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Evaluating Risk

Identify, Assessing and Prioritizing

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January 15, 2008

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Evaluating Risk in Outside the Classroom Learning Environments

Overview

The identification and understanding of hazards and the assessment of risk is a fundamental requirement for all organizations dealing with the safety of people. Whether it is small businesses, not-for-profit organizations, camps, education institutions or manufacturing facilities of all sizes, mitigating the potential for loss begins by the identification and assessment of potential threats.

Requirements for identifying hazards and assessing risk in specific areas of safety are built into many regulations covering hazards of a specific nature, e.g. fire, substances hazardous to health, major accident hazards, noise, vehicle movements etc. Both North American and European Safety Legislation are similarly heavily oriented towards risk assessment and most recent safety legislation incorporates the principle of Risk-based Management in one form or another.

The Basic Approach

Whatever the industry or type of operation and whatever the nature of the hazards to be considered the basic approach is similar – although the techniques used and level of detail required may differ (refer to Figure 1.1).

- Identify the types of hazards – these are generally broad categories covering a variety of situations.
- Identify the individual hazards – these are specific hazards that might arise in each given category and under what conditions they might occur.
- Evaluate the possible consequences and severity arising from the hazard – this may be consequences to people, the environment, organizational impact or any combination of these.
- Evaluate the likelihood of the consequences arising.
- Identify the prevention, control and mitigation measures in place to limit the consequences and / or reduce their likelihood. Eg. Risk Management Plan
- Assess if these measures are adequate and manage the risk to an acceptable level.
- Review the assessment periodically to ensure it remains valid in the light of regulatory changes, new technology and changes in the risk levels considered "tolerable" by society and the organization/institution.

