

ARM – 55 Risk Management Principles and Practices

Presented by:
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Sponsors

- ▶ I would like to thank the following organizations for sponsoring the course, which allows their employees/members to have the registration fee waived:
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Introductions

- ▶ Instructor: Erike Young

- ▶ Participants
 - 160 participants
 - Higher Education
 - Hospitals
 - State/local government – Risk Pools
 - Insurance
 - Consulting
 - Manufacturing
 - Real estate

- ▶ Locations
 - Majority from California/west coast
 - Alaska to Maine
 - Foreign participants –Denmark and Morocco

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Course Schedule

- 7/18 Introduction and Chapter 1
- 7/25 Chapter 2 and 3
- 8/1 Chapter 4
- 8/8 Chapter 5
- 8/15 Chapter 6
- 8/22 Chapter 7 and 8
- 8/29 No Class
- 9/5 Chapter 9
- 9/12 Chapter 10
- 9/19 No Class
- 9/26 Chapter 11
- 10/3 Course Review

Recordings

- For those who cannot attend the live presentations, each webinar will be recorded and typically posted for viewing within 24 hours. I know that due to the different time zones, these recordings are important will get them posted as soon as possible. In some cases, it could be within several hours. The recordings will be made available on a secured YouTube channel, and upon request, available for download. Please note that if downloading, the recordings are approximately 60 mbs each.
- Each participant will use their email to login at www.armstudygroup.com to access the material.

Scheduling the Exam

85 Multiple Choice Questions – 2 Hours
80.04% pass ratio

	Institutes Approved On-Site Testing Centers Register through Sep 15, 2013	Prometric Test Center Early Registration Register on or before Jul 15, 2013	Prometric Test Center Standard Registration Register after Jul 15, 2013
Exam Fee:	\$165 Register now	\$185 Registration Not Available	\$250 Register now
Registrations accepted through:	Sep 15, 2013	Jul 15, 2013	Sep 12, 2013
Cancellation deadline:	Sep 15, 2013	You must cancel 3 or more business days prior to your scheduled Prometric appointment	You must cancel 3 or more business days prior to your scheduled Prometric appointment
Cancellation Forfeiture*:	\$130	\$170 **	\$170 **
Cost to Transfer:	\$80	\$105	\$105

* If you cancel your registration before the deadline, you may receive a credit up to: the amount you paid less the forfeiture amount. If the exam fee paid was less than the cancellation forfeiture, the entire exam fee is forfeited.

** Prometric registrations must be canceled at least 3 business days before your Prometric appointment date. Changes made to Prometric appointments are subject to a rescheduling fee.

Structured Review

How to make the most of this review:

- Mute the phones
- Take notes in course guide, but don't waste effort copying slides. (Slides will be available for download)
- Questions are important. Yet time is limited to cover all of the material.
- Goal is to cover all chapters in 10 weeks – average of 1 chapter per meeting
- The primary purpose is to pass national exam.

Studying the Material

SUGGESTION: Read the Educational Objectives in the course guide BEFORE reading the text.

- Educational Objectives
- Terms and Phrases
- Text Exhibits
- Chapter Summary
- Optional
 - Course Guide Review Questions
 - Course Guide Application Questions

Studying the Material

SUGGESTION: Divide material in the text and course guide into units for EVERY Educational Objectives.

- Have an answer for **ALL** Educational Objectives
- Review all exhibits
- Use same terms and phrases
 - (EX: The text has 4 Pre-Loss Goals and 6 Post-Loss Goals; then so do you!)
 - This course requires memorizing content, not creating NEW examples.
 - Use acronyms to keep the lists separate.
- Test questions frequently interchange information..

Chapter 1

Introduction to Risk Assessment and Treatment

Introduction to Risk Assessment and Treatment

Educational Objectives

After learning the content of this assignment, you should be able to:

- ▶ Describe the nature of risk assessment and the risk assessment process.
- ▶ Describe the major risk identification and analysis techniques.
- ▶ Describe the risk treatment process and risk treatment techniques.
- ▶ Describe the following accident analysis techniques:
 - Sequence of events (domino theory)
 - Energy transfer theory
 - Technique of operations review (TOR) approach
 - Change analysis
 - Job-safety analysis
- ▶ Describe system safety, its primary purpose, and its advantages.
- ▶ Explain how to implement the following loss control techniques for hazard risk:
 - Avoidance
 - Loss prevention
 - Loss reduction
 - Separation, duplication, and diversification

