

Part 2 Hazard Assessment, Elimination and Control

Includes revisions made in April 2004, indicated by a vertical line in the margin.

Notes

Highlights

- Section 7 requires employers to assess a work site and identify existing or potential hazards before work begins. Employers must prepare a report that provides the results of the assessment and specifies the methods that will be used to control or eliminate the hazards. (Section 8 of the *OHS Regulation* requires that the report be in writing and available to workers.)
- Section 8 requires employers, if reasonably practicable, to involve workers in assessing, controlling and eliminating potential hazards.
- Section 9 requires employers to eliminate hazards whenever it is reasonably practicable to do so. If elimination is not reasonably practicable, hazards must be controlled
 - first by using engineering controls
 - then administrative controls, and
 - and finally, as a last option, by using personal protective equipment.
- Section 11 requires an employer to prepare an occupational health and safety plan if ordered to do so by a Director. A Director is a staff member of Alberta Human Resources and Employment, appointed by the Minister under Section 5 of the *OHS Act*.

Requirements

Section 7 Hazard assessment

Subsection 7(1) Identifying existing or potential hazards

When assessing an employer for compliance with this subsection, an officer will ask the following question:

Have existing or potential work site hazards been identified?

Text deleted

The *OHS Act* identifies a “work site” as any location where a worker is, or is likely to be working. As such, hazard assessment must take into account the hazards of the work being done and the hazards present in the surroundings where the work is being done.

For more information:

- See *Thoroughness of assessment*, shown below, for additional comments.
- See *Size and scope of assessment*, shown below, for additional comments.
- See the detailed *Overview* to this Part for general information about hazard assessment, elimination and control.

Subsection 7(2) Written assessment

When assessing an employer for compliance with this subsection, an officer will ask the following questions:

- (1) *Has a report been prepared that includes*
 - (a) *the results of the hazard assessment?*
 - (b) *the methods used to control or eliminate the hazards identified?*

- (2) *As required by section 8 of the OHS Regulation, is the assessment in writing and available to workers at the work site affected by it?*

The employer must be able to produce a written hazard assessment that applies to the work site or work activities being reviewed. The assessment report must indicate the methods used to control or eliminate the hazards identified. The employer must be able to show how workers get access to the written assessment.

For more information:

- See *Thoroughness of assessment*, shown below, for additional comments.
- See *Size and scope of assessment*, shown below, for additional comments.
- See the detailed *Overview* to this Part for general information about hazard assessment, elimination and control.

Completeness of assessment

An employer must be able to demonstrate that all hazards have been considered/identified including the following types:

- | | |
|----------------------|---------------------|
| ▪ Noise | ▪ Toxic substances |
| ▪ Explosives | ▪ Pressure |
| ▪ Mechanical | ▪ Acceleration |
| ▪ Electrical contact | ▪ Flammability/fire |
| ▪ Manual lifting | ▪ Chemical reaction |
| ▪ Biological | ▪ Radiation |
| ▪ Heat/temperature | ▪ Vibration |
| ▪ Other | |

An employer must be able to demonstrate that the assessment/evaluation of the identified hazards has considered such things as:

- contributing factors
- consequences, should the hazard occur
- who would be exposed
- what might cause/trigger it
- etc.

Size and scope of assessment

The hazard assessment need only include those hazards that apply, or are reasonably likely to apply, to the employer's operations. If confined space entry is never done, or respiratory protective equipment is never required because respiratory hazards are not present at the work site, then neither of these hazards is required as part of the employer's hazard assessment.

The size and scope of the written hazard assessment will vary based on the complexity of the employer's operations and the extent to which those operations present hazards to workers. The assessment may only be several pages long, or may take up several three-ring binders. While an assessment written on the back of a napkin is unacceptable, a single-page assessment may be acceptable if it identifies all the existing or potential hazards at the employer's work site, and describes how the hazards will be eliminated or controlled.

One hazard assessment for multiple work sites

A unique hazard assessment need not be performed for each work site. If an employer faces the same hazards at multiple work sites, and the safe work practices to be followed are identical at each work site, then a single hazard assessment applicable to all the work sites is acceptable.

The employer must ensure that the new work site presents no unusual circumstances that differ significantly from those encountered at other work sites. Doing so, perhaps through a walkabout and visual inspection, ensures that the results of the hazard assessment are valid for the new work site. If unexpected differences are discovered, then the employer is required to perform a hazard assessment that takes these new findings into consideration.

Subsection 7(3) Date of hazard assessment

The hazard assessment report must be dated. The date provides an indication of how current the assessment is.

Subsection 7(4) Assessment intervals

In the case of an employer whose operations change very little over time, the findings of the initial hazard assessment may not change for an extended period of time. After the initial assessment, further assessments are required:

- (a) *At reasonably practicable intervals to prevent the development of unsafe and unhealthy working conditions.*

Hazard assessments should be performed periodically, even when nothing has changed. This ensures that workers are following correct procedures and that equipment is in proper working condition e.g. tools, equipment, and workers performing repetitive work may eventually begin to show signs of wear. An assessment should be done at intervals that anticipate problems before the safety and health of workers is affected.

