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# **Fundamentals of SH&E: Risk Management 101F**

**Presenter:**

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# Objectives



- **Describe What is Meant by Risk**
- **Differentiate Risk Management from Safety Management**
- **Describe the Risk Management Process**
- **Identify Resources**

# Definitions - Safety



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

- 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.<sup>1</sup>
- An unsafe condition that, if left uncontrolled, may contribute to an accident.<sup>2</sup>
- 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.<sup>3</sup>
- Source of potential harm.<sup>4</sup>

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).<sup>1</sup>
- The chance of physical or personal loss. Hazard. Danger. Peril. A subjective evaluation of relative failure potential. <sup>2</sup>
- Effect of uncertainty on objectives.<sup>3</sup>

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. <sup>1</sup>**
- **A decision process using core management tools in logical sequence to manage risk. <sup>2</sup>**

- 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.<sup>1</sup>

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**



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# 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

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# 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

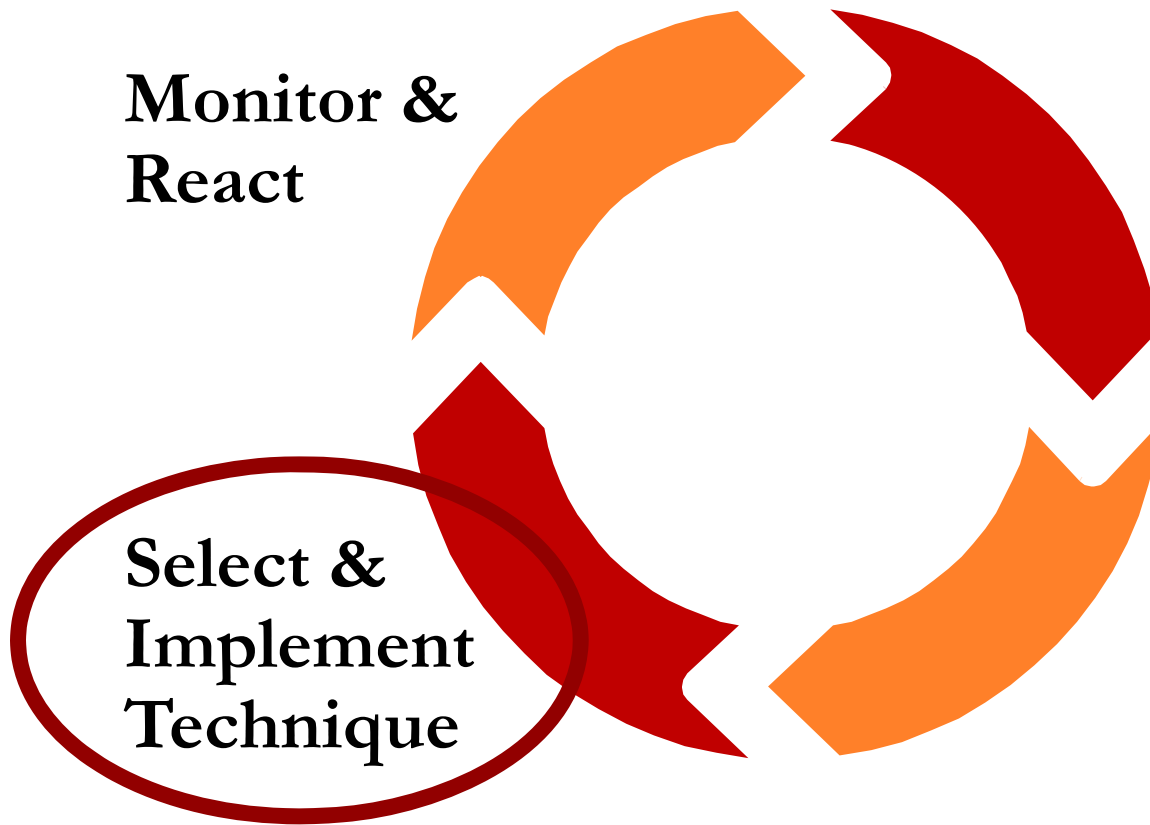


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# Evaluating the Alternatives



