CANADA WEST SKI AREAS ASSOCIATION

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

May 2007

This project would not have been possible without the support and cooperation of all areas within the Canada West Ski Areas Association, especially the valuable input of lift mechanics and lift maintenance departments from Gibson Pass Ski Area, Grouse Mountain Resorts Ltd., Kicking Horse Mountain Resort, Sun Peaks Resort, and Whistler/Blackcomb.

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Any suggestions for amendment or change to any part of this package should be forwarded to the Canada West Ski Areas Association.

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INTRODUCTION

The CWSAA Best Practices Manual is provided with one goal in mind: to reduce accidents and injuries at ski areas involving area staff and guests, specifically those relating to lift maintenance duties and activities.

This goal will be accomplished by helping ski areas to identify hazards that are specific to the ski industry (and a particular ski area) and by creating educational tools that raise awareness of these hazards and the risks associated with them. Furthermore, these materials (included and future additions) will assist ski area operators, regardless of the size or complexity of their operations, to create guidelines and safe work practices for their own operations that will contribute to safe work environments.

It is not the intent of the CWSAA or of this manual to create mandatory policy or procedures that binds a ski area to a certain way of doing things. The material is provided primarily as a guide, and, while we recommend that areas use the material, they are free to use, alter, or discount it (where compliance with legislation allows) at their own discretion.

In addition to a reduction in accidents and injuries amongst area staff, all ski areas should realize a reduction in compensation premiums as the industry base rate drops to reflect increased safety measures and reduced harm to staff.

While there are certain hazards that may be common to all areas, the actual level of risk or exposure to these hazards is different for each individual operation and ski area. For this reason, this manual does not provide any specific procedure for any specific process that may or may not take place at an area, or for any specific piece of equipment that may or may not be used at an individual area. The guidelines provided in Section B of the manual are provided as samples only.

This manual contains the following:

1. Objectives of the CWSAA Best Practices Manual
2. Guidelines for Hazard Identification
3. Guidelines for Risk Assessment
4. Sample procedural guidelines
5. Guidelines for writing Standard Operating Procedures (SOPs)
6. Guidelines for the provision of training
7. Guidelines for Pre-Job Safety Briefings

In addition, the information contained in this manual has been created partly to facilitate an agreement made between the CWSAA and WorkSafeBC. In the interest of providing safe work environments for all ski area staff, and in return for funding, the CWSAA has agreed to:

a. Develop risk assessment packages and standard best practices tools and materials for critical high profile areas such as lift maintenance workers.

b. Create two risk assessment models, a comprehensive model for large firms and a simplified model for small firms.

c. Develop a strategy for effective distribution of the materials to take full advantage of opportunities to improve health and safety within the industry.

Objectives of Best Practices

In order to meet the requirements of the agreement made between the CWSAA and WorkSafe BC and to assist areas in achieving the benefits of a safer industry, this manual has been developed with the following objectives that, when met, will contribute to a reduction in injuries:

Objective #1. Reduce or eliminate the occurrence of serious injury or death while performing lift maintenance duties. This will be accomplished by the manual through

a. the creation of adaptable templates and guidelines that will assist ski area operators through the creation, implementation, and documentation of safe work practices; and
b. the provision of guidelines that assist ski areas in providing information for effective on-the-job training.

Objective #2. Reduce the cost of injuries by lowering the base rate for the Ski Hill classification unit.

While this manual provides specific tools to aid ski areas in the accomplishment of this objective, it will only be possible through the diligent efforts of each area to

a. reduce the number of injuries that occur through lift maintenance activities and processes as a result of accurate hazard identification, risk assessment, and adherence to standardized safe work practices; and

b. reduce the impact of injuries that occur amongst lift maintenance staff.

Objective #3. Create standard risk assessment tools that are specific to the ski industry, are functional, and that address the needs of lift maintenance departments. This has been/will be achieved by:

a. considering the various available risk assessment models, including those used by compensation boards, insurance providers, and other industries; and
b. consulting with lift maintenance staff to ensure that their particular needs are addressed and included in the final risk assessment templates and guidelines.

Objective #4. Create an industry database that allows for the convenient storage of information and sharing of ideas and guidelines amongst members of the CWSAA.

To accomplish this objective, all areas must be willing to share ideas, suggestions, and materials with each other. Database and storage will be maintained by the CWSAA:

a. ensuring that all ski areas have equal opportunity to submit ideas and share procedures that work at their individual areas;
b. utilizing the existing CWSAA web site to its maximum potential as a resource database; and
c. creating industry-driven and specific hard materials for distribution amongst member areas.

With the creation of industry-specific and industry-driven best practice materials comes certain responsibilities and assumptions that will affect each area within the CWSAA. Since the practices provided in this manual are now considered to be the "best" practices for our industry, it will be assumed that all ski areas use them. Therefore, it is extremely important that area operators are familiar with the contents of this manual, apply the principles as required, and make suggestions for change as processes change and circumstances require them.

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

CANADA WEST SKI AREAS ASSOCIATION

SECTION A
HAZARD AND RISK ASSESSMENT

May 2007

SECTION A
HAZARD AND RISK ASSESSMENT

1.0 HAZARD IDENTIFICATION – Step One of the HRV Assessment

Hazard identification is the first step of the Hazard, Risk, and Vulnerability (HRV) or Risk Assessment process, whether for developing disaster plans or for minimizing exposure to risk in a particular work process or environment. Hazards are those things that may injure or have the potential to cause harm, such as a chemical, a vehicle, or an environmental condition.

The aim of this guideline is to provide ski area operators with a simple definition of a hazard in the context of the ski industry. The guideline will explain the different types of hazards and assist in the identification of the various hazards that may present themselves at any ski area.

Without a proper knowledge of the types of hazards and a systematic and detailed means of identifying and understanding them, all other efforts at assessing risk and determining the impact that an event will have on an area may be wasted. Ski area operators must be familiar enough with their areas' conditions, activities, and processes that they may plan for *likely* events while eliminating hazards that are *unlikely* to occur. This will ensure that time and resources are not wasted during the planning process.

After reading the CWSAA Best Practices Manual, area operators should have a clear understanding about what a hazard is and how to identify one in their areas and operations. The purpose of this material is to assist ski area operators to determine what types of hazards should be considered at their

areas, the potential outcomes of these hazards, and the relationships between hazards and outcomes.

1.1 Overview of Hazard Identification and Risk Analysis

Hazards are defined in many different ways by many different people with varying backgrounds. In the occupational setting, a hazard is considered as "a thing that may expose a person to a risk of injury or occupational disease," while in the context of disaster planning and response, a hazard is considered to be "a threat to humans and what they value including life, well-being, material goods and the environment." Considering the various factors such as environment, activities, guests, and equipment that support the ski industry, the true definition of hazard in this context is probably a combination of these two.

Further complicating the risk assessment process is the frequent confusion between the definition of hazard and that of risk. Simply put, the hazard is the "thing" or "condition" with the potential to harm, while the risk is the likelihood that an undesirable event or injury will occur as a result of exposure to the hazard.

This guideline will provide specific information related to the following components of hazard identification:

- Hazard outcomes
- Identifying hazards

1.2 Hazard Outcomes

There are two approaches to hazard identification and risk assessment. The first, and probably the most prominent, focuses on the occupational setting and considers hazards to be things that place people at risk through their work. In this case, hazards are typically restricted to exposure at the workplace to things like chemicals, machinery, work processes, and other conditions, such as noise.

The outcome of a negative exposure to these types of hazards is usually an injury or occupational illness suffered by a worker or worker(s), or damage to an organization's machinery, structures, or equipment.

These hazards are most likely to be present on a day-to-day basis and are typically addressed by an organization's Occupational Health and Safety Management System.

The second approach to hazard identification and risk assessment considers the relationship between hazards and risks and disasters such as earthquakes, floods, and pandemics. This second model uses hazard identification as a critical element in developing disaster management systems and emergency response plans.

The outcomes amongst this second group of hazards are typically much more severe and may include multiple injuries and deaths, partial or complete loss of property including critical infrastructure, and disruption of business continuity. Hazard events within this group are likely to contain large-scale social, environmental, financial, and political impacts on an area and the surrounding community.

These hazards are most appropriately dealt with by an area's Disaster Management System. These may include natural disasters, such as earthquakes, or person-induced events, such as a major chemical spill or toxic release.

The ski industry should be considered unique when it comes to hazard identification given the environment in which we operate, the risk associated with the activities supported, and the combined presence of workers and clients in one setting. Typically, most industries don't have the same exposure to environmental conditions (such as extreme weather), nor do they have the same responsibilities toward guest safety and the potential evacuation concerns as that of our industry. For this reason, ski areas should consider adopting a system of hazard identification that combines the two approaches.

The process for identifying hazards and assessing risk should be the same regardless of the potential outcome of an event. The only significant difference in the process between the two should be in the system activated to respond to and recover from the event. The critical component is understanding that all hazards, not just known occupational ones, must be identified through this process.

To distinguish between the two outcomes, it may be helpful to understand the difference between an emergency and a disaster.

1. **Emergency:** a serious situation or occurrence that happens unexpectedly and demands immediate attention. (The term *unexpectedly,* however, rarely applies with most work-related injuries in the work setting.)
2. **Disaster:** an occurrence causing widespread destruction and distress; a catastrophe or a grave misfortune.

1.3 Identifying Hazards

Hazard identification is the first step of the Hazard, Risk and Vulnerability (HRV) or Risk Assessment process. Operators should consider all actions, situations, and occurrences that have the potential to cause harm. Those hazards listed that are unlikely to exist at a particular area will be removed later on during the actual risk assessment portion of the process, however, a hazard should not be discounted just because it seems unlikely, or because it has never happened at the particular area.

Hazard identification should be completed in consultation with workers (in the case of occupational hazards), the surrounding community, external emergency service providers, and other persons experienced with the hazard being considered.

To identify hazards, follow a 3-step process:

A. Prepare a list of possible hazards
B. Define and describe the hazards listed
C. Provide historical data about each hazard listed

A. Prepare a list of possible hazards

Regardless of the outcome or the system activated to address the particular event, four types of hazards should be listed:

1. Natural Hazards. These hazards are normally considered to be "acts of God." These hazards are more likely to lead to a disaster or situation that requires the activation of an area's Disaster Management System and include such events as earthquakes, avalanches, or floods. Certain natural hazards, such as weather, lightning, and extreme temperatures, may contribute to risks

in the occupational setting, particularly in the ski industry. In some cases, a natural hazard may be triggered by human activity.

The following list identifies some of the natural hazards that could arise at a ski area. Area operators should consider each of these (as they apply) and discount them only as the process allows. The list below provides "general" types of hazards, and area operators should keep in mind that there may be several sub-hazards to consider. For example, where the list indicates *fire*, operators should consider fires such as forest fires, interface fires, and building fires separately, based on the circumstances and conditions that would permit a specific type of fire to occur.

- Avalanches
- Fires
- Atmospheric hazards (storms, lightning, extreme temperatures, etc.)
- Debris avalanches
- Landslides
- Drought
- Floods (flash, snow melt, urban)
- Rain storms
- Earthquakes
- Volcanic activities

When attempting to identify natural hazards, it is important to understand the limitations that our own personal experiences present. Few of us are experts in the area of natural disasters, and, therefore, our list will generally be formed based on

1. events that we have experienced;
2. events that our family or friends have experienced; or
3. events covered recently in the media.

It is important to be as specific as possible when compiling hazard lists for an area. In many cases, there may be several similar events that, in fact, have very different characteristics and outcomes. For example, while potentially similar in outcome, a debris flow is very different from a landslide by the way in which it is caused (affecting mitigation efforts) and the way in which it may present itself (affecting warning systems). For this reason, each sub-category should be measured on its own while considering its unique characteristics.

2. Diseases, Epidemics and Infestations. These types of hazards can apply equally to people, animals, plants, and entire ecosystems and are, therefore, of significant concern to ski area operators. Area staff may be exposed to any one of these hazards through contact with another staff member, a guest (especially those travelling from developing parts of the world), certain animals, or the bite or sting of certain insects.

In the work setting, diseases and epidemics should be considered as potential hazards any time a worker is or may be exposed to a toxic or otherwise harmful chemical or material (such as asbestos, red cedar dust, and certain industrial solvents), environmental tobacco smoke, or human fluids such as blood or saliva.

The following are some of the common (industrial) and currently popular (in respect to media coverage) diseases, epidemics, and infestations that may be considered as possible hazards for ski area operators:

- Environmental tobacco smoke
- West Nile Virus (through exposure to infected insects)
- Water and air-borne epidemics
- Poisoning (lead, mercury, organic solvents, etc.)
- SARS (and other flus and pandemics)

- Tendonitis, tenosynovitis
- Avian Flu (and other animal-borne conditions)
- Asthma (exposure to industrial chemicals or red cedar dust)
- Pneumoconiosis (exposure to silica dust, asbestos, etc.)
- Infections (hepatitis B, HIV, etc.)

When determining exposure to diseases, epidemics, and infestations, it is important to have a good understanding of all the implications and characteristics of the hazard, including

- the conditions that allow the disease to exist at the ski area (standing water pools);
- how the disease is spread (through humans, animals, insects, air, water, etc.);
- signs and symptoms of the illness (nausea, rash, etc.);
- immediate and long-term consequences for the infected person;
- history of the condition (has it occurred in the past?);
- direct and long-term effects of an outbreak on a ski area's ability to operate; and
- the ski area's ability to control the impact.

Currently, in British Columbia, occupational disease makes up less than one percent of all claims for compensation. Given the length of time that it may take for a disease to present itself (often 10 to 20 years of exposure), many experts feel that diseases will eventually overtake injuries, potentially crippling the compensation system. Outside of the occupational setting, SARS, West Nile Virus, Avian Flu and pandemics (to name a few) have positioned themselves at the top of the headlines, making disease, epidemic, and infestation an important and realistic consideration as a hazard for ski area operators.

3. Person-Induced Hazards. These types of hazards are probably the most significant to the workplace and to many lift maintenance activities, especially considering the potential outcomes of exposure to an event. These types of hazards are the most easily identifiable hazards in the occupational setting and the ones most likely to be present throughout day-to-day operations. As a result, they are generally the easiest to mitigate (but often the most overlooked) through controls and personal protective equipment.

Person-induced hazards are caused by acts of commission or acts of omission, and they can be an inherent part of a work process, such as working at heights or around moving equipment. Of particular concern are those caused by acts of omission, such as a person failing to warn or failing to pay attention to a process as it is happening.

In the work environment, person-induced hazards may include physical hazards such as exposure to noise, vibrations, and energy sources. They may also include ergonomic hazards in poorly developed work processes, tools or workstations and subjective hazards such as tiredness, poor judgement, lack of coordination, or lack of fitness. Person-induced hazards have the potential to combine with natural hazards, such as avalanches or fires, to create disastrous outcomes.

The following is a partial list of person-induced hazards that may be of concern to lift maintenance staff and departments:

- Motor vehicle accidents
- Explosions, fires, etc.
- Avalanches (also natural hazards)
- Hazardous material spill/exposure
- Chairlift/gondola breakdown

- Fall from heights
- Person caught in equipment
- Confined space entry
- MSI/ergonomic exposures
- Distraction/inattention

4. Multi-Hazards. These occur when one hazard contributes to another or creates the environment that allows it, for example, a power outage that occurs as a result of an earthquake, or an interface fire that occurs as a result of a motor vehicle accident.

The relationship between various hazards is an important consideration during the planning of capital projects and for mitigation purposes. In many cases, the occurrence of an unpreventable natural hazard will lead to a completely preventable person-induced hazard and vice versa, for example, an earthquake occurs which results in a hazardous material spill or a gas leak. The latter hazard may have been prevented through appropriate engineering controls and other mitigation efforts.

B. Describe and define the hazards listed

Once the list of all possible hazards has been completed, area planners should provide brief descriptions and definitions of the various hazards indicated. This will provide everyone involved with the planning process as well as those who play any role in response with an understanding of the cause and scope of each type of event. This component of the plan should be brief, providing enough information to gain general knowledge; however, references and sources for more information may also be provided.

C. Provide historical data about each hazard listed

The last step in the identification of hazards is to review each hazard and provide as much known historical data as possible. Data may be from other areas within or outside of the CWSAA, or may even be from a different industry exposed to similar events, such as a toxic release or chemical spill. During the entire risk assessment process, this historical information will be used in conjunction with technological data to determine the potential of a hazard occurring and the level of risk associated with it.

Hazard	Historical Data	Risk Factors	Certainty of Data	Risk Rating
Avalanche	2 - Class 3 avalanches, Winter 2006			

Appendix

A-1-4 Hazard Identification Checklist (1)

A-1-5 Hazard Identification Checklist (2)

A-1-6 Take 5

Hazard Identification Checklist (1)

Activity_____ Location: _____

Date: _____/_____/_____

IDENTIFIED HAZARDS	Controls in place?
Avalanche	
Confined Space Entry	
Dangerous Pressure	
Electrical Hazards	
Excavation	
Fall From Elevation- Tower climbing and work chair	
Flammables (Fire/Explosion)	
Hazardous Materials (WHMIS)	
Major Lifts (Hoisting assemblies etc)	
Mobile Equipment (cranes, excavators, cats, etc)	
Power Tools	
Rigging	
Scaffolds / Ladders	
Coordinating with other Work Groups	
Hand Tools	
Vehicles (on or off road)	
Ventilation	
Weather Conditions	
OTHER:	

STANDARD OPERATING PROCEDURES REQ'D

PPE REQUIRED

LOCKOUTS REQUIRED

Item	Y/N	Comments
Work site Access and Rescue Reviewed		
Adequate First Aid on site?		
Central Dispatch Available?		
Work site inspected for hazards prior to work		
Has this job been safely completed before and reviewed ?		

Workers completing task have reviewed the hazards and have received adequate training. If specialized training is required, document below who is qualified.			
Print Name	Position	Signature	Specialized training necessary for this task:

Comments:

_____
_____
_____
_____
_____

Completed by: _____

Hazard Identification Checklist (2)

Activity: _____ Location: _____
Date: ____/_____/_____

IDENTIFIED HAZARDS	What Could Go Wrong?	How Can The Hazards be Prevented or Controlled?
Avalanche		
Confined Space Entry		
Dangerous Pressure		
Electrical Hazards		
Excavation		
Fall From Elevation- Tower climbing and work chair		
Flammables (Fire/Explosion)		
Hazardous Materials (WHMIS)		
Major Lifts (Hoisting assemblies etc)		
Mobile Equipment (cranes, excavators, cats, etc)		
Power Tools		
Rigging		
Scaffolds / Ladders		
Coordinating with other Work Groups		
Hand Tools		
Vehicles (on or off road)		
Ventilation		
Weather Conditions		
OTHER:		
OTHER:		

STANDARD OPERATING	PPE REQUIRED	LOCKOUTS REQUIRED	ITEM	Y/N	Comments
			Work site Access and Rescue Reviewd		
			Adequate First Aid ?		
			Central Dispatch Available?		
			Work site inspected for hazards prior to work commencing		
			Has this job been safely completed before and reviewd		

Workers completing task have reviewed the hazards, have received adequate training. If specialized training is required document below who is qualified.			
Print Name	**Position**	**Signature**	**Specialized training necessary for this task:**

Comments:

_____

_____

_____

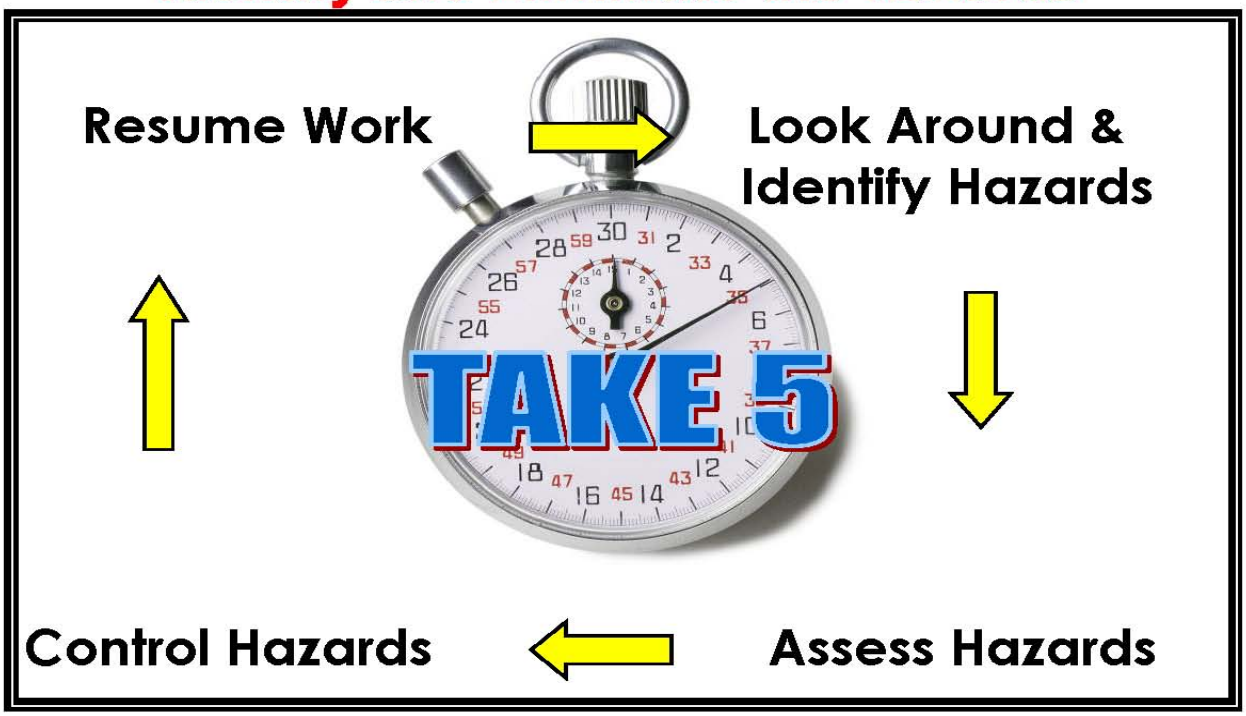
_____

_____

_____

Take 5

Identify and Eliminate the Hazards



" TAKE 5 "

Before you begin working in an unfamiliar environment, take time to assess and manage any unsafe conditions. Here is a partial list of potential hazards that frequently occur in our workplace.