Overview of Risk Assessment

- Risk Assessment Defined
 - Risk Assessment process provides all levels of management with a picture of risks affecting organization
 - Enables organization to effectively manage aspects of risk and impact on meeting organizational objectives
 - Risk definition
 - Uncertainty about outcomes that can be either negative or positive
 - Risk Management
 - Process of making and implementing decisions that enable an organization to optimize its level of risk

Definition of Risk Management

In *Against the Gods*, Bernstein states, "The essence of risk management lies in maximizing the areas where we have some control over the outcome while minimizing the areas where we have absolutely no control over the outcome and the linkage between effect and cause is hidden from us." This concept reflects our definition of risk management: "The process of making and implementing decisions that enable an organization to optimize its level of risk." This definition reflects an organization managing risks, both positive and negative, to meet its objectives. This is the definition that will be used throughout this discussion of risk management.

"The process of making and implementing decisions that enable an organization to optimize its level of risk"

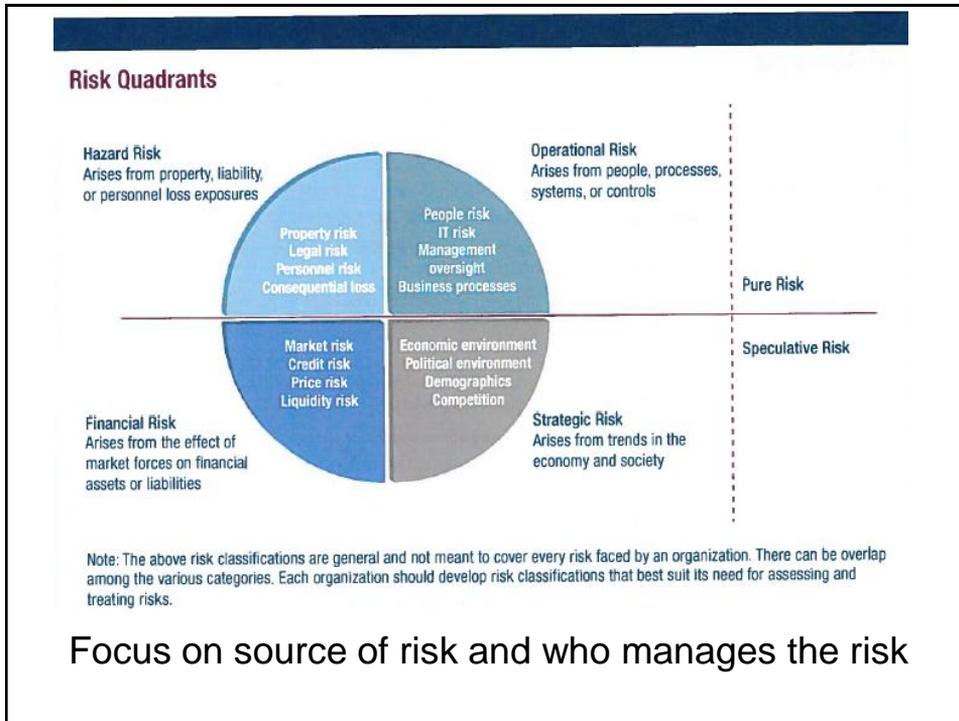
Can you over control/treat a certain risk? Examples...

Can you under control/treat a certain risk? Examples...

Categories of Risk

- Hazard (pure) Risks
- Operational Risk
- Financial Risks
- Strategic Risks

- Risk Profile
 - A set of characteristics common to all risks in a portfolio



Goals of Risk Assessment

- Inform management at all levels of the risks facing organization and how those risks affect ability to meet objectives
 - Identify potential risk treatment options
 - Must consider both existing and emerging risks
 - Analyze upside and downsides of uncertainties
 - Evaluates likelihood and consequences
- Examples
 - Technology, sustainability, regulations

Risk Assessment Process

- Risk Assessment must be conducted with understanding of risk appetite and risk tolerance of organization
 - Risk Appetite is total exposed amount that an organization wishes to undertake on the basis of risk-return trade-offs for a desired outcome
 - Risk tolerance is the amount of uncertainty an organization is prepared to accept in total or within a certain business unit
- Example – Going to a buffet