- 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

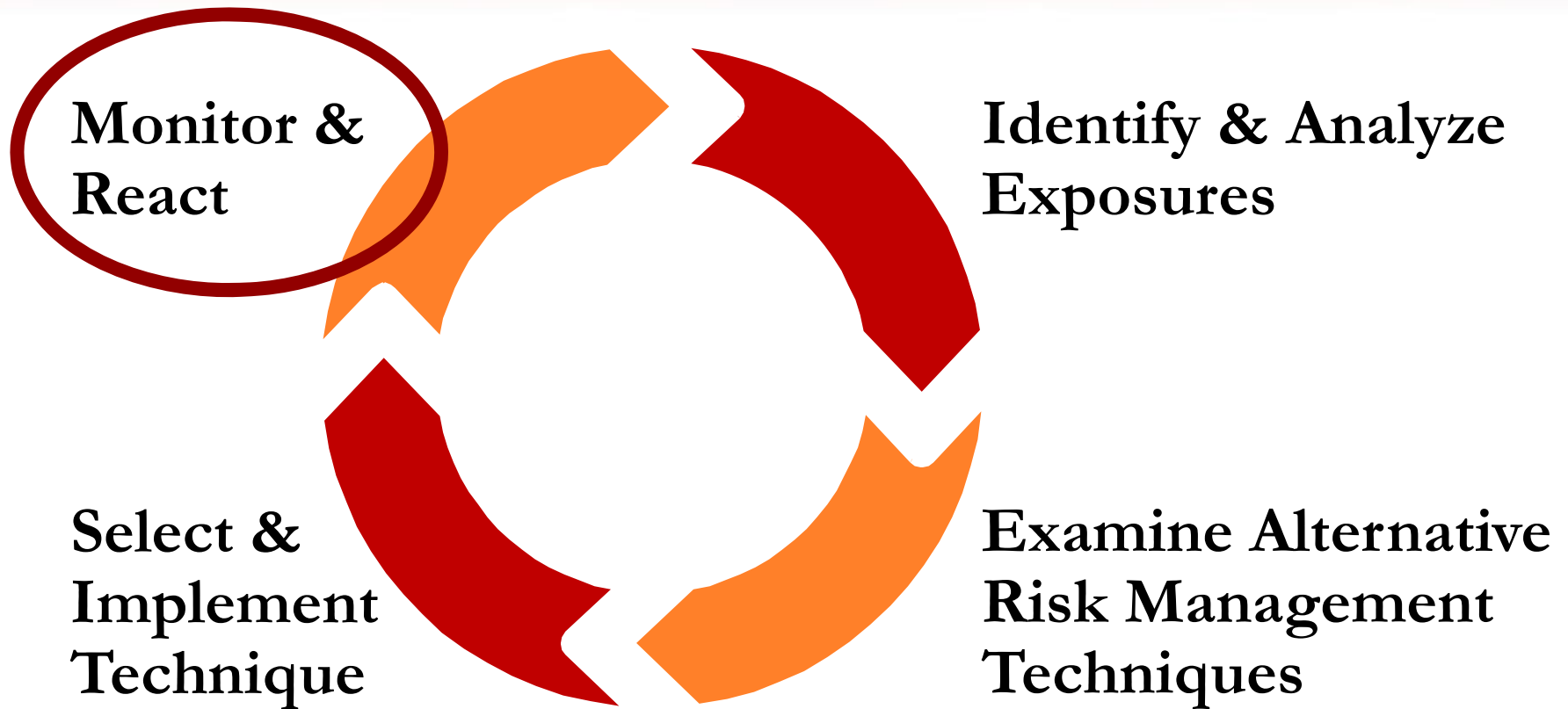


**Measures & Benchmarks developed early**