- Working at Heights
- Confined Space
- Trenching & Excavation
- Working in Proximity to Power Lines
- Avalanche
- Hazardous Materials
- Rigging

- Extreme heat or cold, & weather hazards
- Parts of body in line of fire hands not in line of sight
- Mobile Equipment
- On and Off Road Vehicles
- Scaffolding

Is Lock Out or Tag Out Required?

2.0 RISK ASSESSMENT – Step Two of the HRV Assessment

The second step in the Hazard, Risk and Vulnerability process is the risk assessment. If a hazard is a "thing" or "condition" that threatens a person's health, safety, values, etc., the risk can be defined as the probability that one may be injured as a result of exposure to the hazard or that an undesirable hazard event (such as an avalanche, fire, or earthquake) will occur at all.

The risk assessment process allows the area operator to consider actual risks based on historical evidence, actual risk factors, and the experience(s) of experts and staff that may have encountered or are otherwise exposed to the hazards identified.

In the case of occupational hazards, risk assessment involves a systematic examination of all work processes undertaken by the area and all equipment used to accomplish these processes.

2.1 Risk Assessment Process

Once all possible hazards have been identified for a ski area and for specific locations within the area, the risk assessment process may begin. The goal of this process is to determine the actual likelihood of an event occurring and the potential consequences that the event or exposure to the hazard may have in terms of, for example, injury, property damage, or continuity of business. The risk assessment process is the same for occupational hazards as it is for environmental hazards or disasters.

1. Divide the Operation. Each area within an overall operation should be considered separately, based on the circumstances and activities that take place within it. The history of events that have occurred at the area should also be considered (such as fires, avalanches, and events described in first aid reports and incident reports).

For example, there may be more than one zone within a ski area operation that has an identified fire hazard. The circumstances that would allow the event to occur, the history of events, and the outcome if a fire starts could be very different between the zones. For this reason, each hazard must be considered in the context of each individual area within the operation.

In the case of occupational risk assessments, each work process and piece of equipment must be examined by considering the unique circumstances and different uses respectively. For example, an area may have two forklifts located in two completely different areas, doing two completely different jobs under very different circumstances. As a result of these differences, a separate risk assessment must be completed for each forklift. Areas and operations that are equally impacted by a particular hazard may be assessed as one.

2. Examine the Risk Factors. By examining the risk factors, area managers will be able to better determine the following:

- locations within their operation with increased risk
- the likelihood that workers will be exposed to a hazard or that a hazard event will occur
- areas with a decreased level of risk

Workers that have greater levels of exposure to a hazard or a potentially hazardous event are obviously at greater risk of harm should the event occur.

Hazards that seem impossible or otherwise extremely unlikely to occur should not be dismissed until all risk factors have been considered.

Some examples of risk factors to be considered through the risk assessment process include the following:

a. **Exposure**. How often does the event occur (weather, lightning) or how often are people exposed to the hazardous condition? What is the duration of a hazardous process undertake by a worker?

b. **History of events.** Has a hazard event occurred in the past within an area being assessed? Consider events that have occurred in similar areas and under similar circumstances. Has anyone been injured before by the process or piece of equipment?

c. **Location of hazards in relation to your operation.** Consider the environment surrounding your area. Where are you in relation to seismic fault lines, rivers, dams, lakes, transportation routes, airports, slide areas, etc.?

d. **Weather patterns and historical evidence of extreme weather at or near your operation.** When examining weather, it is important to consider changes in climate, the unpredictability of weather as a result of global warming, and how these new weather patterns may affect an operation.

e. **Current events and circumstances in other areas of the world, especially in from which you may draw customers.** Consider things such as diseases, epidemics, social unrest, and political struggles that may require changes in planning, thought processes, and other elements. These could affect business or your ability to continue with business.

f. **Equipment.** Consider the use, age, purpose, and condition of the equipment used at your area as well as the experience and knowledge of those persons operating it, the conditions under which the equipment is operated, the location of guests in relation to the equipment, safety systems, warnings and guards, etc.

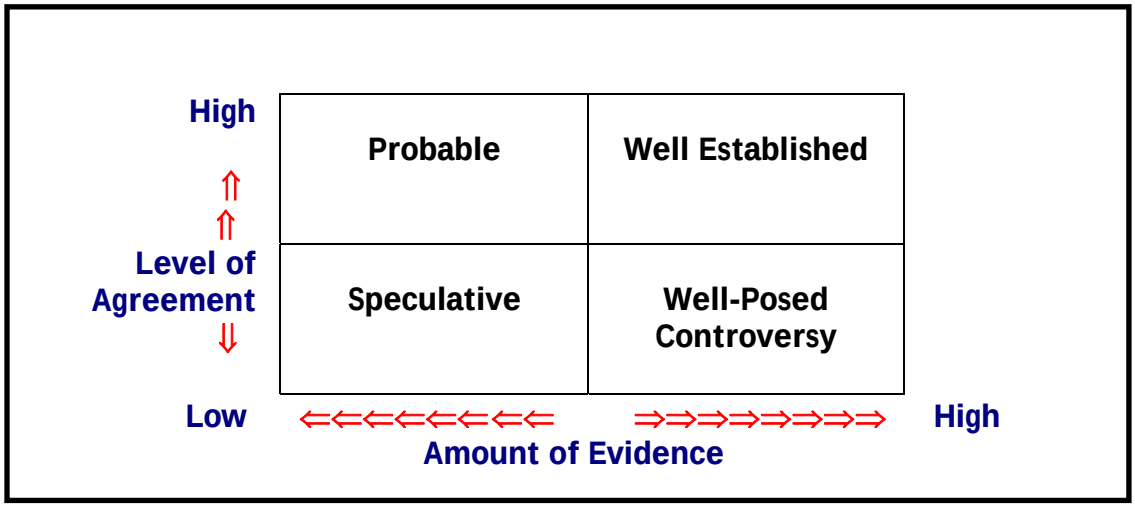
g. **Level of knowledge and ability of area staff and guests.** Consider their knowledge of hazards and hazard events, and their ability to cope with events should they occur.

3. Determine the likelihood of the Hazard Event occurring. The actual likelihood of the hazard event occurring or of workers or guests becoming injured as a result of exposure to the hazard will be determined by considering the history of the area combined with the number of risk factors identified for each hazard. For example, an area completing a risk assessment for avalanches has experienced two significant Class 3 slides over the past winter season. Out of 10 possible risk factors, they can identify 7 present in their operation, resulting in a risk factor of 7/10. Given this information, it can be assumed that avalanches are of significant risk for the area.

Hazard	Historical Data	Risk Factors	Certainty of Data	Risk Rating
Avalanche	2 - Class 3 avalanches, Winter 2006	7/10		

4. Assessing Certainty. Before assigning a final risk score to each identified hazard, there must be some certainty in the information used up to this point. In some cases, such as when considering the potential for natural hazards such as earthquakes, floods, or avalanches, the answers to the questions asked during the risk assessment may be unclear or otherwise unknown. This is especially the case for areas that may not have experienced these kinds of events in the past but where surrounding conditions still may allow the event to occur. Uncertainty is a growing challenge today given changes in things such as climate, global warming, political unrest, or in legislation relating to a work process.

In order to deal with uncertainty, ski areas may use the Subjective Probability Rating Model (SPR), designed to help determine the certainty of information gathered from a variety of sources with varying levels of knowledge or expertise.



To determine the certainty of information, the SPR considers the level of agreement among planners about the information received along with the amount of evidence obtained through the planning process. For example, using the avalanche event, if there is a high level of agreement among the experts and a large amount of evidence to indicate avalanche potential, planners can conclude that the certainty of data is "well established."

Hazard	Historical Data	Risk Factors	Certainty of Data	Risk Rating
Avalanche	2- Class 3 avalanches, Winter 2006	7/10	Well Established	

5. Rating the Risk. Based on the information obtained through the risk assessment process, ski area operators can now effectively "rate" the level of risk to which guests, staff, and components of the operation may be exposed. This rating can then be transferred into action decisions designed to control the risk.

The following scale is an effective and simple tool for rating the potential of an injury or incident occurring as a result of the particular hazard identified and assessed:

+3	Hazard is very likely to occur.	-1	Hazard is not very likely to occur
+2	Hazard is likely to occur	-2	Hazard is unlikely to occur
+1	Hazard has a slight chance of occurring	-3	Hazard is very unlikely to occur.

The risk rating can then be transferred to the Risk Analysis form:

Hazard	Historical Data	Risk Factors	Certainty of Data	Risk Rating
Avalanche	2- Class 3 avalanches, Winter 2006	7/10	Well Established	+3

A risk rating of +3, as in this example, tells planners there is a high risk of a major avalanche occurring at their area, and, therefore, significant planning for avalanche mitigation is justified.

2.2 Another Risk Assessment Model

The Risk Assessment model provided as the main example in this section is one used most often to assess risk of exposure to large-scale emergencies and disasters such as earthquakes, fires, avalanches, mud slides, etc. While it is usually used to assess risk at a community level, it is an appropriate tool for the ski industry due to the nature of our industry and the potential for large-scale incidents involving a lot of people.

While the model used here is appropriate in most cases, areas may prefer a much simpler tool for use in assessing risk associated with day to day work activities. The following Risk Assessment model is used extensively in all industries, and it has been created with the occupational setting in mind.

In the following model, once a hazard has been identified, a risk score is obtained by multiplying *exposure by consequences by probability.* The risk score is then categorized as low, moderate, high, or very high, and risk management

measures are taken according to this score. In order to find the rating, a numeric figure must first be attached to each of the three categories as follows:

1. Consequences. This determines the worst probable consequences should the identified hazard event take place.

Catastrophe: fatalities, extensive damage (greater than $1 million), major disruption of operations	100
Several fatalities, extensive damage ($500 000 to $1 million)	75
Fatality, property damage between $100 000 and $500 000	50
Extremely serious injury or disease (permanent disability) property damage between $1 000 and $100 000	30
Disabling injuries, reversible tissue damage, damage up to $1 000	10
Minor cuts, bruises, irritations and minor damage to property	2

2. Exposure. This identifies how often the hazard event occurs or how often a person is exposed to a hazardous condition.

The hazard event occurs:

Continuously – or many times daily	10
Frequently – or approximately once per day	6
Usually – between once per week to once per month	3
Occasionally – from once per month to once per year	2
Rarely – it has been know to occur	1
Very Rarely – not known to have occurred, a remote possibility	0.5

3. Probability. This scores the likelihood that the hazard event will occur combined with the worst possible consequences if it does.

The accident sequence:

Is most likely and expected result if the hazard event takes place	10
Is quite possible, wouldn't be unusual, 50/50 chance of taking place	6
Would be an unusual sequence or coincidence	3
A remotely possible coincidence, has been known to have happened	1
Extremely remote but conceivably possible, has never happened	0.5
Practically impossible sequence of events, one in a million chance	0.1

4. Risk Score. To obtain the risk score using this assessment tool, multiply *consequences by exposure by risk* numbers as follows:

C___ x E___ x P___ = ___ Risk Score

Risk scores are then categorized as low, moderate, high, and very high.

20 – 80	**Low**
90 – 250	**Moderate**
270 – 750	**High**
750 – plus	**Very High**

3.0 VULNERABILITY ASSESSMENT – Step Three of the HRV Assessment

The information presented to this point in this section should enable area operators to understand how to identify potential hazards at their areas and within their operations. This manual has also provided tools to help measure the level of risk that exposure to these hazards may present to staff, guests, property, and equipment. The next step in this process is the Vulnerability Assessment.

Vulnerability is the susceptibility of people, property, resources, and areas of particular environmental and/or historic significance to the negative impact of a hazard event. Vulnerabilities are represented as a function of the following:

- people
- place
- preparedness
- time

Understanding where an area's vulnerabilities lie is a critical component of this process. Understanding existing vulnerabilities is the first step in developing effective strategies to mitigate and respond to any incidents that may occur. The Vulnerability Assessment model provided focuses primarily on "community-based" factors versus individual factors. While there may be occasions during an event that individual factors may be considered, area managers and planners will be more concerned with how the event is affecting a large number of people with certain vulnerabilities. For example, mitigation efforts and event response for an area may be different from one month to another depending on the

demographics of the guests at the time, even though the actual hazard event is the same.

3.1 Examining Vulnerability Factors

The following chart provides the vulnerability factors for each represented category. During the planning process, check off those that apply. Transfer the number of factors that apply as a fraction over the total number of factors to the Vulnerability Assessment Form.

People	Place	Preparedness	Time
Age	Buildings	Response capability	Pop. Density re: Time of day
Density	Critical facilities	Community education/training	Pop. Density re: Day of the week
Gender	Ecological sites	Mitigation program	Pop. Density re: Time of year
Ethnicity	Economic sectors	Warning systems	Pop. Density re: Holidays
Socio-economic status	Historical and cultural sites		
	Lifelines and infrastructure		
	Non-structural property		
	Recreational land		
	Structures		

3.2 Determining the Degree of Vulnerability

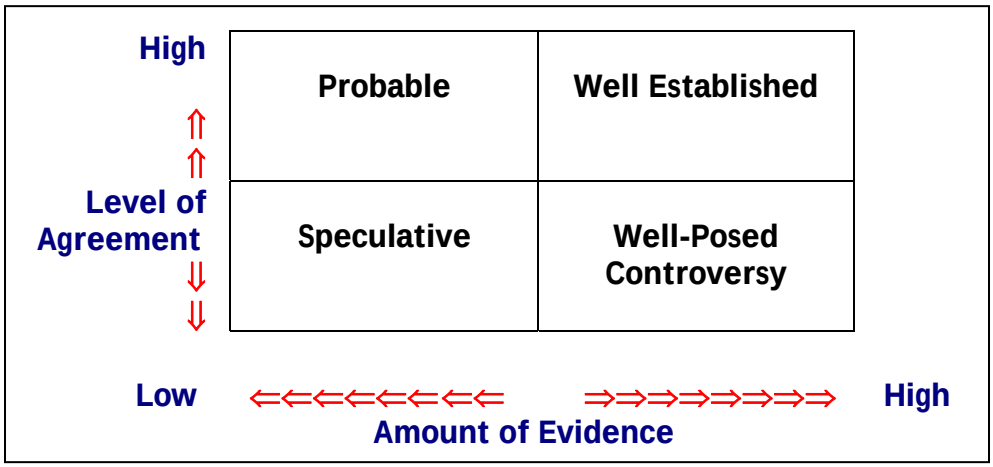
Transfer the information gained from the above table to the Vulnerability Assessment Form, indicating the degree of vulnerability for each category considered.

Name of Hazard	Social	Place	Preparedness	Time	Certainty	Vulnerability Rating
Avalanche	3/5	7/9	2/4	3/4		

3.3 Assess Certainty of Data

As with the risk assessment portion of this process, planners need to have a degree of certainty about the data being used to ultimately create a plan. In some cases, operators may be unsure of their actual level of vulnerability as it relates to a specific event. This is especially the case when certain natural hazards, diseases, or epidemics have not occurred at their area in the past.

The following model will assist in determining the certainty of information received from the various experts, people in the community and at the area being assessed.



The assessment of certainty can then be transferred to the Vulnerability Assessment Form as follows:

Name of Hazard	Social	Place	Preparedness	Time	Certainty	Vulnerability Rating
Avalanche	3/5	7/9	2/4	3/4	Well established	

4. Vulnerability Rating. The following scale is similar to that used to assign a Risk Rating. Use it to determine the degree of vulnerability your area has for a particular identified hazard and its associated risk.

+3	Hazard is very likely to occur.	-1	Hazard is not very likely to occur
+2	Hazard is likely to occur	-2	Hazard is unlikely to occur
+1	Hazard has a slight chance of occurring	-3	Hazard is very unlikely to occur.

Then transfer the Vulnerability Rating to the Vulnerability Assessment Form as follows:

Name of Hazard	Social	Place	Preparedness	Time	Certainty	Vulnerability Rating
Avalanche	3/5	7/9	2/4	3/4	Well established	+3

4.0 IMPACT ANALYSIS – Step Four of the HRV Assessment

The final step in the Hazard, Risk and Vulnerability analysis (HRVA) is to complete an Impact Analysis. Simply put, impact describes the end result of a disaster or hazard event. Using the avalanche example, a significant event occurring at a ski area, within area boundaries, and during operating hours could translate into several impacts including injury, death, property and equipment damage, and disruption in business.

Usually, areas identified during the HRVA process as having a high degree of vulnerability will also suffer the greatest impact following a hazard event.

4.1 Identifying Impacts

The purpose of the impact analysis is to link vulnerabilities to identified hazards and then transfer that information into impacts. For example, an avalanche occurring within a ski area's boundary during operating hours can translate into injuries, potential deaths, property damage, and disruption of business. Impacts are viewed as being:

a. **Social –** the manner in which the event affects people
b. **Environmental –** how the disaster or event can affect the environment (eg., toxic chemical spill)
c. **Economic** – the affect of an event on the area's ability to operate and generate revenue
d. **Political –**how the event affects the community's perception of the ski area—its reputation and brand identification

4.2 Vulnerabilities and Social Impacts

The following table links the vulnerabilities identified earlier with their potential social impacts:

Vulnerabilities	Social Impacts
Age	Number of injuries
Gender	Number of deaths
Ethnicity & cultural background	
Population density	
Time of day, week, year	
Lack of critical infrastructures	
Loss of critical infrastructures	
Capacity to respond	
Buildings	Loss of housing Disruption of family life Loss of educational opportunity Loss of a historic site Loss of a cultural site Loss of health services Loss of critical facilities
Recreational land	Loss of recreational opportunities

Each impact that applies (or potentially applies) to the specific event is given a rating as follows:

+3	Moderate to high degree of impact
+2	Low to moderate degree of impact
+1	Little or no degree of impact

4.3 Vulnerabilities and Environmental Impacts

The following table links vulnerabilities to environmental impacts and allows the ski area to assign an impact score.

Vulnerabilities	Environmental Impacts
Industrial activities	Quality of air
Lifelines and infrastructures	Quality and quantity of water
Ecological sites	Quality and quantity soil
Natural resources	Destruction to plant life Deaths and injuries to wildlife Destruction of natural resources Destruction of eco-systems

Once the environmental impact assessment is complete, total all values given and take an average to reflect the overall environmental impact.

4.4 Vulnerabilities and Economic Impacts.

Consider the following table as it relates to vulnerabilities and economic impacts due to a disaster or hazard event:

Vulnerabilities	Economic Impacts
Buildings	Structural damage
Structures	Non-structural damage
Critical Facilities	Loss of inventory
Historical and Cultural sites	
Attractions	
Non-structural property	
Economic abilities	Loss of jobs
Recreational land	Loss of attraction
Lifelines and infrastructure	Loss of service

Once the environmental impact assessment is complete, total all values given and take an average to reflect the overall environmental impact.

4.5 Vulnerabilities and Political Impacts

Political impact relates to an organization's standing within a community before, during, and after a disaster or hazardous event. How an organization prepares for and responds to an incident is critical in ensuring a good reputation within the community. In many cases it doesn't matter what the actual risk to the community is as a result of the event.

Use the following table to help determine vulnerabilities and their political risk to your organization:

Vulnerabilities	Political Impacts
Capability to respond Community education and training Warning systems Number of potential hazards	Public perception of blame

4.6 Public Perception

There are many different factors that will help determine the degree of community outrage should a particular hazard event occur at your area and within a community. These factors must be considered carefully by any organization conducting HRVAs in an area where the public may be affected by actions or inactions or where public perception of an organization may affect the areas ability to remain in operation.

a. Voluntary risks are generally more accepted than those that are imposed (voluntary vs. coerced);
b. Risks that are within an individuals control are usually accepted more readily than those under an organizations control;
c. Risks that seem fair are more acceptable than those that seem unfair;
d. Information about risks that comes from a trustworthy source is generally more accepted than that from an untrustworthy source;
e. Risks that seem ethically objectionable will seem more risky that will those that do not;
f. Natural risks are often more acceptable than industrial risks;
g. Exotic risks generally seem more risky than familiar ones;
h. Risks associated with memorable events are often considered more risky than those risks that are not so associated;

i. Risks that are "dreaded" seem less acceptable than do those that are not;
j. Risks that are undetectable create more fear than those that are detectable;
k. Risks that are well understood by science are usually more acceptable than those that aren't;
l. Risks that are chronic are better accepted than those that are catastrophic; and
m. Risks that occur within the context of a responsive process are better accepted than those that are part of an unresponsive process. (Bernstein, 1987 and Sandman, 1991).

Generally speaking, the greater the number and seriousness of these factors, the greater the likelihood of community concern.