Risk Assessment Process

- Tools and techniques vary based upon needs of organization. Can include:
 - Questionnaires, checklists, cause-effect analysis, and failure analysis
 - Both qualitative and quantitative approaches
- Top down vs. Bottom up approaches
 - Top down typically more strategic and involve risks to entire organization
 - Bottom-up assessments identify business level and are more operational in nature
 - Results of both approaches should be integrated

Risk Assessment Process

- Risk Identification and Risk Analysis are two steps in the ERM Process
 - Risk Identification – review of all aspects of internal and external environment to identify “events” that could either improve or inhibit achieving organizational objectives
 - Involves a complete inventory of possible risks – Risk Register – to avoid consequences of an unidentified risk
 - All risk sources and exposures should be examined to determine potential financial consequences and possible controls to mitigate risk
- UC ERM Bulletins
 - http://www.ucop.edu/enterprise-risk-management/files/bulletin_12.doc
 - http://www.ucop.edu/enterprise-risk-management/files/bulletin_11.pdf

Risk Assessment Process

- Risk Identification and Risk Analysis are two steps in the ERM Process
 - Risk Analysis – investigate the identified risks to make decisions regarding risk treatment is needed and technique used
 - Considers causes and sources of risks
 - Positive and negative impacts and likelihood of impacts
 - Risk Map/Matrix can be used to evaluate results
 - Possible one event may have multiple types of impact
 - Probability of impacts should also be part of evaluation

Categories of Risk Identification and Analysis Techniques

Risk identification and analysis techniques may include these:

- Questionnaires and checklists
- Workshops
- Cause and effect analysis
- Failure analysis
- Future states analysis
- Strategy analysis

Risk Identification Tools

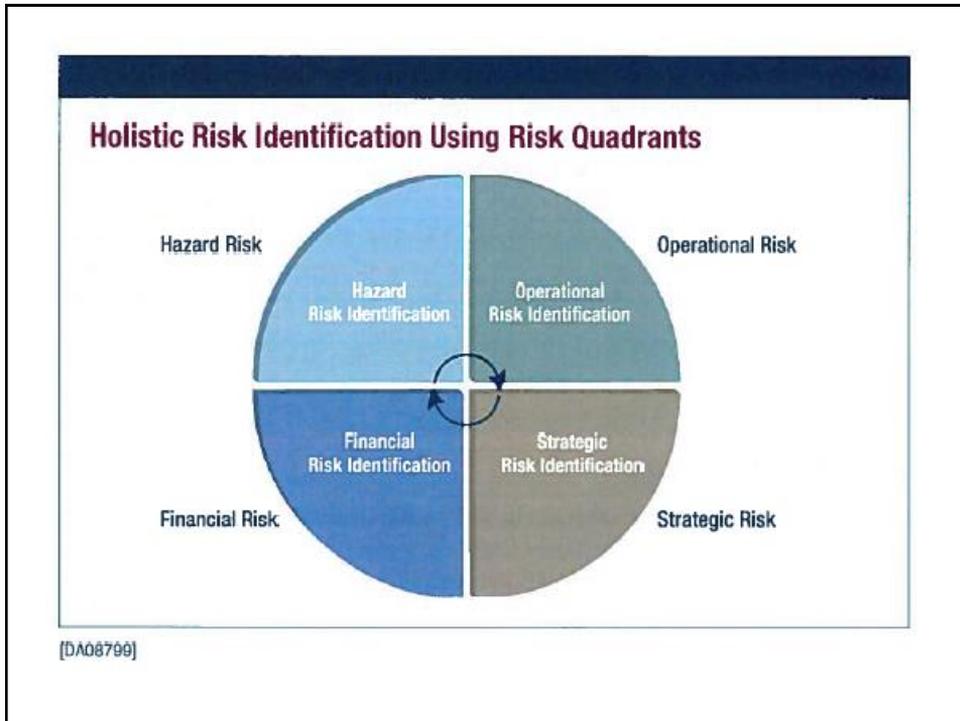
- Checklists
 - Easy to use by non-risk managers
 - Can limit creativity in identifying new risks
- Interviews and workshops
- Escalation and threshold triggers
 - Comparing current events/transactions to set criteria
- Process flow analysis
 - Analyzes process within organization from input to output
- Audits
- Computer software
 - Risk assessment tools
- Team approaches to risk identification
 - SWOT, Delphi, Scenario analysis, HAZOP