- (b) *When a new work process is introduced.*

A new work process may involve the use of new or different materials, chemicals, equipment, etc. with which workers are unfamiliar.

- (c) *When a work process or operation changes.*

The introduction of a new process, operation or piece of equipment might make a previous hazard assessment meaningless. As an example, changing the dimensions or composition of feedstock into a processing machine might significantly affect the safety of workers.

- (d) *Before the construction of a new work site.*

Assessing hazards in this case tries to anticipate potential problems and prevent those problems from being built into the new work site. It is far less expensive to eliminate problems at the design stage than to modify the work site later to eliminate or control a hazard.

Once new controls are implemented, the job or work should be reviewed to make sure that the hazard(s) has been reduced to acceptable levels. This is a check to make sure that the controls work as they should and that the controls do not create one or more new hazards.

Section 8 Worker participation

Subsection 8(1) Worker involvement

When assessing an employer for compliance with this section, an officer will ask the following question:

Have affected workers been involved in performing the hazard assessment and in the elimination and control of the identified hazards?

The employer should be able to indicate which workers were meaningfully involved and to what extent. Workers should be able to confirm their meaningful involvement in the assessment and control activities.

The purpose of this requirement is to involve those persons most knowledgeable about the work or processes being assessed, and who will be most affected by whatever actions are taken as a result of the assessment. Directly affected workers often have more insight into a job or task than persons who only observe the completed work.

Involving workers can

- (a) increase the number of persons available to perform assessments, spreading out the work into manageable pieces,
- (b) teach them how to recognize hazards, increasing the likelihood that the hazards will be quickly corrected, and
- (c) increase their awareness of, and involvement in, health and safety issues at the work site.

To be successful, workers must know ahead of time what is expected of them. They should be given the training they will need to do the job effectively.

Subsection 8(2) Informing workers

Workers affected by the hazards identified in the hazard assessment report need to know about those hazards and the methods that will be used to control or eliminate the hazards. They are the persons with the greatest potential to be affected by the hazards and they need to know if corrective measures will require them to do something.

The findings and recommendations of the hazard assessment report can be communicated to workers by any effective method. This may include discussion of the results at safety meetings, posting completed checklists, and posting any resulting maintenance requests.

To determine if the results of the hazard assessment have been communicated to those workers affected by its findings, an officer may approach workers and ask them whether they are aware of an assessment having been performed and how its results have affected their work, and work in general at the work site. The employer may be asked to describe how workers were informed of the findings and recommendations of the hazard assessment report, including when and by what means.

Section 9 Hazard elimination and control

Subsection 9(1) Eliminate or control

Whenever possible, hazards should be eliminated or controlled at their source – as close to where the problem is created as possible – using engineering solutions. If this is not possible, controls should be placed between the source and workers. The closer a control is to the source of the hazard, the better. If this is not possible, hazards must be controlled at the level of the worker.

Administrative controls and personal protective equipment control hazards at the level of the worker. These control methods reduce the likelihood of the hazard injuring the worker and lessen the potential seriousness or severity of the injury – they do not eliminate the risk posed by a hazard. A combination of several hazard control approaches may be necessary in some situations (see Figure 2.1).

Whatever control method is used, it should attack the source of the hazard, not its outward signs e.g. the noise, vibration, fumes, exhaust, etc. that it produces. It is better to replace, redesign, isolate or quiet a noisy machine for example, than it is to provide workers with hearing protection.

When assessing an employer for compliance with this subsection, an officer will ask the following questions:

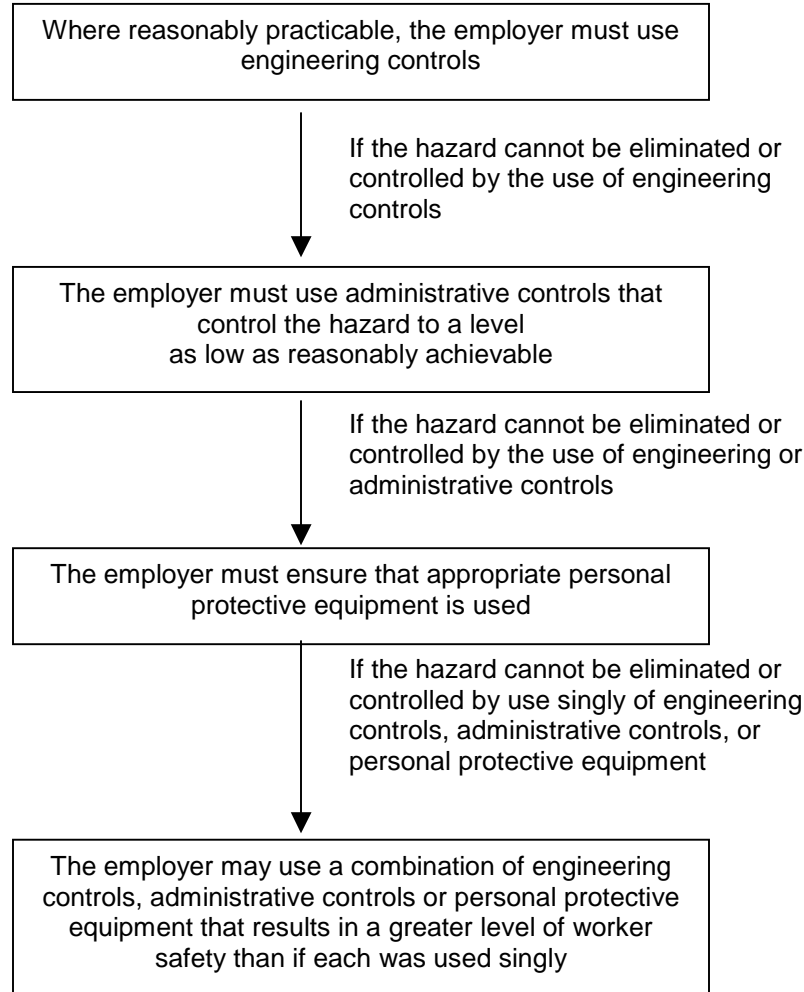
Have as many identified hazards as possible been eliminated or controlled?

The employer should be able to describe which hazards identified by the hazard assessment have been eliminated or controlled. For remaining hazards, particularly those being controlled by the use of personal protective equipment, the employer should be able to explain why those hazards could not practicably be eliminated.

Have appropriate controls been identified and developed for each hazard?

The employer should be able to justify the appropriateness of the controls used to control specific hazards. All reasonably practicable steps should have been taken to first eliminate the hazard. Particular attention will be placed on those hazards that the employer has chosen to control through the use of administrative procedures and, in particular, personal protective equipment.

Figure 2.1 Hazard elimination or control flowchart



Subsection 9(2) Engineering controls

Engineering controls provide the highest degree of control because they eliminate or control the hazard at its source. Engineering controls are the preferred method of eliminating or controlling hazards.

Subsection 9(3) Administrative controls

If engineering controls cannot eliminate or control a hazard, administrative controls must be used to control the hazard to a level that is as low as reasonably achievable.

Subsection 9(4) Personal protective equipment

As a last resort, workers may need to use personal protective equipment (PPE) to lessen the potential harmful effects of exposure to a known hazard. PPE is much less effective than engineering controls since it does not eliminate the hazard. The equipment must be used properly and consistently to be effective.

Subsection 9(5) Combination of control methods

The control of some hazards requires the combined use of all three control methods to reduce the hazard to the lowest level practicable or achievable. Employers are not restricted to a single approach if using a combination results in a greater level of worker safety.

Section 10 Emergency control of hazard

This section applies in situations where emergency action is required to control or eliminate a hazard that is dangerous to the safety or health of workers. Only those workers competent in correcting the hazardous condition may be exposed to the hazard. The number of these exposed workers must be kept to a minimum — as few as is necessary to correct the condition. The employer must make every possible effort to control the hazard while this is being done.

As an example, a piping system in a building fails, releasing a toxic gas. Twelve workers are at the work site, six of which are trained in the use of self-contained breathing apparatus and are capable of initiating a repair or shutdown. Of these six competent workers, only three are required to actually perform the repair or shutdown. As a result, only three of the six competent workers are allowed to enter the building and expose themselves to the hazard. Prior to and during the entry, every possible effort must be made to reduce the flow or production of the gas before it reaches the building, and to limit exposure to other workers in the vicinity of the building.

Section 11 Health and safety plan

Written health and safety plans (sometimes referred to as health and safety programs) are only mandatory for those employers and work sites required to have them by order of a Director of Inspection. For all other work sites in Alberta, the preparation of a health and safety plan is voluntary. Alberta Human Resources and Employment encourages all employers to voluntarily participate in the Ministry's *Partnerships* program and establish an effective health and safety management system for their work sites.

Work sites throughout the province are routinely inspected or monitored for compliance with the *OHS Act* and regulations by occupational health and safety officers. If an employer fails to adequately address health and safety concerns, an officer may, using the criteria listed below, request the employer to voluntarily prepare a written health and safety plan. The request is formalized in a written agreement, signed by the employer and the officer.

Officers will use the following criteria as the basis for the request:

- (a) repeated violations of the *OHS Act* or regulations;
- (b) failure to comply with orders to correct safety hazards;
- (c) repeated substantive worker complaints within an unreasonable period of time;
- (d) a lost-time claim rate exceeding the industry average; and
- (e) poor communication between the employer and workers on health and safety matters.