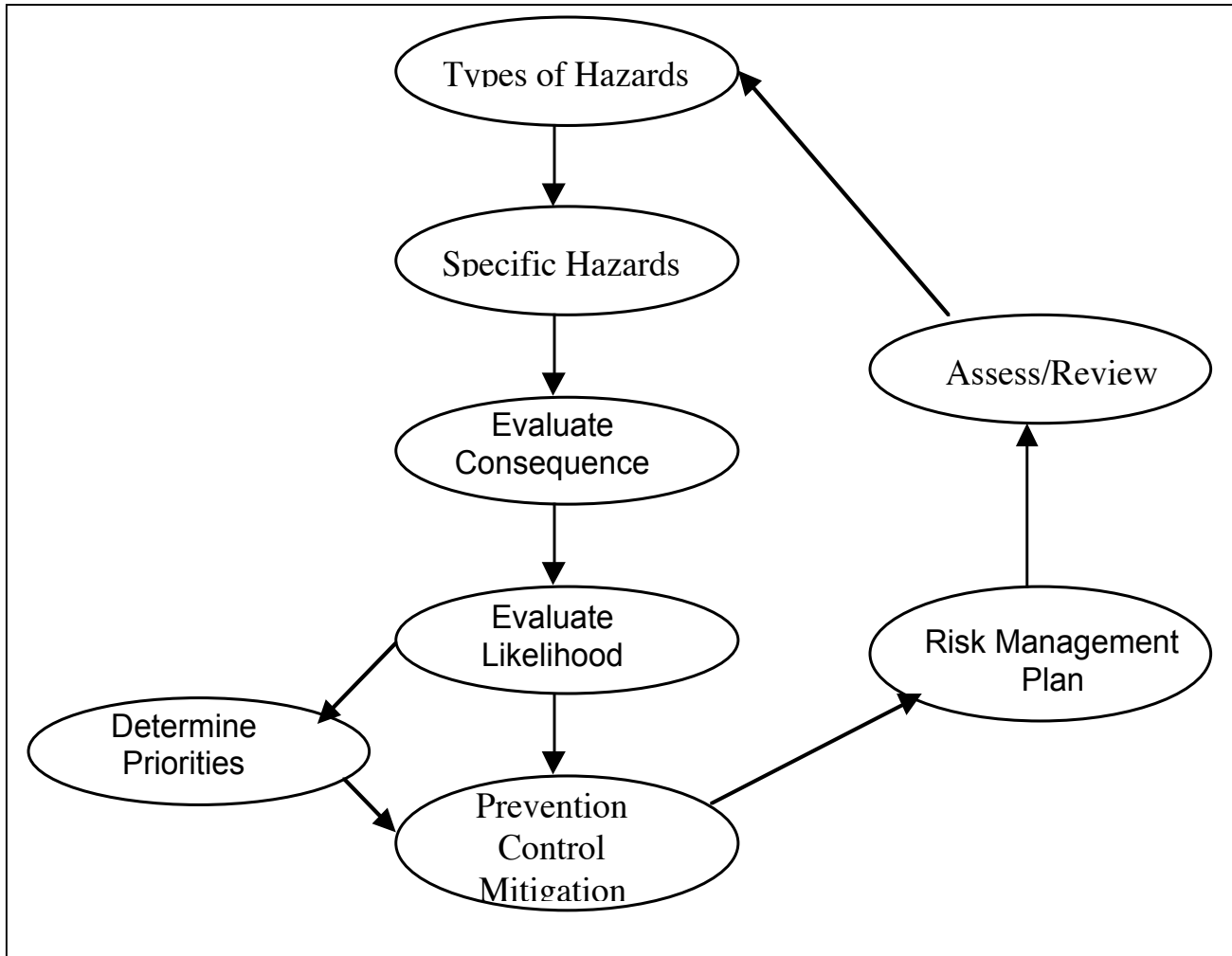


Figure 1.1 – The Basic Approach

Risk-based Management Applied to Outside the Classroom Learning Environments

For the purpose of this discussion outside the classroom learning environments will refer to planned learning activities that take place outside the traditional classroom setting. One of the advantages to using a Risk-based approach is the ability to encompass the myriad of activities that often take place in these diverse and dynamic learning environments.

At the organization or company level, concern for participant and staff safety is broad. A key challenge in the development of program risk management is the focusing of resources on the most significant risks. To obtain such focus, each institution must regularly identify and assess its credible hazards to determine the probability of occurrence, the potential consequence or impact and the school's vulnerability. This

process is called an Hazard Identification and Risk Assessment (HIRA) and is conducted in four distinct, but related, assessment steps:

1. Hazard Identification – identify and research hazards;
2. Risk Assessment – conduct a risk assessment for each hazard;
3. Program Priorities – establish program priorities based on assessment;
4. Risk Profile – summarize program vulnerabilities and highlight preventative, control and mitigation measures.

The HIRA Process

The ultimate purpose of the HIRA process is to develop the Risk Profile. The Risk Profile identifies priority areas requiring attention during the development of the risk management strategy. The result of this process is a risk-based management program.

***Note: This workshop will only be addressing steps 1-3. ***

HIRA Step One – Hazard Identification

The first step toward the creation of a risk profile is the identification of hazards. This is not a complex process but can be time consuming. Begin by generating a list of hazards. Worksheet HIRA 1.1 *General Hazards Checklist* (contained in Appendix A) will assist.

Once a list of general hazards has been created, a more specific identification process can begin. Worksheet HIRA 1.2 *Hazard Information Sheet* (contained in Appendix B) will assist with this process. Complete one worksheet for each general hazard identified as “Likely or “Possible” on Worksheet HIRA 1.1.

When examining specific hazards, past occurrence is a good indicator of future likelihood. The experience of a knowledgeable focus group is the best way to manage this step. This focus group should consist of individuals who have experience running similar programs, staff and outside “experts” with specific experience in the given activity areas. In addition to input from the focus group, accident statistics reports and other reference material can be used to determine the hazards that similar programs have faced in the past and may face in the future. It is strongly recommended that other programs operating similar activities be consulted during this process.

HIRA Step Two – Risk Assessment

Once a comprehensive list of specific hazards has been created, the **probability** and potential **consequence** of each hazard must be determined (in other words, the risk associated with each hazard must be assessed).

When assessing risk, speculation must be kept realistic, with due consideration given for credible program hazards. Focus on situations relevant to the program. It is also important to understand that it is impossible to anticipate every possible risk. Instead, it is important to develop a risk management strategy aimed at the most probable risks. Such a program will ensure that systematic emergency response plans and operating procedures are in place should something unforeseen occur.