Once all factors have been considered findings (for all categories) are transferred to the Impact Factor Analysis Form. These factors must be considered for each identified location within the operations and for each hazard identified through this HRVA process. To assist with this process a score should be assigned to each impact identified as follows:

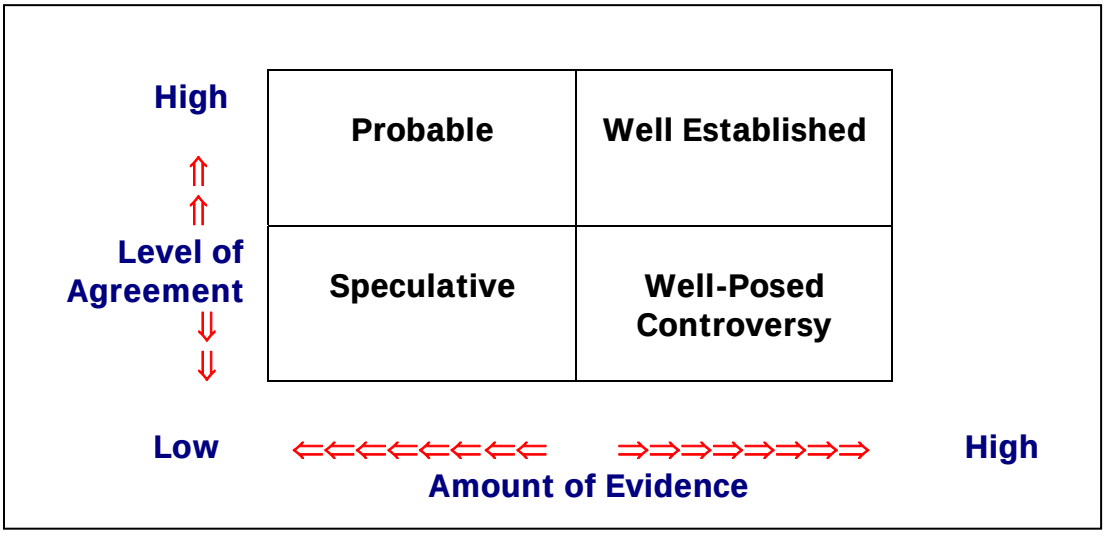
+3	Moderate to high degree of impact
+2	Low to moderate degree of impact
+1	Little or no degree of impact

The following shows a few examples taken from the impact analysis, complete with score:

Social		Environmental		Economic		Political	
Deaths	+3	Air quality	+1	Structural damage	+1	Coerced risks	+1
Injuries	+3	Water quality and quantity	+1	Non-structural damage	+1	Organizational control	+3
Loss of housing	+1			Loss of job	+1	Unfair risks	+1

4.7 Assessing Certainty of Data

As with the other components of the Hazard, Risk and Vulnerability Analysis, planners and area managers must be certain of the information being used to assign risks to create and implement plans that could cost a significant amount of money. The following model (used previously) can be used to determine the certainty of data relating to the Impact Analysis:



4.8 Rating Impact

The final step in this process is to assign a rating score to the overall impact that an event will have on an organization or a community. The rating score is an average of scores given for the 4 categories within the Impact Analysis: social, environmental, economic, and political. The scale used is the same as that given earlier (+3, +2, +1).

The following sample Impact Assessment Form has been provided considering the avalanche example used throughout this section.

Hazard	Social	Environmental	Economic	Political	Certainty	Impact Rating
Avalanche	+3	+2	+2	+1	Well established	+2

4.9 Conclusion

Based on all of the information obtained throughout this process, we are able to determine that the risk of significant avalanche at this particular area is very likely and that the impact, should an event occur, will be low to moderate. This assessment only applies for a specific area and, therefore, separate assessments will be required for each area with an operation that has an identified avalanche hazard. It is probable that the outcome will be different for each area based on the specific elements within the area being assessed.

5.0 RISK MANAGEMENT

5.1 Risk Management and Control

Once the level of risk has been determined and the likelihood of a hazard event occurring identified, area managers can begin to take risk management measures or implement strategies at controlling the risk.

Risk management measures are generally taken in priority based on the degree of vulnerability and impact that the identified hazard potentially brings. Area operators must also consider the relationship between the different hazards and the potential for multi-hazard events when prioritizing response planning and efforts.

Where possible, the ultimate goal to managing risk should be to eliminate any possibility of an event occurring. Where this is not possible, the next step should be to minimize the amount of exposure to the hazard or the outcome of the event should it occur. The risk management process should proceed using the following as a guide for each hazard being assessed. This guide has been created primarily in response to occupational hazards and is used widely by many different industries:

a. Eliminate the hazard, considering

(i) if the hazard be avoided;

(ii) if a particularly hazardous part of the task needs to be completed to achieve the desired result;

(iii) if there is any other way that the task can be competed; and

(iv) if the process or activity can be moved to a safer area.

b. Substitute the task or parts of the process, considering

(i) any different processes that will produce the same result;

(ii) the use of different, safer materials and/or equipment; and

(iii) different locations that the task or operation may be moved to.

c. Implement engineering controls, considering

(i) if there is new technology available that will make the task safer or that will protect people from exposure to the hazard;

(ii) if there are guards or other controls that will reduce the risk resulting from exposure to the hazard;

iii) if there are preventative measures that would control risk such as avalanche control, dyking, etc.; and

(iv) if the workspace can be re-designed to reduce exposure to the hazard.

d. Implement administrative controls, considering

(i) measures that change the organization of the work or operation in a way that reduces exposure to identified hazards;

(ii) if the work or operation can be re-scheduled to allow for breaks away from the hazard; and

(iii) whether tasks or operating hours can be planned or organized around the hazard to reduce human exposure to it.

e. Utilize personal protective equipment. PPE should be considered as the last resort in any risk management plan or processes

(i) when engineering or administrative controls are not practicable; and

(ii) when there is no other way to eliminate or reduce exposure to the hazard and some exposure is inevitable.

PPE includes physical equipment, individual controls such as lock-out devices and specific task instructions.

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

SECTION B
INDUSTRY-RECOMMENDED PRACTICES

1.0 FALL PROTECTION
2.0 MOBILE EQUIPMENT
3.0 SNOWMOBILE OPERATIONS
4.0 WORK CARRIER GUIDELINES
5.0 CONTRACTOR GUIDELINES

May 2007

SECTION B
INDUSTRY-RECOMMENDED PRACTICES

1.0 FALL PROTECTION

1.1 Guidelines for Fall Protection Programs

This guideline provides CWSAA members with a basic template and overview of legislated requirements for fall protection systems. It will assist ski areas in identifying the risk associated with work at heights, provide some options for developing programs suited to the needs of an individual ski area, and help reduce workers' exposure to risk.

Any work at height presents a certain amount of risk to the people carrying it out and to anyone else working or otherwise in the vicinity. Before beginning to develop a fall protection program, ski area management should identify any and all fall hazards present at their work sites. According to WorkSafeBC guidelines, any time a worker is exposed to a potential fall of 10 ft. (3 m) or greater, or where a fall from a lesser height involves an unusual risk of injury, the worker must be protected through engineering controls or by using a personal fall protection system. This guideline will provide areas and lift maintenance management with the following information about fall protection and working at heights:

1. Fall Protection Definitions
2. Duties and Responsibilities
3. Fall Hazard Identification
4. Fall Protection Plans
5. Working Alone
6. Training
7. Equipment Inspections
8. Short Duration Work

1.1.1 Fall Protection Definitions

Anchor	A secure point of attachment for a lifeline or lanyard.
Carabiner	A link with a gate that is normally closed or that automatically closes. It is used to connect components of a personal fall protection system.
Competent/Qualified Person	A person who is knowledgeable about fall protection equipment and systems and the rules for their set up, use, inspection, and maintenance. A person who is capable of identifying existing and potential hazards and has the authority to take prompt action to correct those hazards.
Control Zone	The area between an unguarded edge of a building or structure and a line that is set back a safe distance.
Deceleration Device	Any mechanism, such as a rope grab or rip stitch lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on a worker during an arrested fall.
Deceleration Distance	The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the employee's harness attachment point before the fall and the attachment point once the employee comes to a full stop.

Engineered Controls	Controls that physically limit access to areas from which one might fall. They may consist of guardrails, toe boards, covers, and other rails or barriers. They can be temporary or permanent.
Fall Protection System	Any of the following when used to protect a worker from a fall or minimize the risk from falling: • Guardrails • A full body harness with a lanyard and/or a lifeline and an anchor and related equipment • A safety net • A control zone • A safety monitor with a control zone • Other procedures acceptable to WorkSafeBC
Fall Restraint System	A work positioning system to prevent a worker from falling from a work position, a travel restriction system such as guardrails, or a personal fall protection system to prevent a fall.
Free Fall Distance	The distance from the point where the worker would begin to fall to the point where the hall arrest system would begin to cause deceleration of the fall.
Full Body Harness	A body support device consisting of connected straps designed to distribute the force of arresting a fall over at least the thigh, shoulder and pelvis, with a provision for attaching a lanyard, lifeline, or other components.
Hazardous Processes and Equipment	See “unusual risk of injury.”

Horizontal Lifeline	A system composed of synthetic or wire rope installed horizontally between two anchors, to which a worker attaches a personal fall system.
Lanyard	A flexible line of webbing, or synthetic or wire rope, used to secure a full body harness to a lifeline or anchor.
Leading Edge	A leading edge is considered to be an "unprotected side and edge" of floor, roof, or formwork for a floor or other walking/working surface during periods when it is not actively and continuously under construction.
Lifeline	A synthetic or wire rope, rigged from one or more anchors, to which a worker's lanyard or other part of a personal fall system is attached.
Personal Fall Protection System	A worker's fall protection system, made up of a full body harness, lanyard, lifeline, and any other connecting equipment, that is used to secure the worker to an individual anchor or to a horizontal lifeline.
Positioning Device	A full body harness system rigged to allow a worker to be supported on an elevated vertical surface, such as a wall, and to work with both hands free while leaning.
Rope Grab	A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and clicks so as to arrest the fall of the worker.
Safety Belt	A body support device consisting of a strap with a means for securing it about the waist and attaching it to other components.

Safety-Monitor System	A system in which a trained worker is designated to monitor work activities in a control zone to ensure that work is done in a manner that minimizes the potential for a worker to fall.
Safety Strap	A pole strap or similar support strap used with a work positioning suspension belt and used for climbing trees or structures such as utility poles.
Self-Retracting Lifeline	A deceleration device containing a drum-wound line that can be slowly excerpted from, or retracted onto, the drum under slight tension during normal worker movement and that, after onset of a fall, automatically locks the drum and arrests the fall.
Shock Absorber	A device intended to limit deceleration of a worker during fall arrest.
Snaphook	A connector comprised of a hook-shaped member with a normally closed keeper or similar arrangement, that may be opened to permit the hook to receive an object and that when released, automatically closes to retain the object.
Swing-Fall Hazard	The hazard to a worker of swinging and colliding with an obstruction following a fall when connected to a lanyard or lifeline that runs at an angle off of vertical.
Total Fall Distance	The distance from a point where the worker would begin to fall to the point where the fall would be stopped.
Unprotected Sides and Edges	Any side or edge (except at entrance points of access) of a walking/working surface such as a floor, roof, ramp, or runway where there is no wall or guardrail system at least 42 in. high.

Unusual Risk of Injury	With respect to the risk of injury from a fall, there is a risk of injury greater than the risk of injury from impact on a flat surface, for example, from a fall onto operating machinery or into a tank of chemicals.
Walking/Working Surface	Any surface, whether horizontal or vertical on which a worker walks or works including, but not limited to, floors, roofs, raps, bridges, runways, or formwork, but not including ladders, vehicles, or trailers on which workers must be located to perform their duties.
Warning Line System	A barrier erected on a roof to warn workers that they are approaching un unprotected roof side or edge, and that designates an area in which roofing work may take place without the use of a guardrail or a personal fall protection system.

1.1.2 Duties & Responsibilities

The following outlines the duties and responsibilities of all management levels regarding fall protection.

A. Employers

It is the responsibility of the employer to ensure a safe work environment and to create and enforce a fall protection program for any work done at a location

1. from which a fall of 10 ft. (3 m) or more may occur, and
2. where a fall from lesser height contains an unusual risk of injury.

Employers must ensure that engineering controls such as guardrails or other means of fall restraint are established where practical or that another acceptable fall restraint system is used.

Where not practical, employers will provide their workers with appropriate fall arrest equipment and develop systems that ensure equipment is used correctly.

B. Supervisors and Managers

It is the responsibility of the supervisor or manager to implement the ski area's fall protection program whenever the risk of falling is present. Supervisors must ensure that workers are familiar with equipment, trained in its use, and supervised effectively throughout their work.

Supervisors and managers must conduct equipment and safety checks, enforce fall protection and other safety procedures, and correct unsafe conditions as they occur.

C. Workers

Workers should be expected to take an active role in safety and fall protection programs, and they should be encouraged to contribute to a safe work environment at all times. It is the responsibility of ski area workers to

1. take reasonable care to protect the health and safety of themselves and those other staff and guests that may be affected by their action or inaction.
2. use the required protective clothing and equipment, including appropriate fall protection equipment, for the job being done.
3. follow the safe work procedures as outlines in the area safety program, including those related to fall protection.
4. safely perform their duties.
5. notify their supervisor or manager of any unsafe conditions.

1.1.3 Fall Hazard Identification

The first and most important element of any fall protection program is identifying the fall hazard. All fall hazards should be identified prior to any

work being done in order to determine the best protection system to use (engineering control or personal fall protection system). Since each work area and task may be different, workers should be instructed in systems and procedures that apply to all processes and areas to which they may be exposed.

Prior to starting a task that contains a potential fall hazard, workers, their supervisors, and ski area safety staff should follow six steps. Answering the questions in each step will help determine whether or not the fall hazard can be *eliminated* (by changing the scope of the work. i.e., engineering controls) or *reduced* (by establishing a personal fall protection system).

Step 1 – Does the work expose workers to any of the following?

a. unprotected sides and edges of roofs or walking/work platforms
b. lift, light, or other towers
c. walking or work surfaces that do not have the strength or structural integrity to support the worker's weight
d. hoisting, lifting areas such as mezzanines or roofs where guardrails may have been removed
e. portable ladders
f. elevated platforms, including lift work carriers
g. fixed ladders that are longer than 25 ft. without a cage or ladder safety device
h. excavations, pits, shafts, and holes
i. activities above hazardous processes or equipment
j. other potential height hazards

Step 2 — Does the activity need to be completed?

Step 3 — Can the scope of the activity be changed to eliminate workers' exposure to the fall hazard?

Step 4 — If the exposure to the fall hazard cannot be eliminated, how can the risk of falling be reduced (engineering controls, personal fall protection system)?

If a personal fall protection system will be used, the supervisor must ensure that workers are trained in the appropriate safe work procedures for the area and the task.

Step 5 — Is a written fall protection plan necessary?

A written fall protection plan must be completed if

a. the fall hazard cannot be reduced or eliminated using engineering controls or the use of a personal fall protection system is not practical;
b. the work is being conducted at a location not protected by permanent guardrails, from which a fall of 25 ft. (7.5 m) or more could occur.

Step 6 — Who should complete the fall protection plan?

Fall protection plans should be completed by authorized and qualified area staff who are familiar with the work being done and the procedures and regulations that pertain to it.

1.1.4 Fall Protection Plan

Fall protection plans should be created whenever area staff, including contractors, are, or may be, exposed to any of the following:

1. work at allocation not protected by permanent guardrails, from which a fall of 25 ft. or 7.5 m or more could occur;
2. work that requires the use of a safety monitor and a control zone;
3. other situations where exposure to a fall hazard cannot be controlled or mitigated through engineering controls or the use of a personal fall protection system; or
4. any work that makes the use of fall protection equipment not practical or where the equipment may introduce a greater hazard.

Fall protection plans are typically site-specific and are implemented for the duration of the work. In some cases, a standing plan may be established for a specific work area or task, provided that the fall protection system does not change. For example, ski areas may develop a standing plan for lift tower climbing, work on facility roofs, using a work carrier, etc.

Fall protection plans should be developed by qualified and authorized area staff who are familiar with the job being done and the fall protection requirements of the job. Copies of the fall protection plan should be made available to all workers using the system and at the work site. Workers using the system should have current, documented training in the fall protection plan and the ski area's fall protection procedures.

The following procedure should be followed whenever work that contains a risk of falling will be carried out:

1. The supervisor/manager will review the work plan to determine if a fall protection plan is required.
2. If required, the supervisor or manager will complete a fall protection plan that is specific to the task being completed and its location.
3. The supervisor/manager will ensure that the plan is communicated and reviewed with the workers affected during the pre-job safety meeting and that the workers understand the contents of the plan.
4. The workers will conduct the work in accordance with the approved plan. Any changes to the fall protection plan should be approved by an appropriate supervisor or manager who is familiar with the job and the fall protection requirements of the plan.

1.1.5 Working Alone

In the event that a lift maintenance worker must work alone at a location where a significant fall could occur (not recommended), the following procedures should be implemented:

1. The worker will contact the mountain dispatcher or a designated monitor and provide his/her work location.
2. Once the worker has descended from the height or the harmful exposure to the hazard has been otherwise eliminated, the worker will provide the monitor with an "all clear."
3. The designated monitor will record the name, time, and location of the worker, along with his/her (monitor) name on an appropriate log sheet.
4. In the event that the monitor does not hear from the worker within a pre-determined amount of time, emergency procedures will be initiated.

1.1.6 Training

All workers required to work at any location that contains a fall hazard must receive fall protection training appropriate to the level of risk to which they will be exposed. This training should be given prior to the workers' exposure to the fall hazard by a designated person who is qualified in the area of fall protection and fall protection equipment.

Ski areas may choose to recognize a worker's previous fall protection experience; however, it is recommended that an area-specific refresher course be provided to ensure the worker's familiarity with the specific components of the area's operation and plan.

Fall protection training is designed to ensure that all workers who are exposed to work at heights can

1. understand the policies and procedures outlined in the Occupational Health and Safety Regulation that relate to fall protection;

2. understand their particular roles in the ski area's Fall Protection Plan;
3. recognize fall hazards in their work area;
4. use appropriate procedures to minimize their exposure to fall hazards (engineering controls vs. personal fall protection systems);
5. identify anchor point locations;
6. identify areas where they may be exposed to falling materials;
7. describe the methods of material and tool handling while working at heights; and
8. describe the equipment available for evacuation and rescue.

Workers using a personal fall protection system will be required to demonstrate that they

1. know how to inspect equipment prior to its use;
2. know how to wear equipment properly;
3. know how to use the proper hook-up attachment methods for the specific piece of equipment;
4. know how to use appropriate anchoring and tie-off techniques for the work;
5. understand the importance of using a high anchor point;
6. know how to estimate free-fall distance and total fall distance;
7. know how to minimize swing hazards;
8. understand the care, inspection, and proper storage of fall protection equipment;
9. understand self-rescue and evacuation and rescue procedures and techniques; and
10. understand pre-planning for emergency procedures.

A written training record should be kept for each worker who has received fall protection training. In the interest of due diligence, this record must be signed by the instructor and the student and should be kept for the duration of the worker's employment.

1.1.7 Equipment Inspections

It is the ultimate responsibility of the persons using the fall protection equipment (the workers) to inspect their own fall protection equipment prior to *each* use.

If a piece of equipment shows signs of wear, it should be removed from service as the wear affects the equipment's ability to protect the worker after a fall.

Individual ski areas may choose to designate a person other than the user to conduct additional equipment inspections.

When conducting inspections of fall protection equipment, workers should look for the following:

- Abrasions
- Age or service life
- Broken parts
- Broken stitches
- Burn marks
- Corrosion or charring
- Cracks or deformation
- Cuts or frayed edges
- Damaged or distorted snap hooks or faulty springs
- Deformed thimbles
- Enlarged buckle tongue holes or grommets
- Fraying or kinking ropes
- Loose or deformed connectors
- Mildew or mold
- Proper storage locations

Fall protection equipment showing any of these signs of wear should be retired according to the level of wear. Any fall protection equipment that has arrested a significant fall must be retired immediately and not be returned to service until inspected and re-certified by the manufacturer or its authorized agent.

1.1.8 Short Duration Work

Occasionally, there may be a need to carry out a quick task at height without the benefit of appropriate fall protection equipment. These occasions are extremely rare and will usually present themselves during exceptional emergencies only. Some examples of short duration work may include the following:

1. Installation of fall protection equipment (first person up).
2. Work from portable ladders, including light duty tasks such as inspecting or painting, lasting for less than 15 minutes. (In these cases, the worker should not at any time remove both hands from the ladder or move the body's center of gravity past the outside rails of the ladder.)
3. Roof inspection or estimating. The worker must minimize his or her exposure to the unguarded edge as much as possible.
4. Brief transfers between fall protection systems where the worker is protected by having three points of contact (two feet firmly on the ground/support member, one hand supporting the worker and the other transferring to the next system).
5. Inspections of proximity switches or sheaves on lift tower heads while the lift is operating. An entanglement hazard exists if the worker is attached to an anchor point.
6. Correction of an unsafe condition.

While free climbing should be avoided whenever possible, individual ski areas may choose to develop qualified climber programs with detailed procedures, instructions, and limits on free climbing structures to help reduce risk of injury.

1.2 Guidelines for Climbing Towers

The CWSAA *Guidelines for Climbing Towers* provides ski areas with a template for identifying climbing hazards and reducing the risk of workers' falling when completing tasks that require free climbing structures. This guideline will provide basic information outlining the circumstances where free climbing may be permitted and the requirements that must be met to ensure worker safety.

The Occupational Health and Safety Regulation (WorkSafeBC) provides that a fall protection system must be used whenever work is being performed at a height of 10 ft. (3 meters) or more, or when a fall from a lesser height involves an unusual risk of injury.

Despite the regulation, there may be occasion where a ski area worker (lift mechanic) must carry out short duration work at height without the benefit of fall protection equipment. These occasions should be rare, and the decision to allow this work should be made by a qualified person only after other options have been considered. *If conditions do not allow for the safe free climbing of the structure, then 100% protection must be achieved.* Only staff that have received appropriate training and are considered qualified to free climb by an authorized instructor should be permitted to perform such unprotected work.