If the voluntary arrangement is not agreeable to the employer, or the conditions of an existing agreement are not being met, the officer will recommend to a Director of Inspection that the work site be required to have a written health and safety plan. A Director of Inspection is a member of the professional staff of Alberta Human Resources and Employment, appointed by the Minister under section 5 of the *OHS Act*.

The order is not intended to be punitive. It is a method of improving communication between the employer and workers and encouraging an awareness of, and commitment to, health and safety at the work site.

The written health and safety plan must address the following topic areas:

- hazard assessment – as required by section 7 of the *OHS Code*
- hazard elimination and control – as required by section 9 of the *OHS Code*
- emergency preparedness and response – as required by Part 7 of the *OHS Code*
- worker training – as required by sections 13 and 15 of the *OHS Regulation*
- incident investigation – as required by section 18 of the *OHS Act*

For more information



www.coaa.ab.ca/safety/safetyhome.htm

Field Level Risk Assessment – Construction Owners Association of Alberta



www.osh.dol.govt.nz/order/catalogue/index.html

Basic Steps to Make Your Workplace Safer – Occupational Safety and Health Service, Department of Labour, New Zealand



www.osh.dol.govt.nz/order/catalogue/index.html

Health and Safety Management Systems Assessment – Occupational Safety and Health Service, Department of Labour, New Zealand



www.ccohs.ca/oshanswers/prevention/

Prevention and Control of Hazards – Canadian Centre for Occupational Health and Safety



www.gov.ab.ca/hre/whs/partners/publications/pdf/building.pdf

Building an Effective Health and Safety Management System



www.labour.gov.sk.ca/safety/committee-manual/com-manual.pdf

Occupational Health and Safety Committee Manual – Saskatchewan Labour



www.hse.gov.uk/pubns/indg163.pdf

Five steps to risk assessment

Overview

What is a hazard?

A hazard is any situation, condition or thing that may be dangerous to the safety or health of workers. A hazard has the potential to cause an injury, illness or loss. Some people think of a hazard as “an accident waiting to happen”.

Hazards are often grouped into four categories:

(1) Physical hazards

- lifting and handling loads i.e. manual materials handling
- highly repetitive motions
- slipping and tripping hazards e.g. poorly maintained floors
- moving parts of machinery e.g. belts, flywheels, pinch points
- working at height e.g. from mezzanine floors, on roofs, from an elevated work platform, on the side of a building
- pressurized systems e.g. piping, vessels, boilers
- vehicles e.g. pavers, forklift trucks
- fire
- electricity e.g. poor wiring, worn cords
- excess noise e.g. portable hand held tools, compressors, engines
- inadequate lighting
- extreme temperatures
- vibration
- ionizing radiation
- workplace violence

(2) Chemical hazards

- chemicals e.g. battery acid, solvents
- dusts e.g. from grinding, asbestos removal, sandblasting
- fumes e.g. welding
- mists and vapours

(3) Biological hazards

- viruses, fungi, bacteria
- moulds
- blood and body fluids
- sewage

(4) Psychological

- working conditions
- stress
- fatigue

Assessing hazards involves taking a careful look at what could harm workers at a workplace. Doing a hazard assessment allows an employer to decide whether enough precautions have been taken to prevent accidents and injuries, or whether more needs to be done.

The purpose of the hazard assessment is to identify and evaluate those conditions or equipment that could lead to workers getting hurt or becoming ill. Injuries and ill health can ruin lives and affect an employer's business if production is lost, machinery and equipment are damaged, insurance costs increase, or the employer is prosecuted.

Section 7 of the *OHS Code* requires employers to assess the hazards at their workplaces.

In its simplest form, a hazard assessment answers the question "What if?". What if ...

- I don't put a guardrail around that elevated work platform?
- I don't enforce the wearing of seat belts in all company vehicles?
- I don't have our workers wear eye protection while grinding?
- I don't have workers test the atmosphere before entering a vessel?
- One of our workers becomes injured or dies because?

Putting the hazard assessment in writing moves it from the "what if?", walk-around-the-work-site approach, to one that is more thorough, repeatable and can be shown to have been done. The important things an employer needs to decide when assessing hazards is whether a hazard is significant and whether satisfactory precautions have been taken so that the chances of worker injury are small. When assessing hazards, keep it simple – don't get too complicated.

For most employers in the commercial, service and light industrial sectors, the hazards are few and simple. Checking them may be common sense, but doing so is necessary. Most employers probably know that they have equipment or machinery that could injure a worker, or if there is an awkward entrance or stairway where someone could be hurt. If so, the employer is expected to check that

reasonable precautions have been taken to prevent injury. If the precautions have not been taken, the employer is responsible for ensuring that they are.

Employers must consider how likely it is that each hazard could cause injury or illness. This will determine whether or not more needs to be done to reduce the risk of injury. Even after all precautions have been taken, some risk usually remains. The employer must decide whether this remaining risk is high, medium, or low. The level of remaining risk may indicate the need for additional precautions.