PROBABILITY

In this step the likelihood of occurrence for each identified hazard is examined. This is often best judged by past experience. For example, if at least one student has had frostbite for the past ten years during an annual skiing event it is reasonable to expect that another student will get frostbite in the near future. In this case, frostbite could be considered a high-probability risk for the program. When determining past occurrence, members of the focus group, as well as past staff and institution archives can serve as excellent sources of information. When considering past history also take into account near misses where the potential for injury was narrowly avoided or injury occurred to another party conducting the same activity in a similar fashion.

A second important means of determining probability is by obtaining expert opinion. This information can be found in a variety of sources such as articles, books, industry standards, professional organizations and academia. Such information may be most useful in determining the probability of events that may not have happened in recent memory, but may occur in the future.

Information gathered at this step can be added to the *Hazard Information Sheets* begun during the previous step.

CONSEQUENCE

Whereas the previous step determines how likely a specific hazard is to occur, this step determines how severe that hazard is/would be. This information is fundamental to the process of determining a program's vulnerable areas. When estimating the consequence of a given hazard consideration should be given to the following:

- The impact of other similar or previous incidents;
- The locations of other known hazards;
- The location of where the incident may occur;
- The potential for injuries;
- The potential for fatalities;
- The potential for multiple victims;
- Transportation systems and resources;
- Access to medical care;
- Time factors for response, evacuation and recovery;
- The history of prevailing meteorological conditions;

Information related to consequence can be recorded on each of the *Hazard Information Sheets* developed so far.

HIRA Step Three – Creating Program Priorities

At this step the program's identified hazards are ranked by priority based on their probability of occurrence, potential consequence and realistic concerns about the institution's risk tolerance. This can be accomplished by using a risk assessment grid.

This step translates the information gathered so far into a format that will be used to create a customized risk profile. The profile will then allow for the focusing of the program's risk management strategy – the primary goal of the HIRA process.

The use of the risk assessment grid facilitates the process of creating program priorities by allowing for the visualization of which hazards pose the greatest risk.

The first step in using the risk assessment grid is to assign numerical values/scores for probability and consequence to each program hazard. Assignment of scores should be based on discussion within the focus group. As scores are determined, they can be recorded on each *Hazard Information Worksheet*. It is important to record the rationale the group uses to determine the scope for consequence and probability. Make point-form notes in the space provided on the worksheets.

Once all the scores are assigned they can be recorded on the risk assessment grid.

The following is a sample grid.

PROBABILITY	4				
	3				
	2				
	1				
		1	2	3	4
CONSEQUENCE					

As can be seen on this grid hazard probability and consequence are scored using a scale of one through four. The following guidelines indicate how to score probability and consequence for each hazard.

SCORING PROBABILITY OF OCCURRENCE

1. No history of incidents in the last 15 years
2. Five to fifteen years since last incident
3. One incident in the last five years
4. Multiple or recurring incidents in the last five years.

SCORING CONSEQUENCE OR SEVERITY

1. Negligible impact – minor disruption in program
2. Limited injuries (minor or localized injuries such as scratches and bruises)
3. Substantial injuries (multiple injuries to one person or multiple victims with limited injuries – injuries include fractures, loss of consciousness, medical emergencies, etc. – these injuries typically do not have lasting consequences.
4. Catastrophic incident. (Life threatening injuries, possible fatalities, multiple victims with substantial injuries.) – Injuries likely to result in long-term disability.

High probability and high consequence are assigned numerical values of four. Therefore situations that are high in both categories would score as (4,4) and be recorded in the uppermost right square on the grid. Other situations might be scored as (3,4), (4,3), (2,3), etc. The adding together of the probability and consequence scores provides a general idea of overall risk severity for each hazard. Organizing all identified hazards according to their overall risk score will provide a preliminary ranking of program priorities.

Hazards receiving a score of four in consequence should receive appropriate program attention regardless of their probability score. Transportation is a classic example. A minibus accident may not have occurred within the past fifteen years and therefore would score one (1) for probability. However, the consequence of such an accident could be catastrophic and therefore would score a consequence of four (4). Transportation would then become one of the priority areas during the risk management planning process.