This guideline will provide specific information about components of a Qualified Climber Program as follows:

1. Requirements for free climbing
2. Climbing Hazards
3. Climbing Procedures
4. Free climbing pre-assessment
5. Working alone and in isolation
6. Lockout procedures
7. Conclusion

1.2.1 Requirements for Free Climbing

All area staff that may be required to work at heights should receive authorization from the area and training from an accredited trainer. Not all workers that receive training to work at heights, however, may be permitted to free climb structures. The number of staff permitted to free climb should be kept to a minimum at the discretion of the ski area.

Only those staff that have received further training and have been designated as "qualified climbers" should be permitted to carry out short duration work requiring free climbing. In order to become authorized to free climb structures, ski areas should require that workers meet the following requirements:

1. They are physically and mentally capable of free climbing structures.
2. They are required to free climb structures as a part of their duties.
3. They are capable of determining the need to free climb.
4. They have successfully completed a training program in fall protection systems and free climbing that consists of classroom and practical training.

1.2.2 Climbing Hazards

The single most obvious hazard associated with climbing is the potential to fall. In order to reduce this risk, workers at height must use 100% fall protection whenever possible, and free climbing should only be permitted as a last resort when circumstances make it the only practical solution.

Ski area workers may be required to climb any of the following structures or surfaces at any given time throughout their employment, potentially without benefit of fall protection equipment:

1. Fixed ladders
2. Portable ladders
3. Lift towers, including transfers to and from work carriers and structures
4. Snow and ice walls
5. Rock faces

Regardless of the surface or structure to be climbed, the qualified worker should consider and observe the following before and during the climb:

1. Be aware of the contents of the Fall Protection Plan for the work being done and be prepared to work within the confines of the plan.
2. Always have three points of contact with the structure or surface being climbed.
3. Do not climb while carrying anything in hands.
4. Assess the hazards associated with the structure or surface being climbed, including any additional hazards resulting from the specific job being completed, prior to commencing the climb.
5. Ensure that personal fall protection equipment can be secured as soon as possible and when an emergency is imminent.
6. Observe all special procedures whenever applicable (night climbing, working alone, etc.)

1.2.3 Climbing Procedures

Prior to climbing any surface or structure, with or without fall protection equipment, workers should consider the following factors and determine the safest possible method for completing the job:

1. Why must the structure be climbed?

a. What is the nature of the work being completed?
b. Is the work considered an emergency?
c. Are passengers stuck on the lift?
d. What is the time of day?

2. What is required to complete the work?

a. Do you need tools?
b. Will there be more than one person climbing the structure?
c. What is the level of experience of the climbers?
d. Will the lift be operating while you are climbing the tower?

3. What are the environmental conditions at the time?

a. Is it raining or snowing?
b. Are there high winds in the area?
c. Is there lightning in the area?
d. Is the ladder structure covered in ice or snow?
e. Are there any other conditions present that may make the climb more difficult?

4. Is it an emergency?

a. Are you rescuing a fallen worker?
b. Is the lift stopped? For how long?
c. Are there environmental conditions that are contributing to the emergency?

A written fall protection plan should be completed whenever a worker will be required to work at a height of 25 ft. or greater. In addition, areas may choose to create a standard plan for all lift towers and structures that includes requirements for free climbing.

The fall protection plan must be adhered to at all times and by all staff that climb as a part of their duties. Changes to the plan should only be made by a qualified supervisor or manager.

Any area staff that will be required to climb or otherwise work at heights greater than 10 ft. (3 m) should receive training to do so safely. Workers permitted to free climb should receive additional training and should be authorized by area and department supervisors or managers.

Under no circumstances should an untrained worker be permitted to free climb any permanent structure (e.g., lift towers). Workers climbing structures or otherwise working at heights greater than 10 ft. (3 m) should be familiar with area rescue equipment and procedures.

They should bring appropriate equipment to the area where they are working to facilitate any rescue required.

Free climbing should not be permitted without an approved full body harness. Free climbing includes the movement from the ground to the area in which work will take place. Once in the position of work, workers will secure themselves using the appropriate fall protection equipment.

1.2.4 Free Climbing Pre-Assessment

Once the decision to free climb a tower or structure has been made, workers should consider the following:

1. **Personal physical and mental condition:**
   a. Are you physically and mentally fit and able to climb the structure without distractions? If not, don't climb!
   b. Do you have any injuries or illnesses, or are you on any medications that may cause dizziness or blurred vision? Do you have any other condition that could affect your ability to climb the structure safely?
   c. What is the condition of your co-workers?
2. **Need or reason for climbing:**
   a. How urgent is the need to climb the structure?
   b. Is this a routine task?
   c. Is this a mechanical or electrical problem?
   d. How long will the job take?
   e. Is this an emergency or an evacuation?

3. Physical conditions of the structure being climbed:

a. Have you physically inspected everything prior to and while climbing the structure?

b. Is there ice, rime, snow build-up on the lift, tower, ladder or the tower head?

c. What is the condition of the structure bolts, supports, machinery etc.?

d. What is the position of the haul rope?

e. Are there high winds in the area?

4. Necessary equipment:

a. Full body harness

b. Lanyard, complete with shock absorber

c. Anchor strap

d. Self-retracting lifeline or vertical lifeline with rope grab for any additional workers that may need to follow you

e. Protective clothing

f. Appropriate footwear (ski boots are not permitted unless equipped with Vibram® soles)

g. Radio

1.2.5 Working Alone or In Isolation

Each ski area should have a procedure that identifies hazards associated with working alone or in isolation and provides measures for reducing any associated risks.

These hazards should be identified in the fall protection plan and workers should be completely familiar with them and the connection between working alone and free climbing.

Whenever possible a second person should be available to assist the worker who is free climbing. This may be any other staff member, such as a patroller, who is able to render quick assistance in the event that the worker falls.

1.2.6 Lockout Procedure

Whenever practical, lifts and other equipment should be locked out while any component of the machinery is being free climbed. Equipment may be restarted once the worker has reached the working destination and has secured him/herself with the appropriate fall protection equipment.

1.2.7 Conclusion

The Occupational Health and Safety Regulation is quite specific about the employer's responsibility and requirement to protect workers while at heights. The CWSAA is equally concerned with the safety and health of ski area workers and has created these guidelines to assist ski areas in this regard.

Ski area operators and lift maintenance managers and supervisors have a responsibility to ensure that workers do not endanger themselves, their co-workers, or the areas' guests. In order to accomplish this when working at heights, workers must take every reasonable precaution and avoid the free climbing of any structure as much as possible. Free climbing should only be completed when it is the only practical way to complete a job. Workers must keep in mind that the proper use of fall protection will not, normally, negatively affect their ability to complete their job. Falling from a height, however, especially when attempting to rescue an injured person or evacuate a lift, will typically have a negative impact on the rescue operation.

Whenever a structure must be climbed without the benefit of fall protection equipment, a fall protection plan should be developed by a qualified person, reviewed by all staff participating in the task, and kept readily available at the work site.

1.3 Specifications for Fall Protection Systems

The information contained in this guideline has been provided to assist ski areas and lift maintenance staff in understanding the various fall protection systems and their components. These are defined throughout various regulations and legislation, including those systems and conditions that are likely to be present at any given ski area.

1.3.1 Guardrail Systems

These are often the simplest and most effective measures to protect a worker from a potential fall hazard. Installation of a guardrail will allow a worker to work freely without the potentially cumbersome presence of other equipment (fall protection) into the work area.

In order for a guardrail to meet the requirements provided in the Occupational Health and Safety Regulation (WorkSafeBC) it must include

1. a top rail that is approximately 42 in. above the floor level;
2. an intermediate rail at mid-point between the top rail and the toe board;
3. a toe board;
4. vertical supports that are spaced approximately every 8 ft.; and
5. the ability to withstand a force of 200 lb., applied in any direction.

1.3.2 Fall Restraint Systems

A fall restraint system is one that will not allow a worker to fall from the height being worked at because it prevents the worker from reaching the fall hazard. For example, for a person working on a roof, a fall restraint system would be established to prevent the worker from reaching the edge, therefore preventing any potential fall.

A fall restraint system usually consists of the following equipment:

1. A safety harness. Although the Occupational Health and Safety Regulation allows the use of waist belts for fall restraint, the CWSAA recommends that only full body fall arrest harnesses be used for all applications.
2. Rope grab device.
3. Lifeline (may be vertical or horizontal).
4. Anchor for the lifeline.

The following regulations (provided by WorkSafeBC) pertain to the use of a fall restraint system:

1. Temporary anchors used for a vertical lifeline, or for a lanyard used without a lifeline, must have a minimum breaking strength of 800 lb.
2. Lifelines must have a minimum breaking strength of 5000 lb.
3. Lifelines must be protected against abrasion.
4. Lifelines are to be attached to anchors using a figure eight knot, or eye splices together with a carabiner.
5. Safety harnesses must meet the requirements of the CSA, ANSI, or other standard that is acceptable to WorkSafeBC.
6. Manufactured anchors must have an ultimate load capacity of 5000 lb.
7. If the anchor is permanent, it must be certified in writing by a professional engineer.
8. Workers that are required to work within 6.5 ft. of a leading edge must be provided with and use fall protection.

9. A flagged line warning barrier placed at 6.5 ft. from an edge may be used to protect an unprotected worker from entering a fall hazard area.
10. Workers working outside of the warning line must use fall protection.

1.3.3 Fall Arrest Systems

A fall arrest system is one that protects the falling worker by stopping the fall before the worker reaches the surface below. The most common example of a fall arrest system for the ski industry is a full body harness that is connected to a secure anchor with a lanyard and a shock absorber. Safety nets are also considered to be fall arrest systems.

As a part of a fall arrest system workers wear a full body harness that is connected to an approved anchor point, using a lanyard that has a shock absorber at some point along its length. The following equipment used as a part of a fall arrest system must meet the requirements indicated:

1. Connectors

a. are drop-forged, pressed, or forged steel, or made of an equivalent material;
b. have a corrosion-resistant finish;
c. have a smooth surface that prevents damage to interfacing parts of the system;
d. have a minimum breaking strength of 2268 kg or 5000 lb. tensile strength;
e. must meet requirements of CSA, ANSI, or another acceptable standard.

2. D-Rings, Snaphooks, Carabiners

a. have a 2268 kg or 5000 lb. tensile strength;
b. are to be of the “double locking” type only;
c. must be inspected prior to each use;
d. are not to be connected to one another (snaphooks);

e. are approved by the CSA, ANSO, or another acceptable standard;

f. must be compatible when connected to one another.

3. Vertical lifelines

a. must have a minimum breaking strength of at least 5000 lb. in order to facilitate the reduction in strength of a lifeline when it is attached to the anchor by a rope;

b. must not have any knots or splices except at the ends;

c. must be protected as required to prevent chafing or abrasion caused by contact with sharp or rough edges;

d. must be of wire rope construction whenever a hazard that could result in damage by burning or welding is present, except when used near electrical conductors;

e. must be used with a shock absorber if constructed with wire rope;

f. must extend to within 4 ft. of a safe lower surface, except when used on a sloped roof;

g. cannot exceed 300 ft. in length without prior authorization from WorkSafeBC;

h. must be individually secured to an independent anchor when used for fall arrest;

i. must be attached to one worker only, unless it has been specifically designed and approved for multiple workers;

j. must be installed and used in a manner that will minimize swing hazard;

k. must not have its strength reduced by a splice or knot at the end of the lifeline.

4. Full Body Harnesses

a. must be inspected prior to *each* use;

b. must have hardware that is drop-forged, pressed, or formed steel, or made of materials of equivalent strength;

c. must have hardware that has a corrosion-resistant finish and smooth surfaces and edges to prevent damage to the attached body harness or lanyard;

d. must have webbing made of synthetic fibers;

e. must be used for worker protection;

f. must be approved by the CSA, ANSO, or other acceptable standard.

5. Lanyards

a. must meet the requirements of CSA Standard Z259.1-1995 or other standards acceptable to WorkSafeBC;

b. must be rigged, if not equipped, with a shock absorber that will allow a free fall of no more than 1.2 m (4 ft.) and will prevent contact with a lower level;

c. must be rigged to prevent swing falls;

d. are to be inspected prior to each use;

e. must be protected against potential cuts or abrasions;

f. must be constructed of wire rope if tools that could sever, abrade, or burn a lanyard or safety strap are being used;

g. must be used with a shock absorber when a lanyard or lifeline is constructed of wire rope.

6. Shock Absorbers

a. must limit the impact force of a 310-lb. worker taking a 6-ft. fall, to 900 lb.;

b. have a maximum allowable elongation of 48 in.;

c. must not deploy before 450 lb.;

d. must be able to hold 5000 lb. when fully deployed;

e. must be inspected prior to each use;

f. must be retired after arresting a fall;

g. must be approved by the CSA, ANSO or another recognized standard.

7. Self-Retracting Lifelines

a. must be anchored above the worker and in a manner that prevents swing fall hazard;

b. must be equipped with impact indicators;

c. must be re-certified once per year, regardless of use;

d. must be approved by the CSA, ANSI, or another recognized standard.

1.3.4 Control Zones and Safety Monitoring Systems

Control zones and safety monitoring systems are the final acceptable method of fall protection that may be used by ski area workers at heights and under the conditions provided below. The use of a control zone will normally be restricted to work on areas such as roofs.

The use of a control zone is *not* permitted under the following conditions:

1. The work surface has a slope in excess of 4 vertical ft. to 12 horizontal ft.
2. On a skeletal structure
3. When installing or removing scaffolding

When using a control zone system of fall protection, the following safe work practices are to be followed:

1. The width of the control zone must be a minimum of 6.5 ft.
2. Additional distances must be added to the control zone if:
   a. the working surface is slippery or sloped;
   b. the work is carried out at an elevation relative to the unguarded edge;
   c. the risk of the work is increased by the use of equipment near the control zone.
3. Fall protection does not have to be used if the workers remain further from the unguarded edge than the width of the control zone. If a worker must be within 6.5 ft. of the control zone, a raised line must be established.
4. A raised line marking the zone must be composed of highly visible material, or a line that is flagged with visible material every 6.5 ft.
5. The raised line must be between 34 and 45 in. above the working surface.

When permitted by regulation, a safety monitor system may be used as a means of fall protection for workers that are working within the control zone. The role of the safety monitor is to ensure that any work being performed within the control zone is done so in accordance with the fall protection plan

and in a manner that minimizes the risk of the worker's falling. The Safety Monitor must

1. be experienced with the work being carried out.
2. be present at all times when a worker is within the control zone.
3. have complete authority over the work as it relates to fall protection and the prevention of falls.
4. not engage in any other duties while acting as the safety monitor.
5. be positioned in a location that allows for a clear view of the work being carried out and for normal voice communications with those workers carrying it out.
6. be instantly distinguishable from other workers.

Only those workers directly required for the work at hand may be inside a control zone. A safety monitor may supervise a maximum of 8 workers at a time.

The fall protection plan for the work being completed must contain a list of the safety monitors' names and a record of their training to fulfill this role.

1.3.5 Stairs

Every flight of stairs that has 4 or more risers must be equipped with handrails according to the following specifications:

1. On all open sides
2. On one side of enclosed stairways 44 in. or less wide
3. On both sides of enclosed stairways over 44 in. long

1.3.6 Ladders

Ladders used by ski areas staff should meet applicable CSA, ANSI or other acceptable standard provided in the Occupational Health and Safety Regulation and the Ski Area Safety Program. The following guidelines should be observed by workers before, during, and after a ladder is used as a part of their duties:

1. Always inspect a ladder prior to use and at the end of the work. Replace any ladder with broken or missing steps or rungs, bent or split side rails, or any other crack or deformity. Such ladders should be tagged and removed from service immediately.
2. Never work from the top two rungs of a single or extension ladder or from the top two steps of a stepladder.
3. Do not use metal or wire-reinforced ladders close to energized power lines or other electrical equipment.
4. Always place a ladder on a stable base. Portable ladders must have non-slip feet.
5. Ensure that a ladder used in an access route such as a doorway is protected from being bumped or knocked over. If this is not possible, the ladder must be secured at the top and bottom.
6. Always face a ladder when climbing up or down.
7. Always climb the ladder with the free use of both hands. Hoist materials and tools up using a rope and only after you have achieved a comfortable working position.
8. Secure ladders before use. For single and extension ladders set the feet away from the supporting object by at least 25% of the working height: 4 ft. vertical to every 1 ft. horizontal. If the incline must be less, the ladder must be secured at its top and bottom.
9. Ladders used for ascending or descending from one level to another must extend at least 3 ft. above the upper level.
10. Never paint a wooden ladder. Paint may hide cracks, breaks, and other defects.
11. Whenever necessary, brace a ladder.
12. Never use the upper half of an extension ladder as a single ladder.
13. Only one worker at a time may use a single-width ladder.

2.0 MOBILE EQUIPMENT

2.1 Guidelines for Mobile Equipment

The aim of the Canada West Ski Areas Association *Guidelines for Mobile Equipment* is to contribute toward the health and safety of staff who use mobile equipment as well as that of staff and guests in the area who may be exposed to risk by the equipment.

This guideline provides ski areas with a framework for establishing a mobile equipment program that

- identifies hazards and risks associated with equipment;
- provides training for operating staff; and
- ensures that only well maintained equipment is used.

This mobile equipment program should address all types of equipment used and give operators authorization from ski area management to use the equipment. Procedures should provide for documented training and annual review of programs and training. The secondary purpose to the mobile equipment program should be to prolong the life span of equipment.

As the size of a ski area's mobile equipment fleet grows, so does the amount of risk surrounding its use, especially in areas occupied by the public. Operators must be aware of their surroundings and must be able to anticipate the actions and movements of staff and guests in the area.

One of the critical components of the mobile equipment procedure is the ability to determine whether or not the equipment needs to be used. Wherever possible, use of equipment during the area's operating hours should be

avoided. When this is not possible or practical, public access should be restricted and warning systems put in place.

Mobile equipment procedures should be created with the input of equipment operators, maintenance staff, and management. Anyone within these three identified areas must be ready and willing to stop operating a machine and remove it from service as soon as a safety concern is recognized and until the condition is corrected.

An effective mobile equipment program includes the following elements:

1. Hazard Identification
2. Training
3. Documentation
4. Pre-Operational Equipment Checks
5. Equipment Operating Procedures
6. Post-Operational Checks
7. Equipment Maintenance

2.1.1 Hazard Identification

The introduction of any piece of equipment or machinery into an area also introduces a significant hazard that must be identified. Appropriate assessments must be done and measures taken to reduce the risk of injury or incident to staff and guests as a result of the equipment. Whenever possible, equipment use should be avoided during the area's operational hours and when the public may be exposed to the hazard.

Guests will always have the right of way. Staff must be aware of the people working around them and the limitations of the machine that they are using.

Area operators should conduct hazard, risk, and vulnerability assessments for the equipment that they operate and for areas where equipment is used.

2.1.2 Training

The second component to the mobile equipment procedure is training. In order to ensure the overall effectiveness and integrity of an area's mobile equipment program, no person should be permitted to operate any piece of equipment that is owned, leased, rented, or borrowed by the ski area unless that person has been trained by an authorized trainer.

Training should include all aspects pertaining to the safe operation of the equipment in the conditions present at the time of training and those potentially present at other times. The authorized trainer must be completely comfortable with the trainee's ability to operate the equipment before authorization to operate is granted.

In order to simplify the training process, the CWSAA recommends that only staff members with a valid provincial driver's license be trained to operate area equipment, even if it will only be operated on private property.

Individual ski areas may choose to include the following in their mobile equipment training procedures given the similarities in how the equipment functions, how it is operated and maintained, and the potential for injuries that could result through misuse:

1. Chainsaws, pruners and string trimmers
2. Lawnmowers

3. Snowblowers
4. Salters
5. Other gasoline/fuel-powered equipment

In order to reduce any possible confusion between trainers, it is recommended that ski areas appoint a minimum number of equipment trainers for their particular area and that a training guideline and checklist be created for the area.

Refer to Appendix B-2-2-17 of this guideline for a suggested training guideline.

2.1.3 Documentation

An area's mobile equipment program is only effective to the extent that it is documented. Therefore, no person should be permitted to operate a piece of equipment or other tool listed in the ski area's procedures until proper documentation has been completed by both the trainer and the trainee.

In order to receive authorization to operate any mobile equipment, it is recommended that the following be completed:

1. An equipment training checklist specific to the piece of equipment being trained for, signed by both trainer and trainee
2. A signed statement of understanding that indicates the trainee has read the ski area's instructions pertaining to the equipment, understands them, and agrees to abide by them at all times
3. An employee training record, updated after each training session, for each additional tool or piece of equipment, including refresher training
4. A photocopy of the operator's valid provincial driver's license

Refer to Appendix B-2-3 of this guideline for samples of these documents.

2.1.4 Pre-Operational Equipment Checks

Each operator should be responsible to ensure that the equipment they operate is safe to do so under all conditions, present and potentially present, before every shift. Operators must record pre-operational vehicle checks on ski area-provided checklists and indicate any findings or concerns that may introduce a safety hazard if not corrected. Equipment that is not safe should not be permitted to be operated.

Pre-operational equipment checks are not intended to be exhaustive but should direct the operator to check the following:

1. Equipment fluids such as oils, antifreeze, hydraulics, brake fluids, etc.
2. Fuel levels
3. Equipment safety systems including guards and warning systems
4. Tire pressures and track tensions.
5. Condition of vehicle frame, body, glass, etc.
6. Any other components critical to the safe operation of the equipment.

Pre-operational checklists should be regularly inspected and signed by ski area vehicle mechanics and managers responsible for equipment maintenance.