Benefits

The benefits of performing a hazard assessment may include

- reducing the number and severity of workplace injuries
- identifying the need for worker training
- identifying poor or missing procedures
- increasing worker participation and ownership of workplace health and safety
- reducing production losses and damage to equipment and property
- providing a useful tool when investigating incidents.

Hazard identification process

Listing work types and work-related activities

The hazard assessment process begins by listing all the types of work and work-related activities that happen at an employer's work sites (or in some cases, work areas within a work site). Break the organization down into clearly identifiable work sites so that the assessment task becomes manageable. Consider the size and location of work sites, their geographical location, and the activities that happen there. For example, an organization's operations might be broken down as

- (a) permanent work sites – office building, warehouse, carpentry shop, laboratory, etc.,
- (b) field work sites – locations where field operations are carried out, and
- (c) mobile work sites – vehicles and mobile equipment.

Once the work sites have been identified, the type of work carried out at each one needs to be described. Since a job often consists of several or many different work-related activities, keep the description simple. For example:

Work site: storage area for equipment and supplies

Types of work: manually lifting and handling loads

- work-related activities:
 - manually unloading pallets
 - manually loading pallets
 - preparing orders for shipping
 - checking inventory

operating a forklift truck

- work-related activities:
 - safety check of forklift truck
 - transporting loads
 - loading and unloading pallets

Methods of identifying hazards

Four commonly used methods of identifying hazards are:

(1) *Physical inspections*

Identify hazards using a checklist while walking around a work site or workplace.

(2) *Task or job hazard analysis*

Observe workers while they work, breaking down their actions into individual tasks. Identify the hazards involved with each task.

(3) *Process analysis*

Follow a process from start to finish and identify the hazards involved at each stage.

(4) *Incident investigation findings*

The findings of an incident investigation may identify the hazards involved. Unfortunately, this is an after-the-fact identification of hazards. This approach should only be used as a supplement to one of the other three methods.

The person or team performing the assessment must be able to recognize potential hazards, evaluating all equipment, machinery, work areas and work activities. Having more than one person involved increases the chances that all potential hazards are recognized and assessed. Involving more than one person also spreads out the work and makes the task more manageable.

Hazard assessment tools

Checklists

Checklists or worksheets are a popular way of conducting an assessment and one way of meeting the intent of section 7 of the *OHS Code*. A checklist serves as a survey tool, directing the person or team performing the assessment to look at specific hazards.

Hazard checklists should, at a minimum, ensure that the requirements of the *OHS Code* are met. Hazards specific to a particular job or workplace that are not explicitly addressed by the *OHS Code*, such as working at extreme temperatures, work-related fatigue, etc., should also be assessed and addressed by the employer if the hazards are relevant to the employer's operations.

Using the physical inspection method of hazard assessment, an employer can create a checklist by taking the rules within the *OHS Code* applicable to a particular operation and turning these rules into checklist questions. Each rule or group of related rules in the *OHS Code* is there to protect workers against a particular hazard or type of hazard. The rules can therefore be used as a "road map" to guide an employer through the hazards that need to be considered. Following the road map also makes sure that an employer complies with the *OHS Code*.

Figure 2.2 shows an example of how this approach might look. Figure 2.3 shows a checklist used for assessing working alone conditions, and Figure 2.4 shows an alternate style of checklist. Checklists will vary in complexity based on the types of hazards being assessed, the employer, and the employer's operations.

Figure 2.2 Example of requirements turned into checklist questions

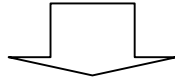
Eye Protection

Section 229 Compliance with standards

229(1) If a worker's eyes may be injured or irritated at a work site, an employer must ensure that the worker wears properly fitting eye protection equipment that

- (a) is approved to
 - (i) CSA Standard Z94.3-99, *Industrial Eye and Face Protectors*, or
 - (ii) CSA Standard Z94.3-02, *Eye and Face Protectors*, and
- (b) is appropriate to the work being done and the hazard involved.

(2) If eye protection is required to be worn by a worker at a work site, prescription eyewear may be worn if it complies with subsection (1).



Eye Protection

Section	Question	Yes	No	Comments
229(1)	Is there a danger of injury or irritation of a worker's eyes? If "Yes", is the eyewear approved to CSA Standard Z94.3? i.e. is there a CSA, UL, SEI, etc. mark on the eyewear? Is the eyewear appropriate for the hazard(s) involved?			
229(2)	Do any of our workers wear prescription protective eyewear? If "Yes", is the eyewear approved to CSA Standard Z94.3?			