Please note the relatively arbitrary nature of the scoring scale and the descriptions of each level. These criteria can be adjusted and modified to meet the needs of any specific situation. The important aspect is that for whatever scale and criteria used it is applied consistently to the evaluation of each of the identified hazards.

A blank copy of the risk assessment grid is contained as Worksheet Risk Assessment Grid HIRA 1.3 in Appendix C.

Once all the hazards have been plotted on the risk assessment grid the tasks of prioritizing begins. The plotted hazards usually group into clusters. Figure 1.2 is an example of what a typical grid might look like.

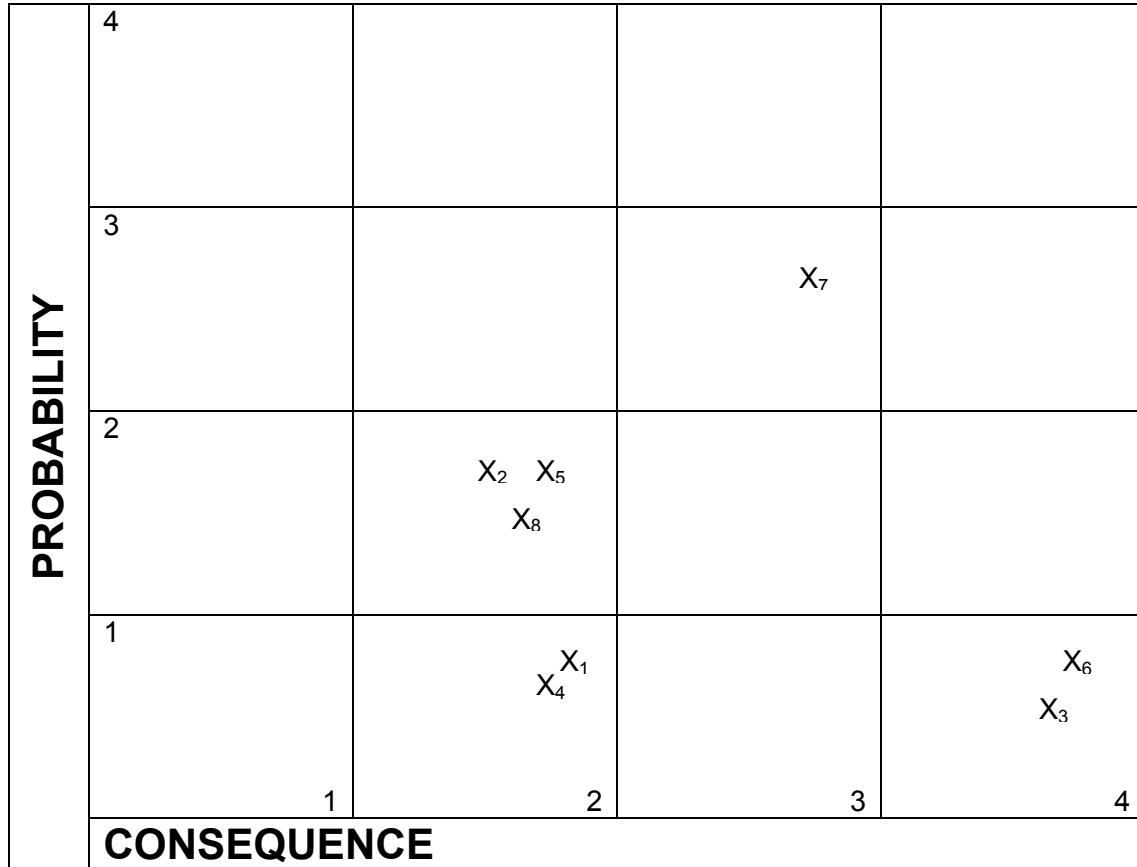


Figure 1.2 – Sample plotting of hazards

The hazards plotted on the grid in Figure 1.2 would have been developed from the earlier discussion of probability and consequence and each hazard would have a supporting Hazard Identification Worksheet completed. For the purposes of creating an example, the sample hazards were derived based on the following information:

Hazard	Probability (A)	Consequence (B)	Risk Level (A+B)	Priority Level
X ₁	1	2	3	Low
X ₂	2	2	4	Medium
X ₃	1	4	5	Medium-High
X ₄	1	2	3	Low
X ₅	2	2	4	Medium
X ₆	1	4	5	Medium-High
X ₇	3	3	6	High
X ₈	2	2	4	Medium

The Risk Level was obtained by adding the probability score with the consequence score. The Priority Level reflects a rank order score for the various groupings.