Refer to Section B Appendix 2.3 of this guideline for a sample pre-operational equipment checklist.

2.1.5 Equipment Operating Procedures

Specific operating procedures will vary from machine to machine and will also be different for each ski area and the different locations within an area. Operators should be provided with all of the information that they will need to safely operate the piece of equipment under all possible conditions. This

information should include procedures specific to the piece of equipment and operating instructions for the area in which it is being used (e.g., parking instructions, speed limits, etc.)

Equipment training should include, but is not limited to, the following:

1. Fuel and oil types, locations, procedures for use, and Material Safety Data Sheets (MSDS) instructions
2. Machine starting procedures
3. Vehicle routes and right of ways
4. Area speed limits
5. Parking procedures and locations
6. Passengers
7. Load carrying and security
8. Safety equipment, warning systems and safety procedures specific to the piece of equipment

The ability to operate a piece of equipment carries with it certain responsibilities, and operators must not take these lightly.

Once trained, the operator must agree to abide by the area's policies and procedures and must understand the limitations of the machine they are using.

Safe operation of equipment and strict adherence to equipment procedures may be a condition of employment and will certainly affect a person's ability to operate equipment in the future.

2.1.6 Post-Operation Procedures

Post-operation procedures typically include general housekeeping and cleanliness tasks designed to preserve equipment and leave machinery in an acceptable condition for future operators. At the end of each shift operators should be encouraged to clean the vehicle, and remove any tools, equipment, or garbage accumulated throughout the day.

Vehicle fuel tanks should be topped up at the end of the day, and any mechanical or safety concerns that may have arisen through the day should be recorded for maintenance staff.

2.1.7 Equipment Maintenance

Possibly the most important line of communication pertaining to mobile equipment is between operators and vehicle maintenance staff. In order to ensure the continued safe operation of equipment, mechanics must be made aware of any unscheduled maintenance requirements as soon as possible.

Maintenance requirements should be documented in the pre-operational checkbook for the vehicle and mechanics should sign off maintenance as it occurs.

Vehicle maintenance staff is responsible for informing operators of the mechanical status of the equipment that they use and for making arrangements for regular scheduled maintenance. In the event that a machine becomes unsafe or is otherwise inoperable, every measure, including area lockout procedures, must be taken to prevent the equipment from being inadvertently operated. To ensure this, the following should take place:

1. Remove keys from the equipment.
2. Place a "do not operate" tag for the equipment in a conspicuous position (on the steering wheel/sticks or ignition of the equipment).
3. Write a note for the specific equipment on the operator/mechanic communication board.
4. Write a "do not operate" note in the pre-operational checkbook for the specific machine or piece of equipment.

Vehicle mechanics should document all maintenance (scheduled and unscheduled) using the specific documentation resources available at the area.

2.2 Trainers' Instructions

The following are suggested topics that should be included in a ski area's mobile equipment procedures training. These instructions should be used along with the training checklist provided, and each item should be checked off by the trainer once it is covered and only if it is understood by the trainee.

Using the checklist

1. indicate the type of equipment for which training is being given (e.g., snowmobile, pickup truck, golf cart, chainsaw, etc.);
2. ensure that the trainee signs the statement of understanding once the training is complete;
3. give the trainee a copy of the area procedure for the piece of equipment; and
4. attach a photocopy of the worker's provincial driver's license to these documents before providing authorization to operate equipment.

2.2.1 Pre-Operational Equipment Checks

1. Go through the equipment checks for the specific piece of equipment, pointing out each check, demonstrating, and allowing the trainee to complete the check.

2. Complete pre-operational checks at the beginning of each shift.
3. Note mechanical and/or safety concerns and bring them to the immediate attention of the on-duty mechanic.

Pre-operational inspection checklists must be reviewed by mechanics and area management.

2.2.2 Safety Procedures

1. Include anything specific to the equipment.
2. Include overall policies for operating near the public such as the following:
   a. using spotters
   b. warning systems such as lights, sirens and flags
   c. safety procedures for operating in adverse conditions such as ice, slush, snow, etc.
3. Discuss procedures in the event of an accident or mechanical failure.
4. Discuss procedures for approaching other working equipment.

All equipment operators must have a working two-way radio.

2.2.3 Machine Fuelling

1. Show locations of fuel pumps and explain machine fuel type.
2. Demonstrate normal and emergency fuel pump shut off procedures.
3. Explain Material Safety Data Sheets (MSDS) and show location of fuel spill kits and instructions.
4. Point out emergency eyewash station.
5. Provide fuel/oil ratios if applicable (chainsaws, etc.)

2.2.4 Machine Oils

1. Show the location of oil storage facilities and specific machine oils. Explain which oil to use for the various components:
   a. engine oil
   b. transmission oil
   c. gear oil
   d. hydrostatic oil
   e. hydraulic oil
   f. anti-freeze
   g. brake fluid
2. Show the location of oil checks and fills on the machine.
3. Explain procedures for cleaning up spills on the machine and on the ground.
4. Show the location of MSDS (Materal Safety Data Sheets).

2.2.5 Equipment Starting Procedures

1. Demonstrate methods of starting the specific machine or piece of equipment.
2. Explain use of chokes, if equipped.
3. Explain park starting switches.
4. Demonstrate chain brakes (chainsaw).
5. Explain any other starting procedures applicable to the equipment.

2.2.6 Equipment Operating Procedures

Explain operating procedures in the following areas:

1. Use of implements
2. Procedures for use during area operating hours
3. Procedures during non-operational hours (working alone)
4. Driving and braking in various conditions

5. Approaching people
6. Driving off road
7. Use of 2WD/4WD
8. Procedures for backing up
9. Loss of control and regaining control

2.2.7 Operating Routes and Right of Ways

Explain the following:

1. Transport and snowmobile suggested routes
2. Summer vehicle routes
3. Area speed limits
4. "No drive" areas

2.2.8 Parking

1. Identify designated parking and no parking areas.
2. Explain and demonstrate procedures for parking machines, especially snowmobiles, on the ski hill.
3. Explain parking brakes if applicable.
4. Explain procedures for leaving a machine unattended.

2.2.9 Passengers

1. Explain procedures for staff and guest passengers.
2. Explain procedures for passengers with freight.
3. Explain transporting injured persons.
4. Explain the use of safety equipment (helmets) for passengers.

2.2.10 Load Carrying and Security

Explain the following guidelines:

1. All loads must be secured to prevent slipping or shifting during transport.
2. Whenever possible, loads should be contained within the confines of the vehicle box or bed.
3. Loads should never extend beyond the width of the vehicle.

2.2.11 Post Operation Procedures

Explain procedures concerning the following:

1. Machine (cleanliness)
2. Fuel
3. Windows (closed)
4. Parking
5. Keys

2.2.12 Personal Protective Equipment

Explain the use of the following equipment:

1. Helmets (riders and passengers)
2. Seat belts
3. Door switches
4. Horns, lights, flags, and sirens
5. Chainsaw safety equipment:
    a. chaps
    b. hardhats
    c. hearing protection
    d. eye protection

2.2.13 Other

Explain the following topics:

1. Provincial driver's license
2. Loss of driving/operating privileges
3. Responsibilities

Appendix

2-1 Pre- and Post-Operational Checklist

2-2 Employee Training Record

2-3 Equipment Training Checklist

2-4 Pre-Operational Vehicle Checks Poster

PRE- and POST-OPERATIONAL CHECKLIST

Equipment Type: _____

Operator: _____ **Hour Meter:** _____

PRE-OPERATION

Machine Walk-Around

- ☐ tires: _____
- ☐ track tension: _____
- ☐ lacings & lacing pins: _____
- ☐ grousers & tire guides: _____
- ☐ visible leaks: _____
- ☐ frame & suspension: _____
- ☐ fire extinguisher: _____
- ☐ body damage: _____
- ☐ lights, flags and sirens: _____

Engine

- ☐ engine oil level
  added: _____
- ☐ coolant level
  added: _____
- ☐ transmission level
  added: _____
- ☐ brake fluid
  added: _____
- ☐ hydraulic oil level
  added: _____
- ☐ hydrostatic oil level
  added: _____

POST-OPERATION

- ☐ fill fuel
  added: _____
- ☐ cleanliness: _____

Notes to Mechanics

_____

_____

_____

_____

_____ _____

Mechanic signature Manager signature

Appendix B-2-2-15

CWSAA EMPLOYEE TRAINING RECORD

Employee Name: _____ **Orientation Date:** _____

Hire Date: _____ **Department:** _____

SUBJECT	INITIAL TRAINING		REFRESHER TRAINING	
	Date & Time	Trainer's Initials	Date & Time	Trainer's Initials

Signature: _____

Appendix B-2-2-16

EQUIPMENT TRAINING CHECKLIST

Trainee: _____ **Trainer:** _____

Date: _____

Equipment Type: _____

☐ Pre-Operational Checks: _____

☐ Safety Procedures: _____

☐ Fuel Type (include gas/oil ratio if applicable): _____

☐ Machine Oils & Fluids: _____

☐ Starting Procedures: _____

☐ Operating Procedures: _____

☐ Routes & Right of Way: _____

☐ Speed Limits: _____

☐ Parking: _____

☐ Passengers: _____

☐ Load carrying and security: _____

☐ Use of implements: _____

☐ Post-operational procedures: _____

☐ Safety equipment and warning signals: _____

I have been fully trained in the safe operation of the equipment indicated above. I agree to follow the safe operating procedures for the equipment at all times and understand that failure to do so may result in disciplinary actions. I have read the appropriate procedures and written instructions for the equipment, and I understand that I am not to operate this or any equipment when my ability to do so is impaired.

_____ _____

Trainee Signature Trainer Signature

Appendix B-2-2-17

industry recommended practice

Pre-Operational Vehicle Checks...

What can happen???

Serious injuries resulting from motor vehicle accidents including: lacerations, broken or loss of limbs, musculoskeletal injuries, crush injuries and death!!! As well as potential vehicle and property damage.

Pre-op checks include…

- √ Vehicle fuel, oil & fluid levels.
- √ Lights, horn, signals and safety systems.
- √ Hoses, belts & couplings.
- √ Tires, brakes & suspension systems.
- √ Visual inspection of frame, body & glass.

Only trained and authorized staff are permitted to operate any mobile equipment.

In order to prevent injury & damage, all equipment must be inspected & signed out at the start of each shift.

Pre-Op vehicle checks help alert maintenance staff to minor equipment problems so that major damage can be prevented.

CANADA WEST SKI AREAS ASSOCIATION

For more information on the use of mobile equipment refer to the CWSAA Guideline for Mobile Equipment.

Appendix B-2-2-18

3.0 SNOWMOBILE OPERATION

3.1 SNOWMOBILE OPERATING GUIDELINES

The CWSAA *Snowmobile Operating Guidelines* provides ski areas with a template for creating a snowmobile procedure suitable for their areas. The information contained is intentionally general and relates to snowmobile-riding skills in conditions likely to be encountered at a ski operation. This guideline will help identify and eliminate hazards (where possible) and reduce the level of risk posed to staff and guests due to their exposure to snowmobile use.

Snowmobiles are important tools that, when used diligently, are very effective at making lift maintenance and other jobs quicker and easier. However, snowmobiles, like all mobile equipment, *should only be used when absolutely necessary and should be kept away from public areas as much as possible.* While primarily designed as recreational vehicles, snowmobiles introduce a significant hazard to any ski area's operation. The use of snowmobiles and other mobile equipment at ski areas requires strict compliance to safety procedures in order to avoid potential incidents and injuries.

This guideline provides the trained snowmobile operator with detailed information about the following:

1. General Mountain Procedures
2. Environmental Considerations
3. Snowmobile Accidents and Incidents
4. Snowmobile Operating Requirements
5. Guidelines for Safe Riding
6. Transport of Materials
7. Parking
8. Fuel and Oil
9. Snowmobile Dos and Don'ts
10. Preferred Vehicle Routes
11. Training and Documentation

Appendix

3.1.1 General Mountain Procedures

The following information relates to the general operation of a snowmobile at a ski area, within ski area boundaries, especially during operating hours.

1. **Speed.** The ability to safely control and stop the snowmobile varies with the speed at which it is ridden. In addition, operators must recognize the effect that snowmobiles have on area guests, even when operated at low speeds. *Snowmobiles should only be operated within the speed parameters defined by Management, and at slower speeds when approaching area guests.*

2. **Sirens.** *Consideration should be given to equipping snowmobiles with a working siren that can be used during normal area operating hours.* (We note that some older snowmobiles cannot be properly equipped with sirens.) If equipped, sirens should be activated whenever travelling uphill or against skier/rider traffic and prior to approaching "blind" areas. Sirens should be sounded at all times when a snowmobile is operated during poor visibility conditions.

3. **Flags.** *All snowmobiles should be equipped with a flag when in use during normal area operating hours.* Flags should be at least 6 ft. high, of bright (fluorescent) colour, and have a surface area of no less than 35 sq. in. They should be kept free of snow and ice build-up that may prevent them from staying vertical.

4. **Lights.** Snowmobiles should not be operated at any time (including outside of normal area operating times) unless head, tail, and brake lights are all functioning normally.

5. **Helmets.** *An approved (ASTM, DOT, CSA, Snell Memorial, or equivalent) helmet must be worn at all times by both operator and passenger while the snowmobile is in operation.* Ski/snowboard helmets, unless approved by one of these organizations, are not acceptable for use on snowmobiles.

6. **Communications.** Snowmobile operators should always be in possession of a working two-way radio.

7. **Provincial Driver's License.** The CWSAA recommends that all snowmobile operators be in possession of a valid, unrestricted provincial driver's license. This demonstrates to the ski area that the operator has some

experience with and has been tested to operate mobile equipment in some form.

8. **Preferred Routes.** All ski areas should designate preferred routes to be used by snowmobiles and should make every effort to restrict snowmobile use to these routes whenever possible. Routes chosen should allow the greatest visibility and the least amount of challenge to the safe and normal operation of the snowmobile.

9. **Keys.** In the interest of equipment security, in addition to safety, all snowmobiles should be equipped with a key that must be present in order to start the machine.

3.1.2 Environmental Considerations

In order to safely operate a snowmobile, area staff must be aware of the different requirements presented by changing environmental conditions (weather). Snowmobile operators must be able to adjust quickly to the various conditions presented by the following:

1. **Man-made Snow.** Snowmaking often presents unique conditions for the snowmobile operator. The general rule is to avoid it as much as possible, especially man-made snow closest to the snow gun.

   Generally speaking, man-made snow makes steering, stopping, and starting very difficult as it tends to stick to the snowmobile more than natural snow. Snowmaking also presents hazards due to high voltage power lines and high pressure air and water hoses.

2. **Rain-soaked Snow.** These conditions greatly reduce the operator's ability to accelerate, brake, or steer the machine. Safe travel distances may need to be increased under these conditions and sirens should be activated as conditions require.

3. **Spring Conditions.** Warmer weather often presents the snowmobile operator with some of the greatest challenges. Softer snow often reduces ability to travel uphill and shaded areas may remain firm, meaning that the snowmobile operator must be ready to react quickly to varying conditions. Safe operating distances should be doubled under spring conditions.

4. **Groomed Snow.** Groomed snow presents the best conditions for the snowmobile operator. When travelling off groomed terrain (unpacked snow 12 in. or deeper), a constant forward momentum is critical. Avoid stopping

the snowmobile except on groomed terrain as the chances of becoming stuck are greatly increased. Always accelerate slowly and deliberately. Always avoid using reverse except on flat, hard-packed terrain. *Reversing the snowmobile will almost never release a machine that is stuck and will almost always make the machine more stuck!*

5. **Poor Visibility Conditions.** *Sirens (if equipped), lights, and flags should be present and functioning normally during these types of conditions.* Sirens should be activated at all times when a machine is operated under conditions of poor visibility. The operator should never assume that skiing/riding guests see the machine (whether moving or not) and, therefore, speeds should be greatly reduced.
6. **Icy Conditions.** Icy conditions can present serious hazards to operators and anyone else in the area. The operator's ability to stop quickly may be greatly reduced or eliminated depending on the severity of the ice. Operators may also have difficulty travelling uphill and may need to react quickly to a loss of traction. The best advice under these conditions is to avoid snowmobile use and find alternate transportation.

3.1.3 Snowmobile Accidents and Incidents

Snowmobile use introduces a hazard that presents significant risk of incident and injury to a ski area's staff and guests. For this reason, it is extremely important that every trip on a snowmobile is legitimate and important. All incidents that involve a snowmobile must be reported to area management as soon as they occur.

All snowmobile operators should be in possession of a working two-way radio and should report any snowmobile accident or injury (or other mountain incident) quickly to appropriate personnel. In the event of a serious injury involving a snowmobile, the machine should not be moved (except to facilitate rescue or injury reduction) until directed by rescue personnel and all necessary incident investigation measures have been taken.

3.1.4 Snowmobile Operating Requirements

Prior to operating a snowmobile (or any piece of mobile equipment) *each* operator should complete a pre-operational equipment check. During the pre-operational check, operators should consider the following:

1. Siren (if equipped) — working as required, free of snow with wiring and battery connections secure
2. Flag — in place and highly visible
3. Snowmobile — clear of snow build-up and easily recognizable from a distance
4. Surfaces — inspected for
    a. cracks
    b. dents
    c. holes
    d. missing pieces
    e. rips
    f. other unusual conditions
5. Fuel levels
6. Oil levels
7. Transmission oil and condition
8. Pull cord condition
9. Working head, tail, and brake lights

Deficiencies noted during the pre-operational inspection should be recorded on a pre-operational inspection sheet or by some other means that ensures vehicle mechanics are aware of maintenance required.

If a condition is present that does not allow for the safe operation of the equipment (according to the guidelines provided here, or in the manufacturer's instructions) the snowmobile should not be permitted to be operated.

Prior to starting the snowmobile and in addition to the above routine checks, the following should be addressed:

1. Ensure that the snowmobile is in the desired gear (if equipped).
2. Ensure that the area in the intended direction of travel is clear.
3. Ensure that the accelerator and brake functions move freely.

To start most snowmobiles, ensure that the key is in the "on" position (all snowmobiles used at ski areas should require a key in order to start), pull the kill switch out, and pull the start cord as required until the engine engages. Some snowmobiles are equipped with an electric start, meaning that they key can be turned past the "on" position (like a car) to engage an electric starter. In this case, be sure not to over-crank the starter.

If the snowmobile does not start immediately, pull the choke lever to half or full choke (as required) and try again. Once the machine has started, allow it to warm up for about a minute. *Never leave an idling snowmobile unattended*.

Once the snowmobile has started, the operator should inspect the following:

1. Head, tail and brake lights — ensure they are functioning normally
2. Suspension — ensure it compresses and releases properly
3. Transmission — ensure it engages properly by shifting the snowmobile into reverse (if equipped)
4. Route of travel — confirm that the desired route of travel is clear
5. Helmet — put it on

3.1.5 Guidelines for Safe Riding

The best position for riding a snowmobile is seated with your back slightly arched and feet placed squarely on the machine's running boards. This position will allow the body to absorb most shock better and will provide the operator with the best position for transferring weight through a turn.

To transfer weight through a turn, slide the body on the seat toward the intended direction of travel and release pressure on the opposite foot (e.g., left foot if turning right). Once the turn has been completed, simply shift weight back toward the center of the snowmobile. Under most conditions, it will not be necessary to ride with one knee on the snowmobile seat (this practice tends to reduce the life of the machine's seat).

To shift the snowmobile into reverse (if equipped), the machine must be completely stopped and all load must be taken off the clutch. The same applies when shifting back into forward gear. Newer machines are equipped with an electric transmission switch that prevents damage by shifting gears while under load. *Always check which gear the transmission is in before moving, and ensure a clear direction of travel.*

When rounding a corner, always turn on the siren (if equipped) well before the corner in anticipation of oncoming traffic. When travelling uphill, stay to the outside of the corner until achieving a clear view of traffic around the corner. When travelling downhill, stay to the inside of the corner.

Braking on a snowmobile is no different than on any other vehicle. The worst thing an operator can do is lock up the track as this will adversely affect control of the snowmobile. The best method is to lightly apply and release the

brake. If the track locks up, release the brake. If, while braking, a loud "whining" noise is heard, lightly apply the accelerator. This noise indicates that the machine is in neutral and the engine is no longer helping to slow the snowmobile.

Take advantage of flat terrain for extra braking power. Lighten up on the brake under icy conditions. Braking should be practised under various conditions so that operators become familiar with required stopping distances.

Operators should always try to anticipate the actions of guests and be able to avoid fallen skiers and riders.

Wearing ski boots while riding a snowmobile should be avoided whenever possible. When riding with ski boots the operator tends to get forced back into the sight meaning that the arms are straighter and more strength may be required to steer the machine. Ski boots may become stuck under the snowmobile cowling, and this could increase the risk of operator injury in the event of a roll over.

3.1.6 Transport of Materials

Any materials being transported should fit within the confines of the snowmobile's cargo area, with nothing hanging outside. Materials should not weigh more than the manufacturer's specifications for the machine and persons should not be permitted to sit in the cargo area. Most toboggans are designed for carrying freight and materials only. Under no circumstances should people be transported in this way unless the toboggan has been specifically designed for use with passengers.

Toboggans are useful for carrying items too big or too heavy for the rack. Toboggans should be secured to the snowmobile as designed and backed up with a safety chain. All loads should be secured.

When using a toboggan with a snowmobile, the ability to maneuver will be significantly altered and stopping distances will be increased.

Operators should avoid using reverse gear when towing a toboggan.

3.1.7 Parking

Snowmobiles should always be parked in designated areas away from the public as often as possible. Park the snowmobile facing the direction in which you are most likely to leave, and remove the key from the machine. In high wind conditions, the snowmobile should be parked facing the wind.