Figure 2.3 Examples of working alone hazard assessment checklists
 (Source: *Working Alone Safely – A Guide for Employers and Employees*, available at www.gov.ab.ca/hre/whs/publications/pdf/workingalone.pdf)

Appendix 1.1: Working Alone

Checklist For Employees Who Handle Cash
(e.g. convenience store clerks, retail and food outlet employees, taxi drivers)

This checklist is intended to help employers implement best practices for employees working alone in situations with substantial risk of robbery or other criminal acts because of cash in public. The questions in bold reflect mandatory requirements. Other questions are highly desirable.

Yes No N/A

CASH AND MERCHANDISE CONTROL

Do you have a policy to control cash and valuables in the workplace?

Do you have a procedure to minimize the cash available in the workplace?

Do you use devices such as drop safes to limit the cash on hand?

Do you post signs in prominent places notifying the public of the policy?

Yes No N/A

VISIBILITY

Do you have good visibility in the workplace to discourage robbery?

Are doors and windows clear of signs, posters and window displays that obstruct visibility of the cash handling area?

Is the check-out stand or cash register located near the entrance of the business where it is clearly visible to observers outside the building?

Is the cash register visible from all sides?

Are shelves and counters kept low enough for good visibility?

Are all indoor lights bright and working properly?

Is the entrance to the building easily seen from the street?

Is lighting bright in parking and adjacent areas?

Yes No N/A

EMPLOYEE TRAINING

Do you ensure employees are trained and competent to work alone?

Does the training program include:

The use of the "Robbery Awareness Education Kit" developed by the Alberta Police Service, or equivalent resources?

Strategies used by the business to discourage robbery attempts?

How to behave during a robbery attempt?

Appendix 1.2: Working Alone

Checklist For Employees Who Meet Clients Away From Their Base Office
(e.g. home care workers and nurses, social services workers, real estate agents, bylaw and government enforcement officers)

This checklist is intended to help employers implement best practices for employees working alone with clients away from the employer's premises. Other questions suggest recommended practices.

Yes No N/A

EMPLOYEE TRAINING

Do you ensure employees are trained and competent to work alone?

Are employees trained in the use of personal safety devices?

Are employees trained in the use of personal safety devices?

Have employees been trained in emergency procedures when needed?

Yes No N/A

SAFE WORK PROCEDURE

Do you have a safe work procedure?

Does the safe work procedure include:

Location (remote areas)

Client behaviour?

Presence of dangerous situations?

Previous case history?

Others? Specify: _____

Are employees required to use the safe work procedure on the above evaluation?

Does the safe work procedure include:

Use of a cellular telephone?

Phone designated person?

"Buddy system" – arrange to meet the client in a high risk situation?

Arrange to meet the client in a high risk situation?

Use of security services?

Defer visit until proper arrangements are made?

Others? Specify: _____

Appendix 1.4: Working Alone

Checklist For Employees Who Travel Alone
(e.g. truck drivers, field workers, and business people in transit)

This checklist is intended to help employers implement best practices for employees travelling alone while working with no interaction with customers. The questions in bold reflect mandatory requirements. Other questions suggest recommended practices that are highly desirable.

Yes No N/A

EMPLOYEE TRAINING

Do you ensure employees are trained and competent to work alone safely?

Are employees informed of the hazards associated with working alone?

For employees who have to travel alone to remote locations, do they have some training in emergency survival?

Yes No N/A

SAFE WORK PROCEDURE

Do you have a safe work procedure for employees travelling alone?

Do employees have adequate rest periods between work periods when they are travelling alone?

Yes No N/A

EQUIPMENT SAFETY

Do you ensure vehicles used by employees are in good working condition?

Are all vehicles used by employees under regular maintenance programs?

Yes No N/A

EQUIPMENT AND SUPPLIES

Do you provide employees with the appropriate first aid supplies?

Do employees carry the required first aid supplies?

Do employees carry emergency supplies when they travel in extreme cold or inclement weather conditions?

Yes No N/A

COMMUNICATION

Do you have an effective means of communication for employees to contact persons capable of responding when employees need immediate assistance?

Do you have a procedure for tracking "overdue" employees that is appropriate to the hazards?

Figure 2.4 Example of hazard identification checklist

Hazard	Potential harm	Action proposed	Completion date	Frequency of follow-up
Extension cords across floor	Trip and fall, sprains, bruising	Install power outlets close to activity Run cords overhead	Within 2 days	Check every 6 months
Noise from machine number 37	Hearing loss assessed at more than 85 dBA L_{ex}	No alternative machinery Machine already enclosed Workers to wear hearing protection	Not applicable	Annual noise survey
Manual lifting and handling of heavy loads	Strain, sprains	Provide mechanical devices for lifting heavy objects See lifting policy for heavy lifting	Within 4 weeks	Annual review of lifting systems Check compliance monthly
Moving parts of machine 74	Cuts, bruising, arm trapped	Place guards over moving parts	Within 2 days	Check compliance monthly
Repetitive tasks	Strain, sprain, musculoskeletal injury (MSI)	Modify work station, job rotation	Within 2 weeks	Monthly check
Chemical ABC	Burns, dermatitis, inhalation, etc.	No adequate alternative chemical Enclose process Personal protective equipment – overalls, gloves, safety glasses when mixing See MSDS	Within 2 weeks	Annual review Check compliance monthly

Written checklists allow the person or team conducting the assessment to take notes and write comments. The notes and comments need to be as specific as possible, especially when referring to a particular hazard. If a machine has had its guards removed, the exact machine must be identified so that there is no confusion about what must be done to which machine.