Categories of Risk Identification and Analysis Techniques

Category	Examples
Questionnaires and Checklists	Risk analysis questionnaires Insurance coverage checklists
Workshops	Brainstorming Delphi
Cause and Effect Analysis	5 Whys Fishbone (Ishikawa) Diagram
Failure Analysis	Hazard and operability studies (HAZOP) Fault tree analysis (FTA) Failure mode and effects analysis (FMEA)
Future States Analysis	Scenario analysis Monte Carlo simulation
Strategy Analysis	SWOT analysis PEST analysis

Holistic Approach to Risk Identification

- Goal is to breakdown silos in risk identification process
- Use four quadrants to identify and categorize risk can provide framework for holistic risk identification
 - Strategic
 - Financial
 - Operational
 - Hazard risk
- Methods of Identification
 - Cascading hierarchy
 - Top Down vs Bottom up approaches



Team Approaches to Risk Identification

- Facilitated workshops
 - Typically used for specific projects or processes
 - Can be used to identify overall risks
- Delphi Technique
 - Two rounds of queries to selected experts
 - Questions asked individually and results combined and question posed again with new information
 - More cost effective than facilitated workshops

Team Approaches to Risk Identification

- Scenario Analysis
 - Identifies various risk and projects the potential consequences of those risks
 - What if analysis
 - Involves cross-functional teams to analyze risks from different perspectives
- HAZOP
 - Hazard and Operability Study is a comprehensive review of a process or system
 - Primarily used to design complex systems in which failure is not an option
 - Used for large projects

Team Approaches to Risk Identification

- SWOT
 - Strengths, weaknesses, opportunities, and threats
 - Team approach useful in analyzing new project or product
 - Representation from different organizational functions

SWOT Analysis Table

		Strengths	Weaknesses
Internal		List assets, competencies, or attributes that enhance competitiveness.	List lacking assets, competencies, or attributes that diminish competitiveness.
		Prioritize based on the quality of the strength and the relative importance of the strength.	Prioritize based on the seriousness of the weakness and the relative importance of the weakness.
		Opportunities	Threats
External		List conditions that could be exploited to create a competitive advantage.	List conditions that diminish competitive advantage.
		Prioritize based on the potential of exploiting the opportunities.	Prioritize based on the seriousness and probability of occurrence.
		Note strengths that can be paired with opportunities as areas of competitive advantage.	Note weaknesses that can be paired with threats as risks to be avoided.

Risk Treatment

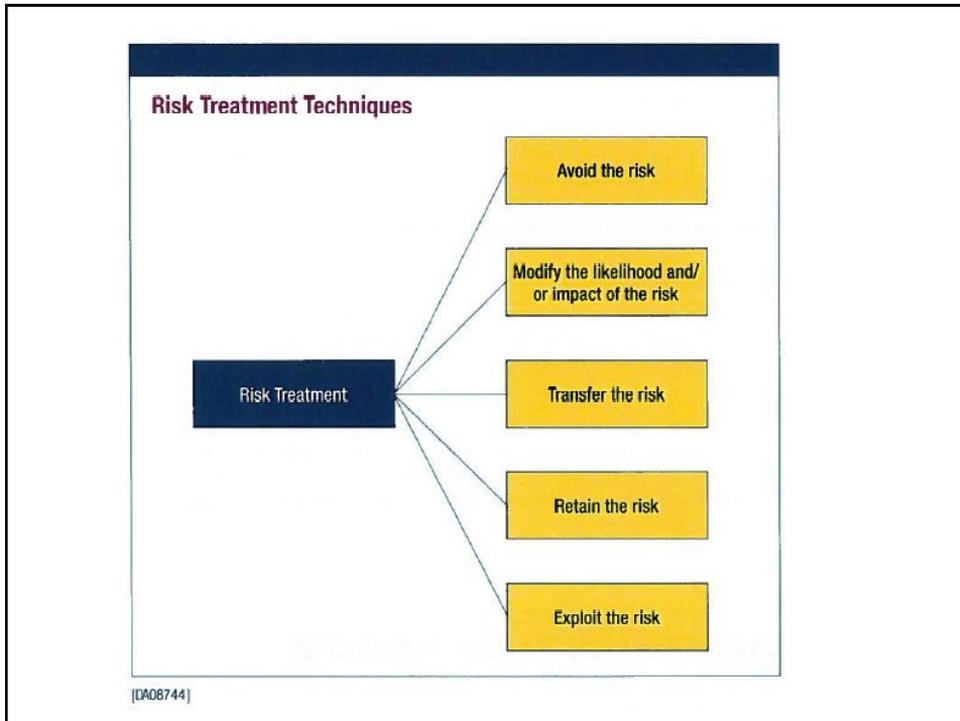
- Risk treatment decisions are based on the results of the assessment
- Available Risk Treatment Techniques
 - Avoid the Risk
 - Modify the likelihood and/or impact of the Risk
 - Risk control – Loss Prevention/Loss Reduction
 - Transfer the risk
 - Retain the Risk
 - Exploit the Risk
- Risk control with risk transfer/retention most common