Whenever a snowmobile must be parked on a ski run or slope of any kind, it should be parked perpendicular to the hill with the ski tips facing uphill. Never leave the snowmobile idling, and don't leave a machine that is facing up or downhill unattended.

As a matter of courtesy, snowmobiles should be fuelled at the end of a shift prior to parking. Whenever possible, park the machine indoors and remove all snow and ice from its surfaces.

3.1.8 Fuel and Oil

All mobile equipment, including snowmobiles, should be turned off prior to fuelling.

Most snowmobiles currently in use have two-stroke engines that require a gas/oil mixture in order to run. Two-stroke oil should be added each time the snowmobile is fuelled.

Never fill the snowmobile close to overflowing as fuel will spill out and onto the seat, even with the fuel cap tightened securely. The fuelling process is a good time for the operator to conduct a quick visual inspection of the whole machine, looking for any damage that may have occurred over the course of the day's operation.

3.1.9 Snowmobile Dos and Don'ts

The following are general, common sense suggestions that will contribute to the safe use of snowmobiles at any area.

- ✓ Never carry more than one passenger on a snowmobile at one time.
- ✓ Avoid straying off your area's preferred snowmobile routes and packed ski runs unless absolutely necessary to reach your destination.
- ✓ Never leave an unattended snowmobile idling.
- ✓ Approach all objects and blind spots including snow banks, drifts, gullies, snowmaking equipment, and grooming equipment with extreme caution.
- ✓ Snowmobiles should be operated at slow, safe speeds while in public areas. Both skis and the track should remain in contact with the ground at all times.
- ✓ Snowmobiles must be operated with the highest level of care and attention to blind corners, visibility conditions, skiers/riders, other equipment, and snow conditions.
- ✓ Snowmobiles should be operated within the rider's ability and with due consideration to terrain conditions. Snowmobiles are capable of very

high speeds, which make them a hazard to the operator, passenger, and any other people in the area.

- ✓ Snowmobiles should be operated in such a manner as to avoid area guests' "space" as much as possible. Operators should not create conditions that cause discomfort, fear, or panic in skiers or riders due to the snowmobile's presence.
- ✓ Snowmobiles must be mechanically sound and functioning safely before going out on the hill.
- ✓ Snowmobiles should not be parked in hazardous areas (behind corners, below banks, in blind spots, etc.) or where they obstruct skiers, riders, guests, or other vehicles.
- ✓ Operators should always check the condition of the accelerator and the brake prior to running the machine.
- ✓ All snowmobiles should be equipped with a flag and must not be operated unless the head, tail, and brake lights function properly. Consideration should also be given to installing a siren (if possible) to warn skiers of oncoming traffic during difficult or congested conditions.
- ✓ Snowmobile operators should yield the right of way to pedestrians, skiers, riders, and grooming equipment.
- ✓ All cargo carried should fit within the snowmobile's carrying basket or a toboggan.
- ✓ When meeting another snowmobile on the hill, operators are to keep to the right side and meet as they would on a normal roadway.
- ✓ Only trained and authorized persons should be permitted to operate snowmobiles or any other mobile equipment.

3.1.10 Preferred Vehicle Routes

Each area should determine which routes are preferred for snowmobile use and encourage staff to use these routes as much as possible. When choosing snowmobile routes consider the following:

1. Steepness of terrain
2. Visibility for traffic travelling up- and downhill
3. Blind spots
4. Difficulty of skiing terrain and experience level (skiing and riding) of guests most likely to be encountered
5. Ability of snowmobile to move from side to side quickly if necessary
6. All of the above under adverse weather conditions

Preferred vehicle routes should be indicated on a map and reviewed with all snowmobile operators during their initial training, prior to each new season, and as routes change.

3.1.11 Training and Documentation

Only staff trained by a ski area's authorized trainer should be permitted to operate snowmobiles or any other mobile equipment, especially when there is the chance that equipment will be operated near the ski area's guests.

Training should include basic equipment maintenance, machine operating guidelines, and procedures that deal with the activity. Area management should provide new operators with sufficient time to practise skills in a controlled environment.

Area management should appoint a minimum number of authorized trainers and provide guidelines and checklists that ensure all trainers teach to the same level. Training should be evaluated from time to time to ensure consistency.

In order to demonstrate due diligence and to prove that training has actually occurred, all training provided must be documented. Documentation should include the following:

1. Names of trainer and trainee
2. Equipment being trained for
3. Date of training
4. Amount of time spent training
5. Specific points relating to the equipment
6. Points that relate to any regulations and area procedures for the equipment
7. Points directly related to safety
8. General maintenance requirements for the machine
9. A statement of understanding
10. Signatures of trainer and trainee

Appendix

3-15 Worker Statement of Understanding

3-16 IRP Snowmobile Poster

WORKER'S STATEMENT OF UNDERSTANDING

SNOWMOBILE OPERATION

I have read and understand the *Canada West Ski Areas Association Guideline for Snowmobiles.* I have also completed a training session that has covered the operational and safety elements and recommended practices outlined in the guideline. I am aware of the hazards and risks associated with this type of work and of my responsibilities to work safely at all times.

_____	_____
Employee Name	Date
_____	_____
Employee Signature	Trainer's Signature
_____	_____
Supervisor Signature	Manager Signature

Appendix B-3-15

industry recommended practice

Riding a Snowmobile...

What can happen???

Minor and severe injuries including cuts, burns, broken limbs, musculoskeletal injuries and death. Snowmobiles are physically demanding to operate and they may present a serious hazard to those around them. Collisions, rollovers and other serious accidents could happen .

SNOWMOBILES ARE TO BE OPERATED BY TRAINED AND AUTHORIZED PERSONS ONLY!

Before going out a snowmobile must…

- √ Be equipped with a flag & working siren.
- √ Have working head, tale & brake lights.
- √ Be inspected and mechanically sound to operate.
- √ All trips must be for legitimate purposes.
- √ Operators must have a working two-way radio at all times.

Be aware of your surroundings at all times and be prepared to adjust riding conditions for changing weather and snow conditions.

Snowmobile Operators must…

- **Wear an approved helmet at all times (passengers included.)**
- **Observe area speed limits and reduce to dead slow when guests are present.**
- **Yield to skiing/riding and walking staff and guests at all times.**

For more information on operating a snowmobile, refer to the CWSAA Guideline for Snowmobiles.

CANADA WEST SKI AREAS ASSOCIATION

Appendix B-3-16

4.0 WORK CARRIERS
(for passenger ropeways)

4.1 Guidelines for Work Carriers

The CWSAA *Guidelines for Work Carriers* is provided as a guideline for conducting maintenance work using a "work carrier." Work carriers, for the purpose of this guideline, are specially designed platforms attached to the haul rope of a chairlift, thereby allowing access to the various electrical and mechanical components of the lift along the lift line.

This guideline will help in identifying the hazards and risks associated with the use of a work carrier and in establishing the minimum guidelines required to ensure the safety of lift maintenance staff and other people that may be near the lift. Lift maintenance staff conducting line work are exposed to hazards and conditions including, but not limited to, exposure to height, moving equipment, work in isolation, and environmental conditions.

This guideline does not replace experience and practical training given by a qualified and knowledgeable trainer, but forms an important part of this training. It must be available, understood, and adhered to at all times while the work carrier is in use. It outlines measures that should be considered by lift maintenance staff prior to conducting line work and followed while using a work carrier. It is the responsibility of each staff member of every company operating passenger ropeways to ensure the safe operation of the ropeway.

Given the hazards and the potential outcomes should an injury occur, it is important that this guideline is followed in conjunction with other procedures

provided in CAN/CSA-Z98-01 Passenger Ropeways and Conveyors, the Occupational Health and Safety Regulations, and written safety programs available at the ski area that pertain to

1. working at heights;
2. working alone or in isolation; and
3. lockout procedures.

This guideline will provide specific information relating to the use of a work carrier used in ski operations and on passenger ropeways. Conditions for use of other work platforms, such as those used with cranes or man-lifts, is not included.

1. Work Carrier Definitions
2. Operators' Responsibilities
3. Maintenance Crew Responsibilities
4. Maintenance Supervisor and Manager Responsibilities
5. Pre-Operational Safety Briefings
6. Communications
7. Lift Starting Procedures
8. Lift Stopping Procedures
9. Carrier Load Capacities
10. Carrier Speeds
11. Lockout Procedures
12. Fall Response and Rescue Procedures

Appendix

4.1.1 Work Carrier Definitions

Operator	A person trained to operate a ski lift for a maintenance crew. This person reports to the maintenance crew while line work is in progress.
Maintenance Crew	A maintenance team designated by the maintenance foreman to work together to perform various repair and installation tasks on lift equipment.
Work Carrier	A unit of one or more platforms that is attached to the haul rope of a passenger ropeway and that has been designed to transport maintenance staff to conduct line work on a ski lift line.
Line Work	Preventative maintenance or emergency repairs on a passenger ropeway that is best accessed by a work carrier.
Lockout	The use of a lock or locks to render machinery or equipment inoperable or to isolate an energy source for that machinery. Lockout is used to prevent a lift from moving whenever maintenance personnel are in the path of moving parts and lift controls are to be left unmanned, thereby preventing injury to a person or damage to equipment.
Partial Lockout	The use of a control system isolating device.
Complete Lockout	Refer to lockout procedures provided in CAN/CSA-Z98-01 Passenger Ropeways and Conveyors and The Occupational Health and Safety Regulation (attached Annexes B and C to this guideline)
Personal Lock	A lock provided by an employer for the sole use of a worker and is operable only by a key in the worker's possession, and by a key under the control of the supervisor or manager in charge.
Control System Isolating Device	A device that physically prevents activation of a system used for controlling the operation of machinery or equipment.

Secure Lift	A lift with the controls shut down and the lift de-energized. The brakes are applied and monitored directly by an operator to prevent the accidental start-up of the lift.
Power On	A command given to indicate the desire or intention to activate a lift control that will start the lift into motion.
Dead Slow	The slowest speed at which the ski lift will travel.
On Line	A phrase that indicates that maintenance crews are working on the ropeway and in a work carrier.
Fall Arrest Kit	A rescue system designed for the retrieval of a fallen or injured worker.

4.1.2 Operators' Responsibilities

Operators are those who are charged with the task of operating the ski lift for the maintenance crew. *Operators must ensure that*

1. the lift is driven in a safe manner as described by the maintenance crew while staff are on line;
2. no lift is started without **clear, concise, confirmed** and **reconfirmed** instructions from the maintenance crew;
3. all radio communications are **clearly understood** and **confirmed;**
4. they have received adequate instructions from the maintenance crew and that they are confident in operating the lift;
5. they are completely familiar with acceptable carrier speeds, including those for entering and exiting a terminal and travelling from tower to tower;
6. they are always aware of the specific location of the maintenance crew while on line; locations are to be communicated by radio;
7. they are aware of the chair number arriving at the top terminal at the same time as the work carrier arrives at the bottom terminal;

8. they are standing at the lift control panel at all times while the lift is moving with a maintenance crew on line;
9. they know how to properly secure a lift;
10. they know how to properly lock out the lift;
11. they **never** leave the lift controls until a partial lockout is applied;
12. they remain at the lift station at all times unless permission has been given by the maintenance crew and a complete lockout has been applied to the lift; and
13. they have an assigned lockout tag(s) and lock(s).

4.1.3 Maintenance Crew Responsibilities

For the purpose of this guideline, the maintenance crew includes those workers actively doing line work on a ski lift. The maintenance crew will

1. communicate with the maintenance supervisor on progress, location of work, and any safety concerns prior to conducting line work;
2. inspect all personal fall protection equipment and rescue equipment prior to getting on the work carrier;
3. visually inspect the work carrier prior to departing the station;
4. provide any training required for the operator, conduct a pre-operational briefing and ensure that the operator fully understands his/her duties before commencing line work;
5. ensure that the operator is completely familiar with the procedures for locking out the lift;
6. ensure that the operator is completely familiar with maximum lift speeds and the concept of dead slow;
7. verbally **confirm** (alternately the operator may do this) that the work carrier's upper deck is stored in the correct position and that the maintenance crew is in a safe position within the confines of the lower deck prior to the work carrier entering or exiting a station;
8. have priority for communications on a dedicated channel whenever line work is in progress;
9. carry their own personal lockout tags and locks;

10. be completely familiar with those lockout procedures provided in CAN/CSA-Z98-01 Passenger Ropeways and Conveyors and the Occupational Health and Safety Regulations;
11. be completely familiar with area procedures for rescuing a fallen worker;
12. contact the Maintenance Supervisor immediately and line work will be suspended if at any time the maintenance crew is not comfortable with the operator's ability to safely operate the lift.

4.1.4 Maintenance Supervisor and Manager Responsibilities

Prior to the commencement of any line work, the Maintenance Supervisor and/or Manager will

1. ensure that the maintenance crew and operators are provided with adequate safety equipment needed to perform line work;
2. confirm that maintenance crew staff and operators have been trained and are familiar with lockout procedures, fall arrest equipment and retrieval procedures, and work carrier and station maintenance procedures;
3. ensure that records have been updated including training and annual refresher training for maintenance staff before the commencement of line work;
4. be available to communicate as required, at all times, while the maintenance crew is on line;
5. be completely familiar with area fall protection and rescue procedures;
6. meet daily with the maintenance crew to discuss work plans, safety concerns, weather conditions, and any other factors that may change the hazard and level of risk associated with the line work;
7. review these and other applicable procedures with the operator.

4.1.5 Pre-Operational Work and Safety Briefings

Prior to conducting line work, the Maintenance Supervisor or Manager should conduct a pre-operational safety briefing. The entire maintenance crew and all

operators should be attend this meeting. Anyone else working near the lift or who may be affected by the line work may also attend.

Pre-operational safety briefings may include the following topics:

1. Work plan for the day/week
2. Radio frequencies to be used
3. Radio and communications procedures
4. Stops, all clears, dead slows, lockout, etc.
5. Lift speed in stations and from tower to tower
6. Duties and responsibilities
7. Emergency and evacuation plans and procedures
8. Weather considerations
9. Any other topics pertinent to the specific task

Pre-operational safety briefings should be documented by the supervisor or manager and should include the names of all persons in attendance and topics discussed.

4.1.6 Communications

Adequate communication is the single most important aspect of line work. *It is essential to the safety of the maintenance crew, operator,* **and anyone else working in the area.** Line work should not be permitted under conditions that do not allow maintenance crews to communicate with one or more of the following persons or places:

1. Lift drive and return stations (return stations where occupied by an operator)
2. The maintenance supervisor or manager

3. The main mountain dispatch center (where applicable)
4. An on-duty first aid attendant.

In the event that more than one department or group of people is required to share a frequency, maintenance crews are to have priority over the frequency while the lift is running. In the event that communications between the maintenance crew and the operator are interrupted during a lift move, the operator will stop the lift until clear communication is restored.

The only exception to this will be an accident, injury, or emergency situation, in which case the emergency will have priority over the frequency. Specific procedures will be communicated prior to the line work in the pre-operational briefing.

Maintenance crews and operators will possess two working radios at all times during line work. Prior to beginning work, a radio check will be conducted between the maintenance crew and the lift operator. Radio checks should also be conducted throughout the day and after each significant break (e.g., coffee and meal breaks).

Radio communications between the maintenance crew and the operator will be **clear** and **concise.**

The maintenance crew and operator will include the name of the lift with every radio communication (in those areas with more than one lift).

Prior to a move, the maintenance crew will communicate their location and the destination of the move, including the approximate distance of the move.

All pertinent communications, including location, destination, stopping distances, stops, etc. will be confirmed (spoken back) to the maintenance crew by the operator.

In the event of an emergency the maintenance crew or anyone else may communicate a "**stop, stop, stop"** over the radio. This will alert the operator to stop the lift immediately.

4.1.7 Lift Starting Procedures

The following is the recommended procedure for starting or moving a lift for maintenance purposes:

1. The maintenance crew will ask the operator to "prepare for the next move on (lift name)," including their location, the next destination, distance of travel, and carrier speed.
2. The operator will reset the lift emergency brake, leaving the normal stop pressed. He/she will then confirm that the maintenance crew is "ready to move (lift name)", including location, next destination, distance of travel, and carrier speed.
3. The maintenance crew will confirm that they are ready to move and will reply over the radio, "All clear, ready to move on (lift name)."
4. Upon hearing the "all clear," the operator will reset the stop button and signal the other station (if occupied) for the move. The operator will be prepared to stop the lift instantly if a stop command is given.

4.1.8 Lift Stopping Procedures

The following is the recommended procedure for stopping a lift for maintenance purposes:

1. As the maintenance crew approaches their intended destination, they will begin to relay stopping distances to the lift operator. He/she will begin slowing the chair accordingly until a dead slow is reached.

2. Stopping distances may be given in chair lengths, meters, feet, inches, or any other means provided that the measurement has been discussed during the pre-operational briefing and is understood by the maintenance crew and the operator.
3. As the work carrier approaches the desired stopping location, the maintenance crew will maintain an open radio frequency by keying a radio and calling approach distances and then the stop. This will ensure clear communications between those involved with the line work and will prevent others from using the frequency during this critical time.
4. Once directed by the maintenance crew, the operator will stop the lift and confirm the stop.
5. If the maintenance crew is satisfied with the location of the stop, they will direct the operator to secure (lift name).
6. The operator will ensure that the normal and emergency stop buttons are pressed and that all brakes have been applied. The control key will be de-energized. The operator will then confirm with the maintenance crew that (lift name) is secured. After receiving confirmation that the lift is secured, the control power key will be locked out.

The operator should remain within visual distance of the lift controls at all times while the maintenance crew is on line. If the operator must leave the controls for any reason, permission will be obtained from the maintenance crew and a complete lockout will be initiated according to the procedure provided in Appendix B-4-1-15.

4.1.9 Carrier Load Capacities

Work carrier load capacities are not to exceed those provided by the manufacturer of the work chair. Typical load capacities for a work carrier are

1. no more than 2 passengers;
2. no more than 650 lb. of additional cargo (with 2 passengers); and
3. a total maximum weight capacity not to exceed 1150 lb.

4.1.10 Carrier Speeds

The following lift speeds are recommended whenever the work carrier is on the lift line, whether occupied or not:

1. A maximum of 3.0 m per sec. when on line
2. A maximum of 0.5 m per sec. when approaching, travelling through, and leaving a station

4.1.11 Work Carrier Lockout Procedure

Once the maintenance crew has reached its intended stop on line, they will remain clear of all moving parts until a partial or complete lockout has been confirmed. In order to lock out the lift (in conjunction with those detailed procedures provided in Appendix 4-1-14 and 4-1-15) the operator will complete the following:

1. shut off the main fuse disconnect switch and apply the operator's personal lockout tag and lock to the switch;
2. apply the service brake; and
3. place a sign reading "people working on ropeway" at the point of power disconnection.

Once the lift has been locked out, the operator will confirm this with the maintenance crew and work may begin. The lift will not be moved again until requested by the maintenance crew.

In order to prevent damage to the lift and equipment, the lift should be locked out by the maintenance crew at the conclusion of the work day, using the WorkSafeBC procedure attached to this guideline as Appendix B-4-2.

4.1.12 Fall Response and Work Carrier Rescue Procedures

Ensuring the safety of the maintenance crew is the primary focus of this guideline. In addition to those measures provided above, the maintenance crew will wear appropriate fall protection equipment at all times while working in a work carrier in order to prevent injuries through a fall from heights. This equipment should include

1. a full body fall arrest harness;
2. work-positioning lanyards; and
3. a fall arrest lanyard complete with shock absorber.

In order to respond quickly should a worker fall from the work carrier, the maintenance crew should also carry in the work carrier suitable equipment to lift and lower a worker who has fallen and caused his/her shock absorber to deploy.

Each area must develop a fall protection plan that includes response to incidents occurring in a work carrier. This procedure should be available to all maintenance crews, operators, and other staff who may be required to assist in a rescue. Rescue plans should be practised at least once per year, and procedures should be discussed as a part of the pre-operational briefing.

Appendix

4-1-14 Z98 – Canadian Standards Association: Procedures for Work Carriers

4-1-15 Occupational Health and Safety Regulation (BC) De-energization and Lockout

4-1-16 Worker Statement of Understanding

4-1-17 IRP Work Carrier Poster

Z98 – Canadian Standards Association: Procedures for Work Carriers

B1. Radio Communication

Communication between maintenance personnel on the work carrier and maintenance personnel at the ropeway operation station is important. The following rules shall be followed:

Note: Operating station refers to the controls.

(a) Radio communication other than that required between the work carrier and operating station shall cease when the work carrier is being moved.

(b) Persons at the operating station shall, at all times, be able to hear their radios. Operating station personnel shall check the audibility of their radios before moving the work carrier.

(c) Personnel at operating stations shall stay at their designated positions at all times during work carrier operation. If for any reason the operator must leave, a full lockout ropeway procedure shall be activated. The operator shall also inform work carrier personnel that he or she is leaving the operating position.

(d) When there are any suspected or actual disruptions of normal radio communications, the ropeway shall be stopped immediately and remain stopped until fully confirmed communication with the work carrier has been restored. This shall include interference of any transmission, static, or any communication that is inaudible or unclear.

B2.

Before any movement of the ropeway occurs while a work carrier is installed on the haul cable, a request for movement shall first come from the work carrier personnel. The approximate distance of movement will be communicated to operating station personnel; for example, “move to next tower approximately eight carrier spaces.” When communicating, persons shall identify themselves and their location.

B3.

B3.1

Personnel at the operating station shall check with personnel on the work carrier that all workers and equipment are clear of the path of moving machinery before the ropeway is moved. An "all clear" response shall be obtained from the work carrier before moving the ropeway.