Next Steps

At this point in the process a given activity has been defined, the associated hazards with the activity have been evaluated based on an assessment of the probability and consequence of each one and the risks have been translated into a prioritized list. The next steps are to begin to manage the risks associated with each hazard.

Appendix D introduces a worksheet that is more sophisticated in the treatment of each hazard as well as the introduction of identifying specific responses to manage the risks.

The underlying strength of the Risk-based management approach is the ability to focus efforts and resources towards managing elements of an activity that pose actual risk to participants and staff involved in the activity.

Developing a risk management strategy is an on-going process. Priorities shift over time through the influence of current events, recent near-miss incidents, program goals, staffing and a multitude of other factors. The importance of undertaking a risk-based evaluation is to establish a baseline level assessment that can serve as a tool to help focus the application of resources in the most relevant areas of risk management development.

Appendix B – Hazard Information Sheet		HIRA 1.2
Hazard Sheet #: _____		
Updated: _____		
Type of Hazard (E.g., climbing, transportation, environmental, etc.)		
Specific Hazard (E.g. rock fall, van accident, lightning storm, etc.)		
Probability:		Score:
Consequence:		Score:

HAZARD INFORMATION SHEET		HIRA 1.2
Hazard Sheet #: <u>(Assign File #)</u>		
Updated: <u>(Date of last update)</u>		
Type of Hazard (E.g., climbing, transportation, environmental, etc.) <i>(Name the general hazard type)</i>		
Specific Hazard (E.g. rock fall, van accident, lightning storm, etc.) <i>(Describe the nature of the hazard without discussing its consequences.)</i>		
Probability: <i>(Record notes/bullet points listing factors affecting the probability of the hazard's occurrence. Include notes about history as well as any available research information.)</i>	Score: <i>(Based on grid)</i>	
Consequence: <i>(Record notes/bullet points listing possible consequences if this hazard where to occur. Include information on vulnerable groups and, if relevant, how remoteness of the location may impact on the outcome.)</i>	Score: <i>(Based on grid)</i>	

Appendix C – Risk Assessment Grid **HIRA 1.3**

PROBABILITY	4				
	3				
	2				
	1				
		1	2	3	4
	CONSEQUENCE				

SCORING PROBABILITY OF OCCURRENCE

1. No history of incidents in the last 15 years
2. Five to fifteen years since last incident
3. One incident in the last five years
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4. Catastrophic incident. (Life threatening injuries, possible fatalities, multiple victims with substantial injuries.) – Injuries likely to result in long-term disability.

Appendix D – Risk Treatment Worksheet	HIRA 1.4
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Identify	Hazard: _____	Hazard Category: _____													
	Risk Statement: _____														
Analyse/Evaluate	Consequence Rating Matrix								Risk Level Matrix						
	Impact areas								Consequence						
		Bodily Injury	Displacement	Support	Property damage	Program delivery	Reputation	Financial	Frequency distribution		Minor (1)	Important (2)	Serious (3)	Major (4)	Catastrophic (5)
										Likelihood					
	Minor									Unlikely	Low	Low	Medium	Medium	Medium
	Important									Possible	Low	Medium	Medium	High	High
	Serious									Likely	Medium	Medium	High	High	Extreme
Major									Almost certain	Medium	High	High	Extreme	Extreme	
Catasrophic									Certain	Medium	High	Extreme	Extreme	Extreme	
Risk Level = Frequency rating x Likelihood rating										Risk Level: _____					
Treat	Prevention	_____													
	Control	_____													
	Mitigation	_____													
Review	Date Assessment	_____							Conducted by	_____					
	Date Approved	_____							Review Date	_____					

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