Risk Treatment Process

- Risk Treatment Process
 - Involves making decisions based on the outcome of the risk identification and analysis process
 - Goal of risk treatment is to modify identified risks to assist the organization in meeting its objectives
 - Continuous process that requires examination risk treatment options that leads to tolerable level of residual risk
- Residual Risk
 - Risk remaining after actions to alter risk's likelihood or impact
 - Example: Fire sprinklers

Risk Treatment Process

- Risk treatments are not mutually exclusive and require combination of techniques
 - Risk treatment plan should indicate risk priorities and order of chosen techniques will be implemented
- Monitoring is required to ensure both under controlling and over controlling of risks
- Risk Treatment Techniques apply to hazard, operational, financial, and strategic risks
- Speculative vs. Pure Risks
 - Speculative – chance of a loss, no loss, or gain
 - Pure risk – chance of loss or no loss, but no chance of gain

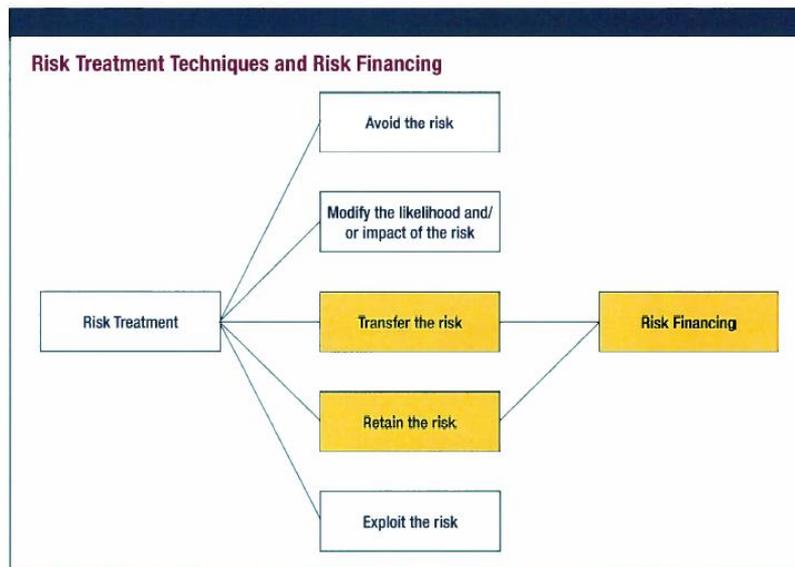


Risk Treatment

- Loss Prevention
 - A risk control technique that reduces the frequency of a particular loss
- Loss Reduction
 - A risk control technique that reduces the severity of a particular loss
- Retention
 - A risk financing technique that involves assumption of risk in which gains and losses are retained within the organization

Risk Treatment

- Risk financing
 - A conscious act or decision not to act that generates the funds to offset the variability in cash flows that may occur as an outcome of risk
 - Buying insurance or retention
 - Transfer (buying insurance)
 - In the context of risk management, a risk financing technique by which the financial responsibility for the losses and variability in cash flows is shifted to another party