B3.2

The ropeway may now be moved by personnel at the operating station, while listening at all times to the radio. The operator shall be prepared to stop the ropeway immediately should an abnormality occur.

B4

The speed of travel for the work carrier shall be established by those riding the carrier and shall be based on the designer's instructions.

(a) Work carrier personnel shall keep the operator informed regarding the work carrier's position relative to the position at which it is to be stopped. The operator shall slow the ropeway to a dead slow well in advance of the intended stop location.

(b) When the work carrier is within 3 m of the stopping position, personnel at the operating station shall be informed.

(c) The last warning before stopping the ropeway shall be transmitted to the operating station 1.5 m prior to the stop.

B5

B5.1

The ropeway shall be stopped immediately upon the "stop" command.

B5.2

Work carrier personnel shall at this time transmit to operating personnel that the ropeway is to be shut down and is not to be started up again until requested by the work carrier personnel. Work carrier personnel shall remain clear of all equipment until the operating personnel have confirmed that the ropeway is shut down.

B5.3

The following shall be performed before the ropeway is considered to be shut down:

(a) For a ropeway powered by electric drive units
  (1) the main fuse disconnect panel shall be shut off and locked off; and
  (2) the service brake shall be applied and remain applied for the duration of the shut-down period.

(b) For a ropeway powered by engines

  (1) the power transmission from the engine to the ropeway drive bull wheel shall be disconnected;
  (2) the service brake shall be applied and remain applied for the duration of the shut-down period; and
  (3) where the drive power cannot be disconnected, the engine shall be shut down.

A sign reading "people working on ropeway" shall be posted at the point of the power disconnection.

B5.4
Having shut down the ropeway, the operating station personnel shall communicate to the work carrier personnel that the ropeway is now shut down and will not move again until requested by work carrier personnel.

B5.5
Operating station personnel shall be ready at all times to respond to work carrier personnel during the shut-down period. Operating personnel shall be responsible for preventing any ropeway start-up by anyone during the shut-down period.

3.27.10 Work and Freight Carriers

3.27.10.1
A work carrier shall be provided for those ropeway types covered by Clause 5 of this Standard. This shall be a separate carrier from those used for transportation of passengers.

Note: A work carrier may also be provided for ropeway classes covered by Clause 6 for this Standard.

3.27.10.2
The designer shall specify in kilograms the maximum allowable combined weight of a work carrier or freight carrier, and the load that may be suspended at any one point on the rope.
Appendix B-4-1-14

3.27.10.3
The maximum load in kilograms that may be carried on a work carrier or freight carrier shall be posted on the carrier and at each station.

3.27.10.4
The maximum line speeds for operation with the work and freight carrier shall be specified by the designer. Any other precautions to be taken when using this device shall be specified. The specified maximum speed shall apply to operation on the line and circulation through the stations.

Appendix B

Occupational Health and Safety Regulation (BC)

De-energization and Lockout

10.2 General requirement

If the unexpected energization or startup of machinery or equipment or the unexpected release of an energy source could cause injury, the energy source must be isolated and effectively controlled.

10.3 When lockout required

(1) If machinery or equipment is shut down for maintenance, no work may be done until

(a) all parts and attachments have been secured against inadvertent movement,

(b) where the work will expose workers to energy sources, the hazard has been effectively controlled, and

(c) the energy isolating devices have been locked out as required by this Part.

(2) If machinery or equipment is in use for normal production work, subsection (1) applies if a work activity creates a risk of injury to workers from the movement of the machinery or equipment, or exposure to an energy source, and the machinery or equipment is not effectively safeguarded to protect the workers from the risk.

10.4 Lockout procedures

(1) When lockout of energy isolating devices is required, the devices must be secured in the safe position using locks in accordance with procedures that are made available to all workers who are required to work on the machinery or equipment.

(2) The employer must ensure that each worker required to lock out has ready access to sufficient personal locks to implement the required lockout procedure.

(3) Combination locks must not be used for lockout.

(4) Each personal lock must be marked or tagged to identify the person applying it (Appendix B-2-3).

(5) Procedures must be implemented for shift or personnel changes, including the orderly transfer of control of locked out energy isolating devices between outgoing and incoming workers.

(6) If the use of a personal lock is not practicable for lockout, another effective means, if approved by the Board, may be used in place of a personal lock to secure an energy isolating device in the safe position.

10.5 Access to energy isolating devices

When an energy isolating device is locked out, the lock must not prevent access to other energy isolating devices supplying machinery or equipment that could cause injury to workers.

10.6 Checking locked out equipment

(1) Effective means of verifying lockout must be provided and used.

(2) Before commencing work, a worker must verify that all energy sources have been effectively locked out.

10.7 Worker responsibilities

Each worker who works on machinery or equipment requiring lockout is responsible for

(a) locking out the energy isolating devices before starting work, except as provided by section 10.9,

(b) removing personal locks on the completion of his or her work, and

(c) maintaining immediate control of the key(s) to personal locks throughout the duration of the work.

10.8 Removal of locks

(1) A personal lock must only be removed by the worker who installed it, or if this is not possible, the matter must be referred to the supervisor or manager in charge, who will be responsible for its removal.

(2) The supervisor or manager in charge must

(a) make every reasonable effort to contact the worker who installed the lock, and

(b) ensure that the machinery or equipment can be operated safely before removing the lock.

(3) A worker must be notified at the start of his or her next shift if the worker's personal lock(s) have been removed since the worker's previous shift.

10.9 Group lockout procedure

(1) If a large number of workers are working on machinery or equipment or a large number of energy isolating devices must be locked out, a group lockout procedure that meets the requirements of subsections (2) to (7) may be used.

(2) In a group lockout procedure 2, qualified workers must be responsible for

(a) independently locking out the energy isolating devices,

(b) securing the keys for the locks used under paragraph (a) with personal locks or other positive sealing devices acceptable to the Board, and

(c) completing, signing and posting a checklist that identifies the machinery or equipment components covered by the lockout.

(3) Before commencing work each worker working on the locked out components must apply a personal lock to the key securing system used in subsection (2)(b).

(4) Workers may lock out a secondary key securing system if 2 qualified workers lock out the primary key securing system and place their keys in the secondary system.

(5) On completion of his or her work, each worker referred to in subsections (3) and (4) must remove his or her personal lock from the key securing system.

(6) When the requirements of subsection (5) have been met and it has been determined that it is safe to end the group lockout, 2 qualified workers must be responsible for removing their personal locks or the positive sealing device(s) from the key securing system or systems containing the keys for the locks used under subsection (2)(a), and once those keys are released, the system is no longer considered to be locked out.

(7) The written group lockout procedure must be conspicuously posted at the place where the system is in use.

WORKER'S STATEMENT OF UNDERSTANDING

WORK CARRIER OPERATIONS

I have read and understand the Canada West Ski Areas Association Guideline for Work Carriers. I have also completed a training session that has covered the operational and safety elements and recommended practices outlined in the guideline. I am aware of the hazards and risks associated with this type of work and of my responsibilities to work safely at all times.

_____	_____
Employee Name	Date
_____	_____
Employee Signature	Trainer's Signature
_____	_____
Supervisor Signature	Manager Signature

Appendix B-4-1-16

industry recommended practice

Using a Work Carrier...

What can happen???

Serious injuries resulting from falls and contact with moving equipment including: lacerations, broken or loss of limbs, decapitation, musculoskeletal injuries, crush injuries and death!!!

Work Carrier Operators...

- √ Must be trained to operate the lift.
- √ Must understand lock-out procedures
- √ Must not leave the control panel while the lift is moving.
- √ Must confirm all actions with the Maintenance Crew
- √ Must be prepared to stop the lift immediately if required.
- √ Know where the maintenance crew is at all times

Maintenance Crews...

- √ Wear fall arrest equipment at all time while on line.
- √ Communicate all intentions with the operator
- √ Ensure that the operator has been trained
- √ Conduct a pre-operational safety briefing.

- √ Maximum lift speeds 3 m/s on line and .5 m/s in station.
- √ Lift must be locked out before work starts.
- √ Crew and Operator must have spare radio and batteries

CANADA WEST SKI AREAS ASSOCIATION

For more information on the use of work carriers refer to the CWSAA Guideline for Work Carriers.

Appendix B-4-1-17

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

SECTION C
STANDARD OPERATING GUIDELINES

May 2007

SECTION C
STANDARD OPERATING PROCEDURES

1.0 Introduction to Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs) are detailed, written instructions, generally prescriptive in nature, that show how a task is to be performed from start to finish. SOPs provide detailed, straightforward instructions for completing a task. An SOP breaks a task down into its simplest form, identifies risks for each part of the task, and provides instructions as to the safest manner to complete that part of the task. SOPs are also an important tool for training.

Standard Operating Procedures (SOPs) may pertain to a specific process or task, such as using a piece of equipment, or they may address a general process that can apply to several tasks like working at heights. SOPs are designed to provide detailed instructions in a directive manner. SOPs tell a person how a job *must* be completed, giving little or no room for deviation. The ultimate goal of the Standard Operating Procedure is to ensure that a task is completed in the same way, *every time* that it is done.

Given the diversity of operations that make up the CWSAA, it would be very difficult to develop a set of SOPs that could apply to each ski area. Although there are many similar tasks that occur at all ski areas, each area brings with it its own unique set of circumstances that would make it unreasonable to expect a standard SOP to suit each area.

SOPs are designed to protect the health and safety of the worker completing a task. For that reason the CWSAA encourages areas to develop SOPs for those tasks and processes that present significant risk to their workers.

1.1 Guidelines for Standard Operating Procedures

Guidelines for Standard Operating Procedures provides area operators with a template that will aid in the creation of an SOP and ensure that SOPs, while specific to a ski area, identify components of a task that are common to all areas. This will facilitate sharing ideas and knowledge between areas, and help our industry to fulfill its duty to protect the safety of our workers.

1. What is a Standard Operating Procedure?
2. Why Write SOPs?
3. Components of the SOP
4. Writing a Standard Operating Procedure
5. Training and Documentation
6. Evaluating the SOP

Appendix

1.1.1 What is a Standard Operating Procedure?

Standard Operating Procedures are written documents that establish procedures for working with or using a machine or piece of equipment, working with a hazardous chemical or material, or completing a specific task or work process.

Standard Operating Procedures provide *written* instructions that *must* be followed by workers when completing the specified task. The identified task is usually broken down into stages and provided in the order in which the task must be completed.

Standard Operating Procedures are written using directive or prescriptive language that describes actions to be completed by workers with verbs such as "will" and "must" rather than subjective verbs like "may" or "should." The SOP is intended to provide a consistent method of completing the task or routine operation by providing detailed descriptions of common procedures.

1.1.2 Why Write a Standard Operating Procedure?

Standard Operating Procedures are compulsory instructions that are written to ensure that a process is carried out correctly, safely, and always in the same manner. They eliminate most guesswork about critical safety decisions, and they incorporate safety measures into each step of the process.

By writing SOPs, the ski area

1. provides staff with the information needed to perform the task safely;
2. ensures (with supervision) that the operation or process is completed in a consistent manner *each* time that it is done;
3. allows a task to be completed within a prescribed time frame;
4. reduces the potential for failure either within the process or through unusual break-down (in the case of a maintenance SOP);
5. ensures that area or governing regulations and/or procedures applicable to the task are recognized and that compliance is achieved;
6. aids in the training of workers that must complete a specific task or process;
7. provides the worker with a checklist that will ensure that each part making up the overall process has been completed;
8. provides a documented explanation of the steps within a process, for use in an incident investigation if required;

9. provides an historical record of how, when and why a process has been completed as well as a record of the number of times the process has changed;
10. provides a checklist for use when auditing a process or a program.

1.1.3 Components of a Standard Operating Procedure

The SOP is a detailed and descriptive document that provides instructions for the completion of a specific task. Formats of the document may differ from industry to industry and from area to area; however, the following components should be included within the SOP:

1. **Date of the SOP.** This may be the date written or the date approved. The document should also include a scheduled date for review.
2. **SOP Number and Revision Number.** All area SOPs should be categorized and stored in a central location. The SOP number will help organize all documents and the revision number tells how many times the SOP has been reviewed or re-written.
3. **SOP Title.** This should be descriptive in nature since the SOP is designed to tell a person how to do something. The title should reflect the task that will be accomplished, for example, "Using a Work Carrier" or "Climbing a Tower."
4. **Purpose of the SOP.** The purpose should expand on the title of the document.
5. **Scope.** This includes the functions that will be performed through the SOP and the limitations of the procedure. The scope identifies the department or area affected by the SOP and those areas where it doesn't apply.
6. **Responsibility.** This defines who is responsible for conducting the work, supervising the workers, and authorizing the SOP. This section provides details regarding any special training requirements for the task and certification requirements of workers, and it defines the intended audience of the SOP.
7. **Procedure.** This is the part of the document that provides the step by step description of the task to be completed, in chronological order. Where applicable, each individual step will have a corresponding safety instruction. Like the title and purpose, the procedure section is also written using direct action phrases and words.

8. **Hazard and Environmental Controls.** This section identifies the overall safety systems and equipment required to protect the worker against injury through exposure to identified hazards and risks.

   While the procedures section gives specific safety instructions for certain parts of the overall task, this identifies general requirements for the whole job. It identifies engineering controls such as lockout procedures and/or PPE requirements such as use of fall protection equipment, hearing protection, or respiratory equipment.

   Environmental controls may identify any requirements to stop work due to weather or provide conditions that must be present in order for the task to be completed.

9. **Unusual and/or Emergency Procedures.** This part includes procedures for and actions to be taken in the event of an injury or an emergency or other unusual event such as a fire, chemical spill, or power outage.

10. **References.** The SOP should be kept as brief as possible while providing enough information to guide the worker to safely accomplish the task. The document need not (and should not) provide excessive background pertaining to the task or any regulations affecting it.

    This section may be used to direct workers towards supporting documents such as the Z-98, Occupational Health and Safety Regulation, or other area procedures.

1.1.4 Writing a Standard Operating Procedure

Standard Operating Procedures can be complex documents that need to address a variety of components of a specific task and the knowledge and abilities of the person doing the job. The SOP must address the various steps required to complete an operation, but it must also acknowledge the nature of the task, ability of the audience to complete the task, and the worker's ability to follow instructions and to understand the risks associated with all aspects of the job. In order to accomplish this, the SOP should be kept as short and simple as possible while identifying all of the critical components of the action for which it is written.

SOPs should not be written by one person. The writer should seek input from a variety of sources including technical experts, workers expected to use the SOP, supervisors and managers of the task, and any other work group that may be affected by the work. The following tips are provided to assist area operators in developing SOPs for their operations:

1. Consider all hazards associated with the task or process, including environmental hazards.
2. Consider lessons learned from similar tasks or past experiences with the same task.
3. Write the SOP as the smallest set of instructions possible.
4. Use action verbs and direct statements to describe tasks and components of the task.
5. Write the procedure so that it communicates with the people doing the job.
6. Ensure that they are written in a manner that does not encourage deviation. Use simple, direct statements. SOPs *must* be followed.
7. Ensure the SOP is available at the place where the work is being done. SOPs are created to ensure that tasks are completed correctly and always in the same manner.
8. Use the SOP as a training tool. SOPs are not substitutes for experience or training.
9. Modify, update, or add to an SOP as required due to reflect changes in operation, equipment, processes, etc.

1.1.5 Using Training & Documentation to Ensure Effectiveness

In order to ensure the effectiveness of the Standard Operating Procedure and to confirm that all staff affected by it understand its contents, it should be used as much as a training document as a task checklist. SOPs are very effective training tools due to the manner in which they break down a task into its simplest steps. Using the SOP in this way will also encourage input to their creation and revision amongst user groups.

SOPs are intended to provide a consistent manner in which workers complete a process. They do not replace experience, training or supervision. Writers of SOPs, must consider which parts of a specific task need to be written and which can be left to training.

Training is not complete until it has been documented. Whenever a Standard Operating Procedure has been introduced, it is important that the training provided with it is documented and that all staff acknowledge, preferably in writing, understanding of the content of the SOP.

1.1.6 Evaluating Standard Operating Procedures

Standard Operating Procedures should be evaluated informally each time that they are used and formally on a schedule determined by the ski area. It is recommended that evaluation occur at least annually. When evaluating the SOP consider the following questions:

1. Are all steps within the SOP in order? Should any new steps be added?
2. Are safety considerations detailed enough to adequately protect the worker and are they provided at logical steps within the SOP?
3. Has the SOP, and the steps within it, adequately identified the hazards and risks associated with the task or process?
4. Is the SOP still practical, appropriate, and easy to use and understand?

Once evaluated, and when the revisions have been approved, a revision date must be added to the SOP.

Appendix

C-1 Standard Operating Procedure (1)

C-2 Standard Operating Procedure (2)

SOP No:	Date:	Revision:
Title:		

Name of Resort: _____

Purpose: _____

_____

_____

Scope: _____

_____

_____

Responsibility: _____

_____

_____

Procedure: _____

_____

_____

_____

Hazard and Environmental Controls: _____

_____

_____

_____

Emergency Procedures: _____

_____

_____

_____

References: _____

_____

_____

Written By:	Authorized By:
Next Revision Due:	

Appendix C-1

CANADA WEST SKI AREAS ASSOCIATION

Name of Resort

Standard Operating Procedure

Title of SOP

SOP No: _____ **Date:** _____

Purpose: _____

_____

_____

_____

_____

Scope: _____

_____

_____

_____

_____

Responsibility: _____

_____

_____

_____

_____

Hazard Controls: _____

_____

_____

_____

Environmental Controls: _____

_____

_____

_____

_____

Emergency Procedures: _____

_____

_____

_____

_____

Appendix C-2

Operating Procedure:

Process Steps:	Safety Measure:

Reference(s):

_____
_____
_____

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

SECTION D
STAFF TRAINING

May 2007

SECTION D
STAFF TRAINING

1.0 Guidelines for Staff Training

Guidelines for Staff Training is written for department managers, authorized trainers, and persons seeking training. It provides basic instructions needed to ensure that all training provided to lift maintenance staff and representatives (as defined in Bill C-45) is authorized, conducted by a qualified person or agency, and well documented to ensure meeting standards of due diligence. Any training provided not meeting the requirements of this guideline should not be considered legitimate or authorized and, therefore, should not have occurred.

All training provided should benefit staff and guests, and in some way contribute toward the safe operation of facilities and equipment overall. All training conducted for area staff and representatives should be done considering specific operational requirements, environmental conditions, and potential impacts of a particular situation at a ski area.

This guideline contains the following information:

1. Due Diligence
2. Types of Training
3. Legislated Training Requirements
4. Authorized Training
5. Authorized Trainers
6. Delivery of Training
7. Documentation of Training

Appendix

1.1 Due Diligence

Changes in provincial legislation and criminal law in respect to the health and safety of an organization's employees and guests have contributed significantly to the requirement for a ski area to integrate the concept of "due diligence" into all parts of its planning, training, and day-to-day operations.

A key step in the move towards due diligence involves the training of workers. In order to protect an organization's workers, representatives, and guests from any potential hazards associated with an operation, training must be provided. It must be pertinent to the task being completed, the equipment being used, and the environment in which it is used.

Due diligence is a standard of care in which an employer (and its representatives) takes every reasonable precaution to ensure the safety and well being of those that could be exposed to, or otherwise be affected by, the consequences of certain actions or inactions.

In order for an area to protect itself in this regard, training should identify specific hazards, risks, and potential outcomes resulting from the use, or misuse, of a particular piece of equipment or machinery, or by following a specific practice.

Training should be documented to prove due diligence. Documentation demonstrates that training has actually occurred and that performance requirements have been achieved.

1.2 Types of Training

Given the complex organization of staff in the ski industry and the many different roles and services provided, it is extremely difficult to list all the specific courses and training sessions required for operating a safe and profitable business. That said, training can be divided into four (4) general categories:

1. Orientation training
2. Certificate training
3. On-the-job training
4. Refresher training

1.2.1 Orientation Training

This typically consists of an introduction to a general operation, process, or topic. Orientation training introduces a person to a policy, procedure, or practice and directs that person toward further training. For example, employees will be introduced to the fall protection program or the violence prevention program during their initial safety orientation, but they will not receive detailed training in the program during this session. The result of an orientation is the expectation that the staff member has a general knowledge and familiarity with a broad procedure, process, or area of operation and the components within that operation. Orientation training is often required before a person begins a job for the first time. The purpose of this training is to achieve the following:

1. Reduce Start-up Costs.

This allows new staff to become familiar with the job and the employer's requirements more quickly, thereby reducing costs associated with learning the job.

2. Reduce Anxiety.

The anxiety of learning a new job can be a great barrier to a new worker's ability to pick up the job quickly. Proper orientation helps to eliminate the "unknowns" of the job and provides all of the necessary guidelines that eliminate the need for guessing.

3. Reduce Employee Turnover.

Orientation demonstrates that the organization values the employee and helps to provide the necessary tools and guidelines to complete a task safely and properly.

4. Save Time for Supervisors.

A good orientation will reduce the amount of on the job training required later.

5. Develop Realistic Job Expectations and Satisfaction.

The orientation will reflect the goals and values of the organization and will ensure that workers fully understand what is expected of them in their new job.

1.2.2 Certificate Training

Certificate training is provided by an agency or individual considered to be an expert in a specific field. This may include training held at the ski area or off site at a training institute.

Certificate training may be presented by a qualified area staff member provided that this person is accredited by an authorized agency (e.g., WHMIS) to provide training. At the end of the training, candidates receive a certificate (that may be transferable as their employment changes) from an accredited agency that is not typically the ski area itself.