For every hazardous condition identified, recommendations should be made to eliminate or control it. The recommendations should include:

- (a) the specific actions required to correct the problem,
- (b) who is responsible for performing the corrective actions, and
- (c) when each corrective action is to be completed.

Figures 2.5, 2.6 and 2.7 provide examples of inspection checklists for hazard assessment that would meet the intent of section 7 of the *OHS Code*. Figure 2.5 is an example of what would be appropriate for an employer with a minimum number of workplace hazards. Figure 2.6 and 2.7 deal with workplaces of increasing complexity, requiring longer and increasingly more detailed checklists. The inspection checklist that an employer uses should be at least as effective as these example checklists, and be appropriate for the workplace and type of work performed.

Suggested approach to assessing hazards

With so many potential hazards and so many rules in the *OHS Code*, employers may feel overwhelmed and wonder where to begin. The following is one suggested approach — other equally effective approaches can also be used.

STEP 1

List all the types of work and work-related activities that happen at an employer's work sites (or in some cases, work areas within a work site). Break the organization down into clearly identifiable work sites so that the assessment task becomes manageable.

STEP 2

Determine the hazards associated with the listed work-related activities.

STEP 3

Based on the work-related activities and hazards present, create checklists or similar tools to help identify existing or potential hazards. See Figures 2.2, 2.3 and 2.4 for examples of checklists.

STEP 4

Identify and prioritize. Identify high hazard jobs, tasks, work areas, etc. Doing so points out which jobs, tasks, processes, etc. need to be assessed first. Look to the following sources of information when identifying the most hazardous jobs, tasks, work areas, etc.:

- (a) *accident or incident records* – jobs that have resulted in numerous incidents or near misses should be reviewed. WCB accident claim records and the employer's first aid record book may help;
- (b) *the severity of those incidents* – jobs that resulted in a serious injury or fatality should be reviewed, as should jobs considered to have a high potential for serious injury;
- (c) *talk to workers* – workers may be aware of unreported near misses, and the way that work is actually done as opposed to the way others expect it to be done;
- (d) *material safety data sheets (MSDSs)* – MSDSs may help to identify unrecognized or underestimated hazards involving substances;
- (e) *industry incident reports and statistics* – look beyond the employer's workplace to others in the same or similar industries. Consider industry-wide experiences; and
- (f) *stop work orders, inspections reports, safety audits* – these can be good indicators of existing and potential problems.

STEP 5

Assess the hazards associated with each work-related activity, beginning with the most hazardous jobs or processes identified.

Notes

Figure 2.5 Example inspection checklist for hazard assessment – small retail operation

	Hazard	Corrective action	Completion date	Priority
1	Is there enough light to work safely?			
2	Are shelves and racking in good condition?			
3	Can stored goods fall on workers?			
4	Has clutter been removed or cleaned up to prevent tripping (good housekeeping)?			
5	Are entrances/exits free of slipping and tripping hazards?			
6	Has the lifting and carrying of goods been minimized e.g. use of hand trucks, wheeled carts, dollies?			
7	Is electrical equipment safe to use e.g., no frayed cords or broken ground pins, properly maintained?			
8	If chemicals are used e.g. for general cleaning, disinfecting refrigerators, etc., have workers received WHMIS training?			
9	Is there a first aid kit on site? Do workers require first aid training?			
10	Are workers competent to work safely without direct supervision?			
11	Do workers work alone?			
12	Other			

Notes

Figure 2.6 Example inspection checklist for hazard assessment – grocery store

	Hazard	Corrective action	Completion date	Priority
1	Is there enough light to work safely?			
2	Are shelves and racking in good condition?			
3	Can stored goods fall on workers?			
4	Has clutter been removed or cleaned up to prevent tripping (good housekeeping)?			
5	Are entrances/exits free of slipping and tripping hazards?			
6	Has the lifting and carrying of goods been minimized e.g. use of hand trucks, wheeled carts, dollies?			
7	Is electrical equipment safe to use e.g., no frayed cords or broken ground pins, properly maintained?			
8	Is any equipment and machinery unguarded?			
9	Can walk-in freezers and refrigerators be opened from the inside? Does door hardware work properly?			
10	Are forklift operators safety trained? Are forklift trucks maintained?			
11	Do workers need high visibility clothing when working e.g. collecting carts, in the parking lot?			
12	Are hair and clothing confined to prevent getting caught in machinery e.g. bakery, delicatessen, and meat-cutting areas?			