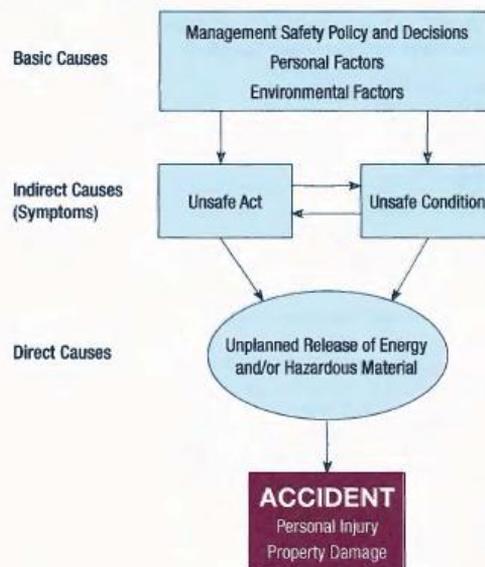
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Traditional Accident Analysis Techniques

These five theories or approaches to understanding accident causation include elements of direct, indirect, and basic causes of accidents:

- Sequence of events (domino theory)
- Energy transfer theory
- The technique of operations review (TOR) approach
- Change analysis
- Job safety analysis

Accident Causation



Accident Causation – The Domino Theory (Heinrich)

- All accidents are the result of a chain of 5 factors:
 1. Ancestry and social environment
 2. Fault of person
 3. Unsafe act/mechanism or physical hazard
 - 98% of all accidents are caused by unsafe acts of people
 - 2% by “acts of God”
 4. The accident itself
 5. The resulting injury

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Sequence of Events (Domino Theory)

Accident Factors	Explanation of Factors
1. Ancestry and social environment	Ancestry includes inherited psychological disorders. Dysfunctional social environment can form unsafe character traits and may impede learning. Both ancestry and social environment can cause faults of person.
2. Fault of person	Faults of person can include impulsiveness, violent temper, nervousness, and resistance to accept safe practices, all of which can cause unsafe acts to occur and/or mechanical or physical hazards to exist.
3. Unsafe act and/or mechanical or physical hazard	Unsafe acts can include improper use of a machine or equipment, such as ignoring lockout tag out safe operating procedures or carelessly overextending a ladder. Mechanical or physical hazards can include slippery floors and inadequate ventilation which can result in an accident.
4. Accident	An occurrence that causes an injury.
5. Injury or illness	Trauma to the body caused by an accident.

Accident Causation – The Domino Theory (Heinrich)

- Every accident begins with #1 and ends with an injury.
- Removing any of the 4 preceding the injury prevents that injury.
- Emphasis is placed on #3 unsafe act/mechanism or physical hazard.
- Well suited to accidental losses from human activity.

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The Energy-Release Theory (Haddon)

- According to Haddon, accidents result from uncontrollable energy releasing on structures that can't withstand the energy in certain rates or amounts.
- Focus is on controlling released energy or reducing the harm caused by that energy.

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The Energy-Release Theory (Haddon)

- Ten basic strategies are:
 - Prevent the marshaling of energy
 - Reduce the amount of energy marshaled
 - Prevent the release of built up energy
 - Modify the rate or spatial distribution of the release of energy
 - Separate in space or in time from energy released
 - Interpose a physical barrier between the energy & the structure
 - Modify the contact surface or basic structure
 - Strengthen the susceptible structure.
 - Move rapidly to detect & evaluate damage and to counter its control or spread
 - Take LT action to reduce further damage such as rehabilitative or salvage efforts

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The Energy-Release Theory (Haddon)

Strategies for Injury Prevention	Example
1. Prevent the creation of the hazard in the first place	Avoid raising babies above the floor, as to cribs and chairs from which they may fall
2. Reduce the amount of the hazard created	Reduce the height of diving boards above swimming pools
3. Prevent the release of a hazard that already exists	Put safety devices in electrical outlets
4. Modify the rate or spatial distribution of the hazard from its source	Reduce the slope of ski trails for beginners
5. Separate in time or space the hazard from that which is to be protected	Place electric power lines out of reach
6. Separate the hazard and what is to be protected by a material barrier	Use bicycle helmets or safety glasses
7. Modify relevant basic qualities of the hazard	Build cribs with slats too narrow to strangle a child
8. Make what is to be protected more resistant to damage from the hazard	Enact tougher codes for motor vehicle impact resistance
9. Move rapidly to detect and evaluate damage that has occurred and counter its continuation and extension.	Train people in First Aid
10. Stabilize repair, and rehabilitate the damaged object	Develop a regional trauma system