Some examples of certificate training include

1. Trades apprenticeships
2. Propane cylinder filling
3. Occupational first aid
4. WHMIS
5. Other courses provided at a college or university

1.2.3 On-the-job training (OJT)

This includes any training provided by an authorized trainer (usually an experienced or qualified area staff member) to a staff member or representative. OJT usually provides the candidate with a specific skill or measurable new knowledge that pertains to the individual's specific job, for example, operating a snowmobile, using a food processor, or using a fire extinguisher.

As mentioned, OJT may take many different forms and may be provided in many different ways during a person's employment. It may be scheduled or not and may be provided by a supervisor or another person with knowledge and experience in a particular area. It does not usually provide the trained candidate with any sort of certification recognized outside of the ski area or the industry.

OJT, as with other training, must be documented in order to provide the trained candidate with the authority to complete a process or use a piece of machinery or equipment.

In the case of OJT, department managers and supervisors must be familiar with the content of training as well as with the knowledge and skills of the person

providing the training. All on-the-job training should be authorized by the department manager.

1.2.4 Refresher training

This is a review of any previously provided orientation, certification, or on-the-job training. Refresher training will normally occur at scheduled intervals (e.g., annually, seasonally) and, as with other types of training, will always be provided by an authorized person. The date of refresher training will be indicated on the staff member's record of training, beside the entry of the original training session.

1.3 Legislated Training Requirements

In British Columbia, employers are bound by the *Workers Compensation Act* and the Occupational Health and Safety Regulation to provide training that ensures the health and safety of workers.

Specifically, Section 115(2)(f) states that the employer must "provide to the employer's workers the information, instruction, training and supervision necessary to ensure the health and safety of those workers in carrying out their work and to ensure the health and safety of other workers at the workplace."

In addition to WorkSafeBC, there may be other agencies with authority to require specific training in respect to components of the ski industry (e.g., BC Safety Authority, CSA/Z98, environmental agencies, local bylaws). It is up to the individual area to be familiar and compliant with any such training requirements.

1.4 Authorized Training

In the interest of "due diligence" and in order to ensure the continued effectiveness of training and the accountability of both trainers and trained staff, all training conducted on or off site for area staff and/or representatives, including on-the-job training, should be authorized. Authorization for training may come from one of the following:

1. Department managers
2. Human resources manager
3. Safety manager
4. General manager

The purpose of a training authorization policy is to ensure that

1. training is required to facilitate an operation and any specific components within it.
2. training is required to ensure the safety of staff, representatives, and/or guests.
3. training addresses any potential emergencies or other situations that could arise at an area.
4. training meets a legitimate regulatory requirement.
5. trainers are qualified to provide the training.
6. the best possible training is provided for the most reasonable price.

Training requirements for staff require frequent review in order to meet the growing and ever-changing demands of our business and our staff. In addition, new processes and equipment are introduced to an operation, all of which require orientation and, potentially, changes to the manner in which things are done. To this end, staff should be encouraged to continue to strive toward company, department, and self improvement and to continue to make training suggestions to their department managers.

1.5 Authorized Trainers

This section pertains mainly to internal trainers who provide scheduled and on-the-job training (e.g., mobile equipment trainers, customer service trainers, WHMIS instructors). When contracting training from an external provider, the manager responsible for the affected staff should ensure that the agency/person contracted has the necessary skills and qualifications to provide the service.

Most area operators employ a number of highly trained and skilled workers with a variety of specialties. Whenever possible, the experience of these people should be used to facilitate learning amongst newer staff or those staff moving between departments and ski areas.

It is extremely important to maintain the control and integrity of all on-the-job training by ensuring that only those people designated to train others in specific processes and areas are authorized to do so. The authority to train should be granted by department managers, the safety manager and/or the human resources manager. A list of authorized trainers, complete with types of training, should be produced at regular intervals and as the individual ski area's operations demand. For example, only those persons specifically listed should be authorized to train other staff in the use of specific items of mobile equipment such as snowmobiles, transporters, or forklifts.

1.6 Delivery of Training

In order to ensure effectiveness of training and to obtain the highest level of knowledge retention, training should be delivered with consideration to the following:

1. Prior to the commencement of training, candidates should be given performance criteria that outlines what is expected of them at the end of the session, for example, "At the end of this course you will be able to achieve 8/10 on a written exam or perform a certain task with minimal error or within a specific time period."
2. Training contents should be divided into information that the candidate
   a. must know;
   b. should know; and
   c. could know.
3. All training sessions should have a timetable with a checklist that corresponds to the information on the timetable. At the end of the course the candidate should sign the checklist , indicating understanding of the information, or, in the case of particularly important information, the candidate may initial each element listed on the checklist.
4. Any scenarios provided during a training session should consider actual operational concerns at the specific area, identifying actual and potential hazards, risks, and the impact of an undesirable event.
5. Candidates should be provided with some sort of test or performance measure at the conclusion of the training session.

The safety of trainers, candidates, and other staff and/or guests in the area should be of prime concern at all times during the training session. The following are some considerations concerning candidate training:

1. Safety guards and devices should be identified, used, and their importance explained as a part of the training.
2. Any specific safety procedure or measure (e.g., manufacturer's suggestions, WorkSafeBC regulation, area procedure.), if applicable, should be mentioned as a part of the training.
3. Training conducted at heights (as defined by WorkSafeBC) and that contains a risk of falling will be done so with candidates protected
   a. by a minimum of two fall protection devices (e.g., work positioning lanyard and fall arrest lanyard and/or a separate belay device);
   b. by use of mandatory helmets where the risk of falling objects or swing fall hazard is present;
   c. by ensuring that all applicable regulations, procedures, and industry best practices are adhered to at all times;

   d. by providing training at a location that provides suitable realism while reducing the level of risk to which the trainee is exposed; and
   e. by following specific regulations and industry best practices that pertain to work at heights.

4. Training conducted using gasoline-powered pruning/trimming equipment, including chainsaws, should be provided while ensuring candidate's safety in the following ways:
   a. trainers and trainees wear appropriate, approved eye and hearing protection;
   b. trainers and trainee's wear appropriate hand, leg, and arm protection; and
   c. trainers and trainees follow regulations and industry best practices that pertain to the specific piece of equipment.
5. Training involving mobile equipment should be conducted
   a. with candidates and instructors using all safety equipment that is a part of the equipment (e.g., seat belts) and that are required in addition to the equipment (e.g., helmets);
   b. while observing regulations, procedures, and industry best practices that pertain to the specific piece of equipment being trained for;
   c. at speeds that are safe considering environmental conditions at the time; and
   d. in an area that minimizes any risk to other staff or guests who may be put at risk by the presence of the equipment in the area.

1.7 Documentation of Training

All training conducted at an area for staff and representatives should be documented on an area-specific employee training form. This form should be maintained on the employee's personal record for the duration of his/her employment, and copies may be kept in other areas (e.g., safety department files) as deemed necessary.

Documentation of training will include the specific type of training, date and time of training, and the instructor's initials.

Training that has not been documented will be considered not to have happened.

No person should be permitted to use a piece of equipment or operate a machine without appropriate training and authority to do so. The entry on the employee training form will serve as this authorization.

Appendix

D-1-8 Employee Training Record

D-1-9 Equipment Training Checklist

D-1-10 OHS Training Checklist

CANADA WEST SKI AREAS ASSOCIATION

CWSAA EMPLOYEE TRAINING RECORD

Employee Name: _____ **Orientation Date:** _____

Hire Date: _____ **Department:** _____

SUBJECT	INITIAL TRAINING		REFRESHER TRAINING	
	Date & Time	Trainer's Initials	Date & Time	Trainer's Initials

Signature: _____

Appendix D-1-8

EQUIPMENT TRAINING CHECKLIST

Trainee: _____ **Date:** _____

Trainer: _____

Equipment Type: _____

☐ Pre-Operational Checks: _____

☐ Safety Procedures: _____

☐ Fuel Type (include gas/oil ratio if applicable): _____

☐ Machine Oils & Fluids: _____

☐ Starting Procedures: _____

☐ Operating Procedures: _____

☐ Routes & Right of Way: _____

☐ Speed Limits: _____

☐ Parking: _____

☐ Passengers: _____

☐ Load carrying and security: _____

☐ Use of implements: _____

☐ Post-operational procedures: _____

☐ Safety equipment and warning signals: _____

I have been fully trained in the safe operation of the equipment indicated above. I agree to follow the safe operating procedures for the equipment at all times and understand that failure to do so may result in disciplinary actions. I have read the appropriate procedures and written instructions for the equipment, and I understand that I am not to operate this or any equipment when my ability to do so is impaired.

_____ _____

Trainee Signature Trainer Signature

OHS TRAINING CHECKLIST

WorkSafeBC has requirements in the *Workers Compensation Act* (WCA) and the Occupational Health and Safety Regulation (OHSR). Some training requirements are for very specialized activities while others are for all workers. Use this checklist as a guide. For example, if your workplace has trained workers in emergency evacuations you check YES. If your work site has been evaluated, there are no ergonomic issues, and the workers do not require training, check Not Applicable. Regulation numbers are provided for reference.

Item	YES Workers Are Being Trained	NO Training Occurring	Not Applicable At This Site	Comments
All Workers In All Types Of Operations Require Training For:				
Hazards of the workplace and the job (WCA 115)			Mandatory	
Emergency procedures and personnel (WCA 4.16)			Mandatory	
General duties of workers (WCA 116)			Mandatory	
Worker's right to refuse unsafe work (OHSR 3.12)			Mandatory	
Joint Occupation Health & Safety Committee Training for Members			Mandatory For Committees	
A list of the employer's general safety rules			Mandatory	
A list of safe work procedures that is applicable to the worker (use this check list as a guide)			Varies by Site	
The location of first aid facilities			Mandatory	
Who the first aid attendant(s) is			Mandatory	
Names of the members of the safety committee			Mandatory	
Ergonomics (OHSR 4.51)				
Violence and Workplace Conduct (OHSR 4.30)				
Working Alone (OHSR 4.22)				
First Aid- Must have an attendant trained as outlined OHSR 33.39			Mandatory	
Controlled Products- WHMIS (OHSR 5.6, 5.7)				

Item	YES Workers Are Being Trained	NO Training Occurring	Not Applicable At This Site	Comments
Some Workplaces That Have Higher Risk Because of Their Functions Will Require Training For:				
Use of emergency eyewash/shower (OHSR 5.94)				
Training in appropriate emergency procedures (OHSR 5.102)				
Exposure to asbestos (OHSR Sec. 6.11)				
Exposure control plan (biohazardous materials) (OHSR 6.38)				
Handling of cytotoxic drugs (OHSR 6.50)				
Exposure to lead (OHSR 6.66)				
Noise, (OHSR 7.9 7.10)				
Excessive levels of vibration to reduce the risk (OHSR 7.31)				
Hazards and safe use of ionizing or non-ionizing radiation equipment (OHSR 7.37)				
Recognition of signs/symptoms of heat related disorders, assessment, education training (OHSR 7.62)				
Use, limitations and maintenance duties of PPE (OHSR 8.7)				
Confined space, hazards and precautions (OHSR 9.8)				
Confined space rescue (OHSR 9.38)				
Fall protection system and procedures (OHSR 11.4)				
Cranes/Hoists Operator Qualifications 14.34				
Tire servicing (OHSR 16.47(2))				
Traffic Control (OHSR 18.6)				
Mobile equipment operation (OHSR 16.4)				
Proximity to Powerlines (OHSR 19.27)				

Item	YES Workers Are Being Trained	NO Training Occurring	Not Applicable At This Site	Comments
High Hazard Operations With Specialized Operations Will Require Training For:				
Blasting operations general requirement (OHSR 21.7)				
Blasting emergency procedures (OHSR 21.28)				
Underground working, emergency procedures (OHSR 22.47)				
Gassy underground workings (OHSR 22.148)				
Driver training, Mobile Equipment (OHSR 23.22)				
Coordination of multi employer workplaces (OHSR 23.4)				
Oil and gas (OHSR 23.5)				
Fishing operations general instruction (OHSR 24.73)				
Forestry operations, general, training (OHSR 26.3)				
Falling and bucking, faller qualifications (OHSR 26.21, 26.22)				
Aircraft operations (OHSR 29.3(b))				
Aircraft operations restricted practices (OHSR 29.4)				
Firefighting (OHSR 31.4)				
Evacuation and rescue (OHSR 32.2)				

BEST PRACTICES MANUAL:

A GUIDE TO INDUSTRY-RECOMMENDED PRACTICES

SECTION E
SAFETY MEETINGS

May 2007

SECTION E
SAFETY MEETINGS

1.0 Introduction

It is the responsibility of ski area management and supervisors to provide a safe work environment for their staff and to identify any hazards that could result in injury or incident. It is the responsibility of supervisors to inform their staff of these hazards and to explain the measures needed or taken to prevent injury.

The aim of this guideline is to provide ski area management and supervisors with a template and format for conducting pre-job safety meetings.
The purpose of the pre-job safety meeting (also referred to as *tailgate* or *toolbox* meetings) is to effectively communicate operational requirements and safety matters. The safety meeting is a quick and effective means of ensuring that all staff completing a task, or who may be otherwise exposed to a hazard, are aware of the hazard and that the appropriate pre-cautions have been taken.

Pre-job safety meetings, once documented, are valuable tools that allow the ski area to prove "due diligence" in the event that an accident or injury should occur. (Due diligence simply means that the employer and its representatives have taken all reasonable precautions to prevent an incident or injury from occurring).

This guideline provides information that relates to the following components of the pre-job safety meeting:

1. Why have safety meetings
2. When to hold safety meetings

3. What to talk about at safety meetings
4. How to conduct a safety meeting
5. Meeting documentation

Appendix

1.1 Why Have Safety Meetings?

The most important reason to conduct any type of meeting is to facilitate communication between area managers, supervisors, and workers. Effective communication ensures that everyone is aware of the job and is working toward the same goal. It also ensures that all concerns are addressed and that people understand their roles and those of their co-workers in accomplishing the task.

Pre-job safety meetings may be conducted on their own; however, for best results, the meeting should be part of a more general meeting relating to the task as a whole. The desired result of the safety meeting will be to

1. provide an overview of the job and its components.
2. identify any hazards within the job that may put the workers and those near the job at risk.
3. provide information about the controls put in place to reduce risks and how these controls work.
4. introduce any required personal protective equipment (PPE) and ensure that workers understand how, when, and where to use it.
5. ensure that workers understand all of the policies and procedures that pertain to the job and to ensure that compliance with regulations is achieved.
6. allow the sharing of ideas and experience from all persons involved with the task.

1.2 When to Hold a Safety Meeting

Safety meetings should be held whenever workers may be exposed to a hazard that puts them at risk of injury, whether that hazard is presented through their work, the conditions that they must work in, or the activities of other workers around them. The frequency of meetings will vary between each ski area and each department within an area; however, the following should be considered:

1. Weekly safety meetings should be held at the beginning of each week. This allows discussion related to the week's projects and the safety considerations of projects as a whole. Weekly meetings allow workers to prepare for what is to come and help eliminate unwelcome surprises.
2. Daily safety meetings will ensure that all staff are aware of the day's events. It will allow for adjustments based on weather and other factors that may not be controlled. These meetings give workers the opportunity to gather necessary equipment at the beginning of the day and they help everyone on the crew understand the day's tasks.
3. Safety meetings should be held as jobs and situations change. This may include changes in process as a result of an incident, weather, or priorities.
4. Safety meetings should be held whenever a new piece of equipment is introduced. Workers should never be permitted to operate a piece of equipment until they have been trained to do so. Meetings will allow management and supervisors to train people as a group rather than individually.
5. Safety meetings should be held after an accident, incident, or injury has occurred. This allows changes in process or attitude to be made as a group. These meetings allow discussion that is helpful in reducing speculation and may facilitate consensus on how to do the job more safely in the future.
6. Safety meetings should be held whenever a concern is raised about a job process or piece of equipment. Workers need to know that their concerns are important for the overall safety of the team.

Safety meetings may be held on their own or as a part of a more general departmental meeting held to discuss things such as upcoming events, special projects, changing seasons, and priorities. Regardless of the reason for holding the general meeting, time should always be provided for discussion specifically

related to safety. Communication between all persons involved with a task or working near it will contribute greatly to the safety of the whole ski area environment.

1.3 What to Talk About

Individual ski areas and their departments will have their own topics based on the conditions of their environment, the projects undertaken, and the level of experience of staff, among other things.

Safety meetings should be held to talk about work practices, machinery, tools, equipment, materials, and attitudes, for example. They should also be held to discuss incidents and injuries that have occurred locally or at other ski areas in order to take measures to prevent a similar injury at their area.

Safety meeting topics should be pertinent to the job and the local setting. Supervisors and managers should use this opportunity to discuss trends or other topics that have been noticed, such as housekeeping if spills aren't being cleaned up, for example.

Safety meetings should address upcoming tasks, the identified hazards associated with the task, and the level of risk to which workers will be exposed. They should also identify control measures put in place to reduce risks and how to use any required personal protective equipment (PPE).

Include information about topics such as reacting and responding to incidents, evacuation information, and location of safety equipment such as fire fighting equipment.

Refer to the Appendixes to this guideline for suggested safety meeting topics.

1.4 How to Conduct the Meeting

Pre-job safety meetings should be conducted at the beginning of a shift or after a break in a relaxed setting.

The meeting should be conducted by a supervisor, manager, lead hand, or other knowledgeable person. The person conducting the meeting should research the topic prior to the meeting and ensure that all information is accurate. Consider using

1. manufacturers' instructions and operations manuals when discussing equipment and machinery.
2. Material Safety Data Sheets (MSDS) when discussing a toxic substance.
3. area injury statistics and incident investigations (ensuring the privacy of any individuals named).
4. area-written instructions.
5. examples from other ski areas and other industries.

Meeting topics should not be too broad and should be pertinent to the ski area and the task being undertaken. Refer to Annex A of this guideline for suggested pre-job safety meeting outlines and templates.

1.5 Meeting Documentation

All pre-job safety meetings, regardless of length, topics, or attendance must be documented in the interest of due diligence and to ensure understanding by all in attendance. Documentation may include simple notes taken in a personal notebook; however, documentation must exist.

Meeting documentation may include the following:

1. Date
2. Name of person holding the meeting
3. Job title or purpose for the meeting
4. Names of persons in attendance
5. List of identified job hazards
6. List of controls and personal protective equipment
7. Communication instructions
8. Emergency response procedures
9. Worker comments and any other discussion

At the very least, the pre-job safety meeting documentation should include the name of the department holding the meeting, the subject of the meeting, date and time of the meeting and the names (with signatures if possible) of those in attendance.

Refer to the Appendixes to this guideline for sample meeting documentation templates.

Appendix

E-1-9 Meeting Attendance Sheet

E-1-10 Pre-Job Safety Meeting Outline (1)

E-1-11 Pre-Job Safety Meeting Outline (2)

E-1-12 Pre-Job Safety Briefing

MEETING ATTENDANCE SHEET

Department: _____

Date/time: _____

Supervisor/Manager: _____

Meeting topic: _____

Name	Signature	Date

Appendix E-1-9

CANADA WEST SKI AREAS ASSOCIATION

PRE-JOB SAFETY MEETING OUTLINE

Department: _____
Date: _____
Supervisor: _____
Topic: _____

KEY POINTS	DETAILS
INTRODUCTION	• Introduce the topic for the meeting and explain why it is important.
BODY	
What needs to be done?	• Describe the overall project or safety procedure, e.g., “Line work on the Red Chair” or “Lockout procedure for new machine”
Why must it be done?	• Explain the reason for completing the task, e.g., routine maintenance or to avoid injury, etc.
Who will do what jobs?	• Describe duties and responsibilities of each person completing the task or, in general cases, “who will lock out.”
Where will the job take place?	• Include environmental and other considerations based on the job location.
How will the job be completed?	• Provide a step-by-step explanation of the job process, e.g., line work: 1. scope of the task. 2. equipment requirements. 3. attaching the work carrier. 4. driving the lift. 5. communications details. 6. emergency procedures. 7. lift speeds, stopping, etc. 8. anything else
CONCLUSION	• Stress the importance of the job and of the meeting. • Ask for questions and ask questions. • Identify any consequences for non-compliance.

Provide any procedures required to do the job, e.g., procedures for work carriers, fall protection, etc.

CANADA WEST SKI AREAS ASSOCIATION

PRE-JOB SAFETY MEETING OUTLINE

Department: _____
Date: _____
Supervisor: _____
Topic: _____

KEY POINTS	DETAILS
Regulation	• Identify any regulations, policies, or procedures relating to the topic, e.g., fall protection.
Reason for Concern	• Increase in fall-related injuries, new job with greater risk of falling, death at another location, etc.
Who was injured?	• Identify jobs and occupations, e.g., maintenance workers, operators. Note names.
Type of injury?	• Describe injury, e.g., fall from height of 2 ft.– returned to work; fall from 20 ft.– serious injuries with time loss.
Examples of injuries?	• Draw on personal experience(s) of group, e.g., Have any of you suffered an injury due to falling from height?
Show and tell	• Explain and demonstrate types of fall protection equipment.
Enforcement	• Review company policies. WorkSafeBC regulations. BC Safety Authority. CSA-Z98 codes
Questions	• Ask for questions from the group. If none, ask the group questions to ensure understanding.
Conclusion	• Reinforce the topic and the importance of the information provided.

Workers in Attendance:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

PRE-JOB SAFETY BRIEFING

Department: _____ **Job:** _____

Job Duration: _____ **Supervisor/foreman:** _____

In Attendance (include description of individual roles if applicable):

1	6
2	7
3	8
4	9
5	10

Identified Job Hazards:

1
2
3
4
5

Controls and Personal Protective Equipment:

Communications:

Appendix E-1-12

Injury/Emergency Response Procedures:

Crew Questions and Comments:

Supervisor's Signature: _____

Manager's Signature: _____