**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

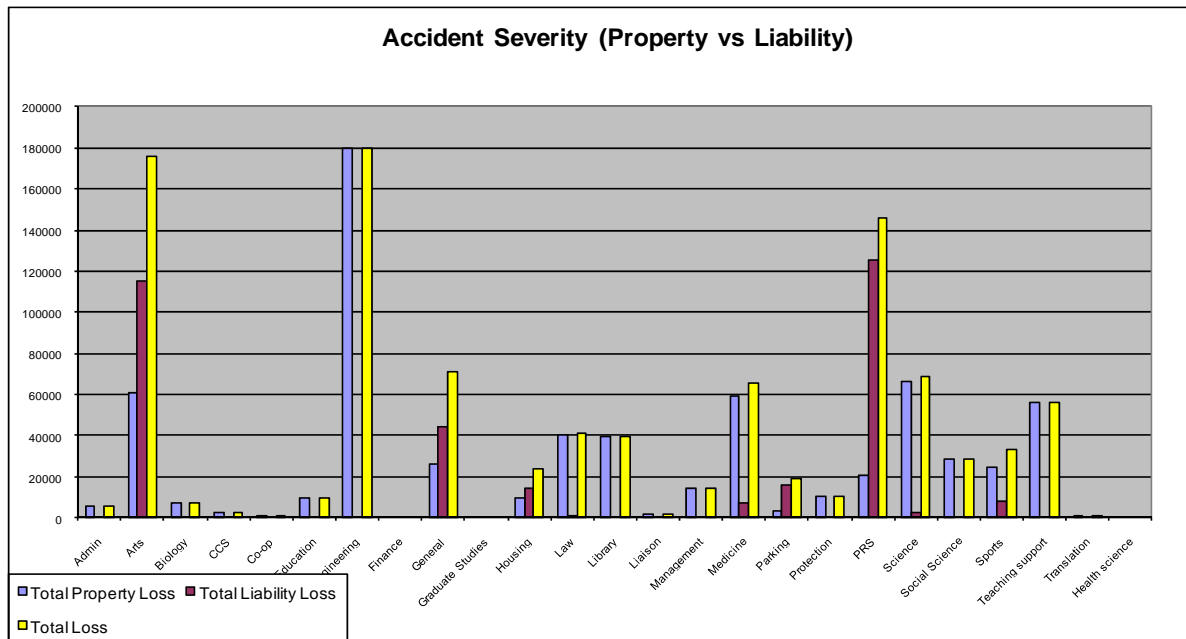
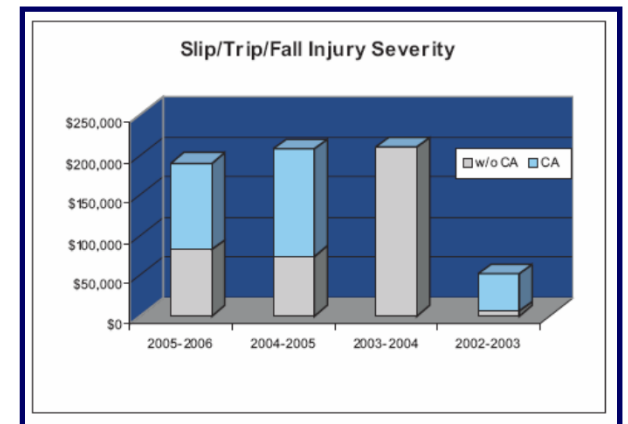
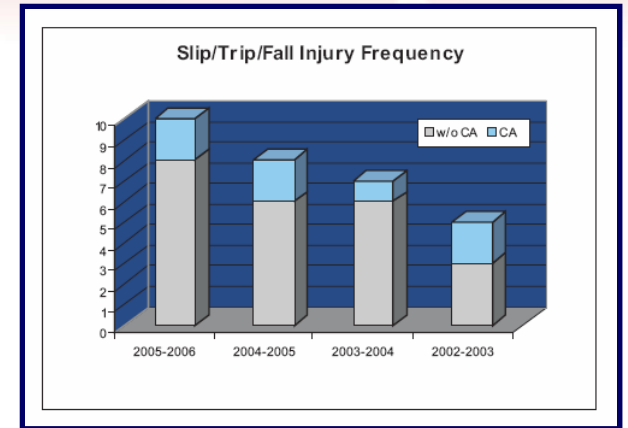