Source: <http://rms.ovh.org/haddon.htm>

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Techniques of Operations Review (TOR) System

- Root causes of accidents can be management failures or shortcomings such as improper policies or procedures, supervision or training.
- The key to effective line safety performance is having management specify procedures for accountability.
- Removing management's faults such as inadequate coaching, failure to take responsibility, unclear authority, inadequate supervision, workplace disorder, inadequate planning or organizing, and personal deficiencies will eliminate most if not all accidents.
- **Safety Management**

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Techniques of Operations Review (TOR) System

This view of the root causes of accidents led Petersen to establish five basic principles of risk control:

- An unsafe act, an unsafe condition, and an accident are all symptoms of something wrong in the management system.
- Certain circumstances, unless identified and controlled, will produce severe injuries.
- Safety should be managed like any other organizational function, with management setting achievable goals and planning, organizing, leading, and controlling to achieve them.
- Management must specify procedures for accountability if safety efforts are to be effective.
- The function of safety is to locate and define the operational errors that allow accidents to occur.

Accident Causation

- Change Analysis
 - Analysis that projects the effects of a given system change is likely to have on an existing system
 - Based on asking series of “what if” questions
 - Scenario analysis
- Job Safety Analysis
 - Analysis that dissects a repetitive task, whether performed by a person or machine, to determine potential hazards if each action is not performed

System Safety Analysis

- System safety analysis looks at organization as a whole to identify sources of potential losses
 - Originated within US Dept. of Defense in design, manufacture, deployment of Minuteman missile
 - Organizations can be viewed as systems
 - Read Peter Senge’s book, [The Fifth Discipline](#)

System Safety Analysis

- System safety defined
 - A safety engineering technique also used as an approach to accident causation that considers the mutual effects of the interrelated elements of a system on one another throughout the system's life cycle.
 - Can help estimate probability of failure of events and suggest ways to prevent failure
 - Does not focus on unsafe acts or conditions

The Concept of a System

By understanding the features of systems, risk management professionals can be more effective at protecting the integrity and reliability of any system. All systems have these four features:

- Components
- Purpose
- Environment
- Life cycle

System Safety

- Components – All systems have the following components:
- Physical Elements
 - Any damage to the physical element of a system can shut down the entire system, which requires the risk manager to consider the impairment of all of the systems' physical elements.
- Subsystems that compose major systems
 - Each system is likely made up of many subsystems which are interrelated and interact with one another.
 - A risk manager needs to know what all the company's systems and subsystems are, and how these systems interact, and how the failure of any subsystem can threaten other subsystems and systems.

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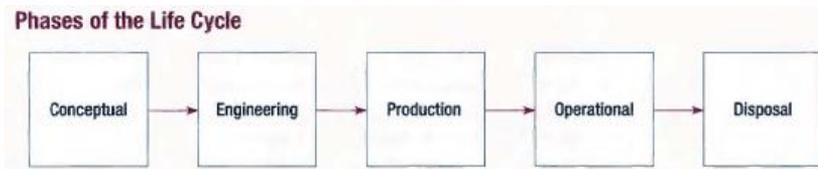
System Safety

- Purpose – Every system has at least one purpose. To assess the adequacy of a system's components, risk management professionals must know the purpose of those components.
- Environment – Environments are typically aspects of larger systems of which the system in question is a subsystem. Environments can be classified as follows:
 - The immediate physical environment
 - The organizational environment with policies and procedures
 - The socioeconomic/legal environment with social norms and conventions; safety, environmental, transportation laws and regulations; and local, national, and global economic considerations.

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System Safety

- Life Cycle – there are five phases in the life of any system:



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System Safety

- Life Cycle – there are five phases in the life of any system:
 - Conceptual Phase is when basic purpose, mission and planning design of system take place. At the conceptual phase the greatest number of cost-effective opportunity for designing a hazard free system exist.
 - Engineering Phase is when design of system is constructed and tested. Safety design features, such as machine guards or a fire detection system, also become integral parts of the system during this phase.
 - Production Phase is when the actual system is created or purchased.
 - Operational Phase is when system is implemented and safety features built into the system during the earlier phases must be maintained
 - Disposal Phase when system use elapses and is disposed of.
 - System Oriented Approach designs each product and process so that their disposal or obsolescence creates little hazardous waste or environmental harm.

