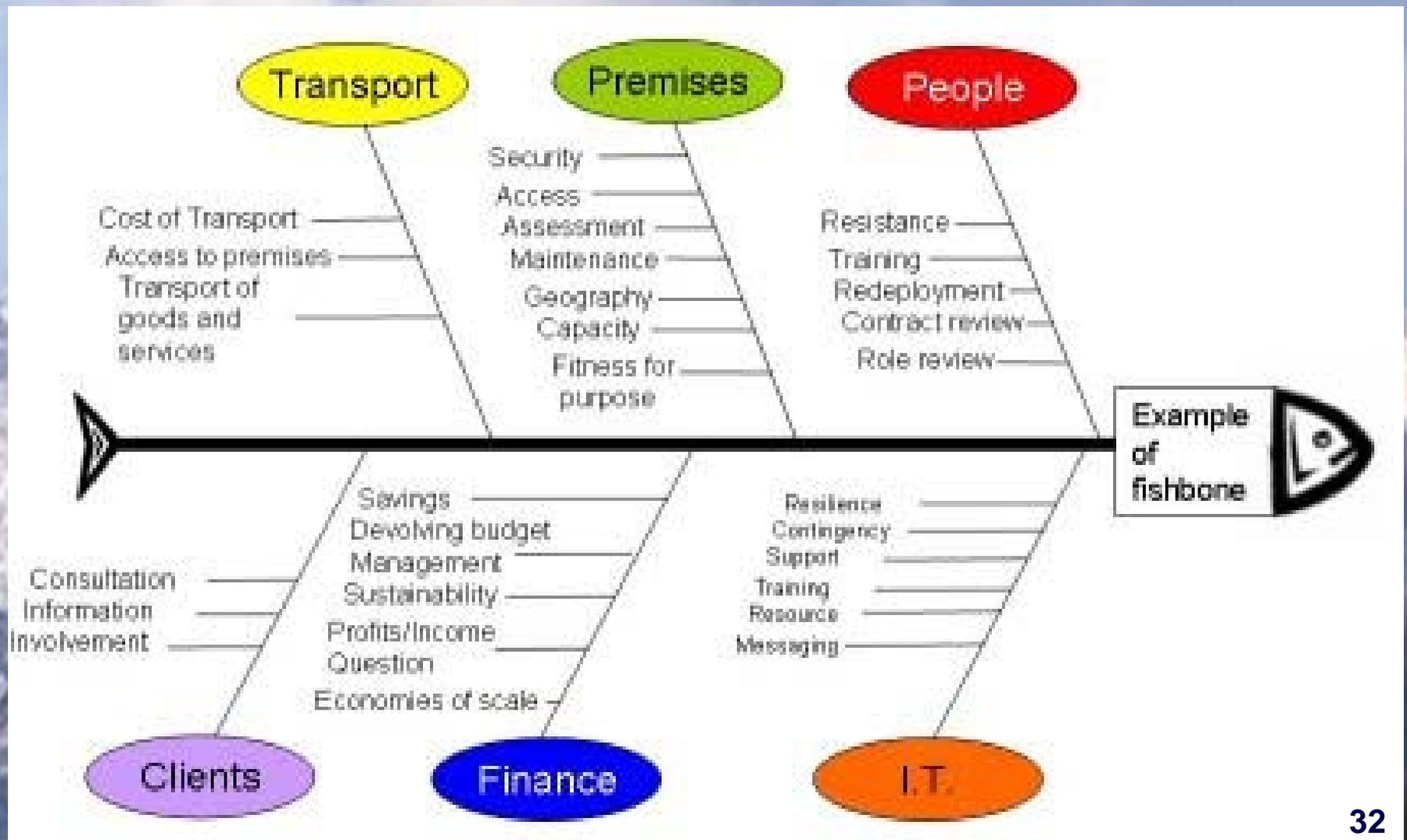
- **FMEA – Failure Mode and Effect Analysis**
- **OHA - Operations Hazard Analysis**
- **JHA/JSA – Job Hazard Analysis, Job Safety Analysis**



Tools and Resources

Deductive analysis

- **MORT – Management Oversight and Risk Tree**
- **FTA – Fault Tree Analysis**
- **HAZOP – hazard and operability method**
- **PHA – Preliminary Hazard Analysis**
- **What if Analysis**
- **THERP – Technique for Human Error Rate Prediction**
- **Fishbone Diagram**





Tools and Resources

- **ANSI/ASSE Z690.1-2011**
- **Associate in Risk Management**
 - **Insurance Institute of America**
 - **Your insurance broker's risk control folks**
 - **Your insurance carrier's loss control staff**
 - **Regulatory agency web sites**
 - **Professional Associations**



Questions