# Risk Monitoring



## Data analysis Discussions



# Risk Monitoring



- **Results**
- **Activities**
- **Comparison with standards**

# Visualizing The Risk Management Process

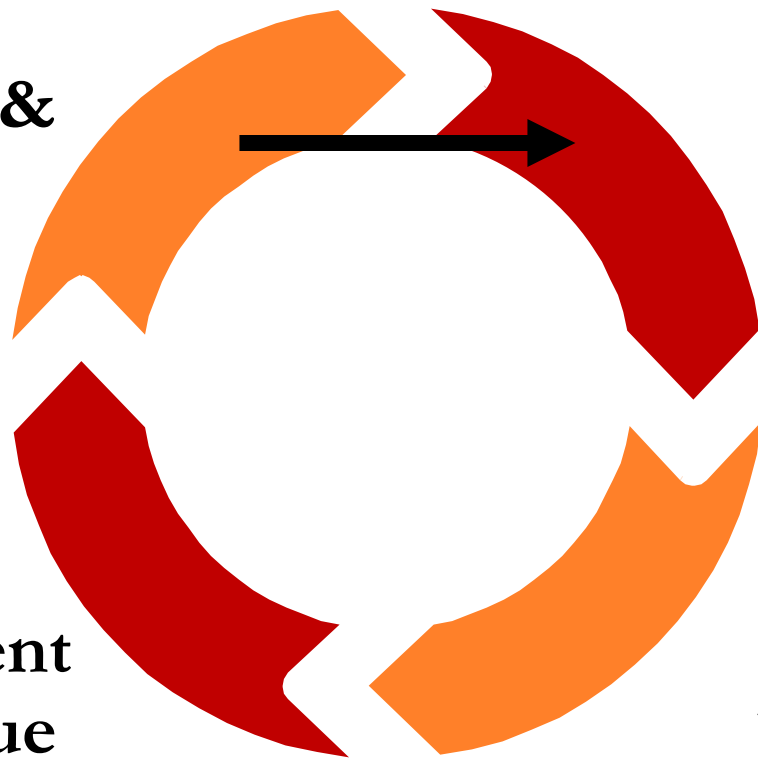


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# Feedback Looping



## Continuous Improvement

Overall package and individual items

“As a Result...” Statements

Organizational Impacts

Symptomatic Impacts

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# Tools and Resources



## Inductive analysis

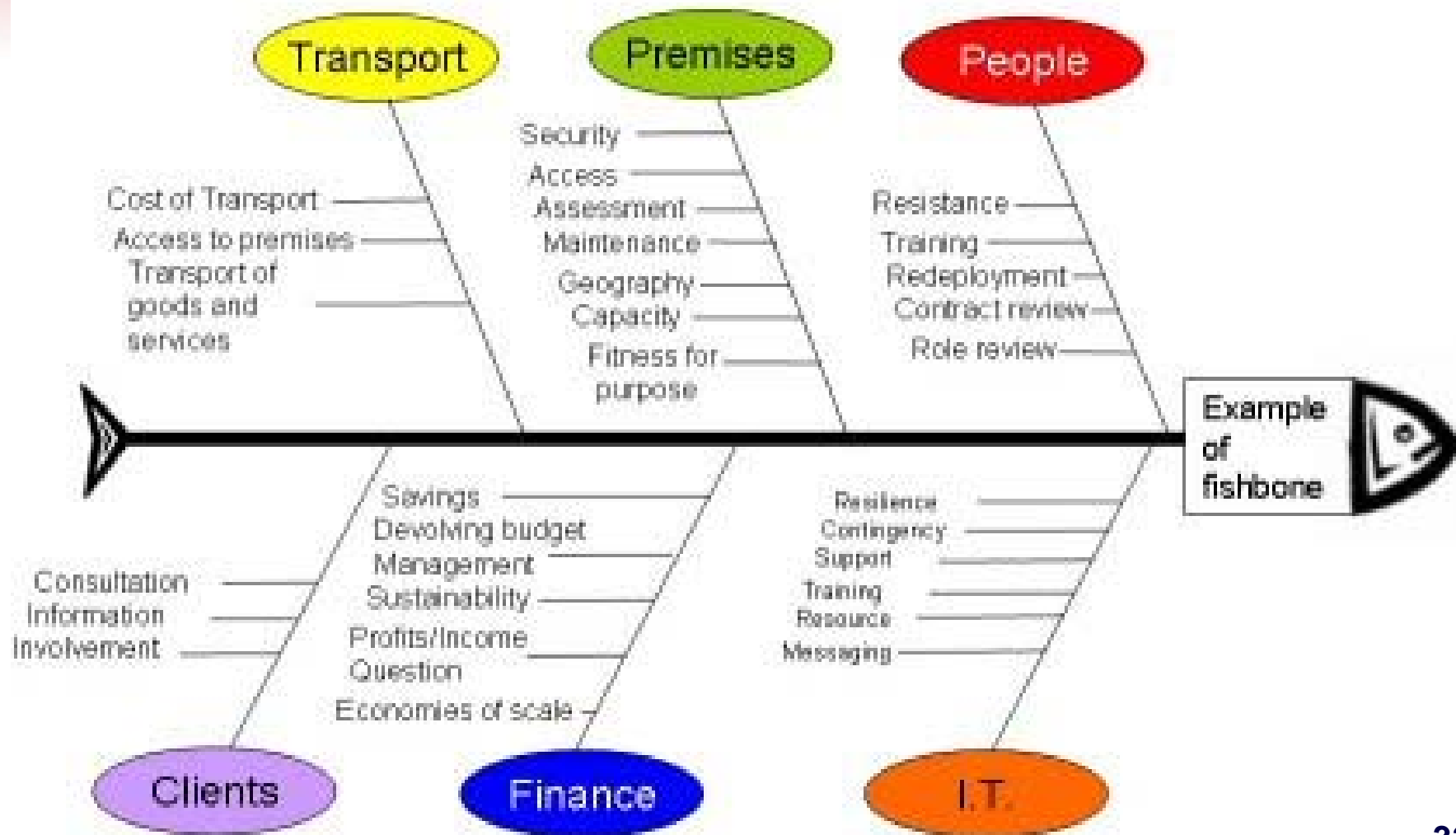
- **FMEA – Failure Mode and Effect Analysis**
- **OHA - Operations Hazard Analysis**
- **JHA/JSA – Job Hazard Analysis, Job Safety Analysis**

# 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