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Case Study

Systems Safety Example

The failure of the brakes on the delivery truck can be viewed within these systems:

- The brake mechanism itself, consisting only of its mechanical parts
- The brake system for the truck, including the brake mechanism, the driver's foot on the brake pedal, and the truck tires on the highway
- The driver/vehicle/highway system that transports the Internet servers
- The transportation system (truck, rail, ship, or air) through which the computer manufacturer delivers its products to customers
- The computer manufacturer's overall management system
- The overall economic and legal systems of the U.S.

Case Study

Loss Control Techniques for Each System

System/Component	Possible Loss Control Technique
Braking system	Purchase better parts components/parts or replace them more often
Truck's brake system	Purchase trucks that use a more reliable brake system design
Driver/vehicle/highway system	Improve fleet management
Manufacturer's transportation system	Find a more reliable way to transport goods to customers
Manufacturer's overall management system	Focus senior management's attention on transportation/fleet safety
U.S. economic and legal systems	Revise the manufacturer's contracts of sale to allow for delays caused by specified types of accidents

Case Study

System Safety Advantages

The delivery truck example indicates three advantages of applying system safety to loss control programs. First, by considering how an accident impairs various systems, risk management professionals can follow an orderly process for developing a range of loss control measures that improve the reliability of interrelated systems. Second, because systems differ in scope, risk management professionals can use system safety analysis to enlist the cooperation of many people inside and outside the organization. In the delivery truck case, these people could be included:

- The computer manufacturer's purchasing personnel (responsible for buying and maintaining trucks with adequate braking systems)
- The drivers of the trucks
- The manufacturer's senior management (responsible for coordinating the work of all departments)
- Legal experts (responsible for reviewing contracts with customers)

Finally, by using a system safety approach, risk management professionals can reduce accident frequency and severity by defining and preventing events that lead to a particular type of accident.

Loss Control Techniques for Hazard Risk

- Hazards risks are pure risks from property, liability or personnel loss exposures
- Loss control techniques include:
 - Avoidance
 - Loss Prevention
 - Loss Reduction
 - Separation, Duplication, Diversification

Avoidance

- Loss is impossible as probability of loss is reduced to 0. No further risk control or risk financing measure is necessary when an organization elects not to undertake or eliminates a specific activity.
- Has very limited applications. Should be considered when the expected value of the losses from an activity outweighs the expected benefits of an activity, which applies another risk management technique.

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Loss Prevention

- Any measure that reduces the probability or frequency of a particular loss.
- Loss prevention reduces frequency w/o necessarily affecting severity of loss.
- It does not eliminate all chances of loss.
- Generally taken before a loss occurs to break the chain of events that lead to a loss which stops the loss from happening or lessens the effects of the loss.

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Loss Reduction

- Any measure that reduces the severity of loss.
- Assumes that a loss has occurred, and then asks what could have been done either before or after the loss to reduce its size or extent.
- Pre-Loss measures to reduce severity may also reduce frequency.
- Post-loss focus on emergency procedures, salvage operations, rehabilitative activities, or legal defenses to halt the spread or to counter the effects of loss. Commonly used in energy-release theory.

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Separation of Exposure Units

- Divides an organization's existing single asset or operation into 2 or more separate units.
- Appropriate if organization can meet its goals with only a portion of these separate units left intact.

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Duplication of Exposure Units

- Reproduces an organization's assets or activities and keeps it in reserve.
- Appropriate if an entire asset or activity is so important that the consequence of its loss justifies the expense and time of maintaining the duplicate.

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Separation and Duplication Comments

- Neither Separation nor Duplication attempts to reduce the severity of loss to a single unit.
- Both reduce the severity of an individual loss but they could have different effects on loss frequency.
- Duplication reduces the average expected annual loss from a given exposure because it reduces severity without increasing loss frequency.

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Separation and Duplication Comments

- Separation might or might not decrease the average expected loss because it often increases loss frequency.
- Separation is seldom undertaken for its own sake but usually a by-product of another management decision unlike duplication, which is often prompted by risk management considerations.
- Separation has more practical uses than duplication because it does not keep assets idle until an emergency.

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Diversification of Exposure Units

- A risk control technique that spreads loss exposures over numerous projects, products, markets, or regions.
- Prevents a single event or series of events from destroying a large percentage of your entity's assets.
- Primarily deals with business risk.

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Questions?