Notes

	Hazard	Corrective action	Completion date	Priority
13	Do workers require hand, eye, and foot protection in meat-cutting areas?			
14	Is there a process for assessing and dealing with work-related musculoskeletal injuries (overuse and overexertion injuries)?			
15	If chemicals are used e.g. for general cleaning, disinfecting refrigerators, etc., have workers received WHMIS training?			
16	Is there a first aid kit on site? Is the correct number of workers trained to give first aid?			
17	Are workers competent to work safely without direct supervision?			
18	Do workers work alone?			
19	Is there a written emergency response plan?			
20	Other			

Notes

Figure 2.7 Example inspection checklist for hazard assessment – car dealership and repair garage

	Hazard	Corrective action	Completion date	Priority
1	Is there enough light to work safely?			
2	Are shelves and racking in good condition?			
3	Can stored goods fall on workers?			
4	Has clutter been removed or cleaned up to prevent tripping (good housekeeping)?			
5	Are entrances/exits free of slipping and tripping hazards?			
6	Has the lifting and carrying of goods been minimized e.g. use of hand trucks, wheeled carts, dollies, portable hoists?			
7	Is electrical equipment safe to use e.g., no frayed cords or broken ground pins, properly maintained?			
8	Is any equipment and machinery unguarded e.g. grinders?			
9	Are compressed gas cylinders stored upright and secured?			
10	With welding and cutting equipment, is there a flashback device at the regulator end and a backflow preventer at the nozzle end?			
11	Are vehicle lifts properly maintained and serviced?			

Notes

	Hazard	Corrective action	Completion date	Priority
12	Do workers require hand, eye, hearing, respiratory, and foot protection?			
13	Is there a process for assessing and dealing with work-related musculoskeletal injuries (overuse and overexertion injuries)?			
14	Have workers received WHMIS training? Where are the MSDS sheets?			
15	Is there a first aid kit on site? Is the correct number of workers trained to give first aid?			
16	Is the general ventilation system adequate? Is vehicle exhaust vented outside?			
17	Are workers trained in the safe use of power washers?			
18	Are flammable and combustible materials stored properly?			
19	Have workers changing tires been trained? Are manufacturer instructions available? Are they enforced?			
20	Is a lockout / tagout procedure required at the workplace?			
21	Is there a written emergency response plan?			
22	Are workers competent to work safely without direct supervision?			
23	Do workers work alone?			
24	Other			

When hazard assessments should be done

After the initial assessment, further assessments are required:

- (a) *at reasonably practicable intervals to prevent the development of unsafe and unhealthy working conditions* – hazard assessments should be performed periodically, even when nothing has changed. This ensures that workers are following correct procedures and that equipment is in proper working condition;
- (b) *when a new work process is introduced* – a new work process may involve the use of new or different materials, chemicals, equipment, etc. with which workers may be unfamiliar;
- (c) *when a work process or operation changes* – even small changes, such as the dimensions or composition of feedstock, can significantly affect the safety of workers; or
- (d) *before construction of a new work site* – the hazard assessment tries to anticipate potential problems and prevent them from being built into the new work site.

In general, workplace hazards should be assessed as often as possible. Doing so improves an employer's ability to identify and eliminate hazardous conditions before they lead to an incident or illness. Regular assessments or inspections also reinforce worker awareness of the importance of health and safety.

If hazardous conditions are discovered every time an assessment or inspection is done, then assessments or inspections should be done more often. Performing inspections more frequently helps to reduce the length of time that workers are exposed to a particular hazard.

If no hazardous conditions are found, how often assessments or inspections are done should not be reduced. If everything is being done correctly and hazards are not being missed, then the inspections are doing what they are supposed to do – keeping conditions safe and under control.

Hazard elimination and control

Once hazards are identified, they must be eliminated or controlled. Examples of hazard elimination include replacing a frayed electrical cord or fixing a damaged ladder – the hazard no longer exists. If a hazard cannot be eliminated, then the employer must try to control it. Examples of how to control a hazard include putting noisy machinery in a separate room, guarding machinery, placing barricades and warning signs around an opening in a floor, using detailed safe work procedures, providing special training, and using personal protective equipment and clothing such as hearing protectors, protective eyewear, flame resistant clothing, etc.

While all hazards are important, some are more likely than others to result in harm or damage. Similarly, the amount, or degree of harm or damage varies with the hazard. When two machines present the same likelihood of injury, but in one case the injury is death and in the other a bruised or broken finger, the machine involving the risk of death requires a higher level of safety precautions.

Some types of injury, particularly those involving illness e.g. resulting from exposure to asbestos, chemicals, etc., are not immediately apparent. Such injuries may not show up until some time – 20 to 30 years later in some cases – after exposure to a hazard has ended. Other injuries, such as musculoskeletal injuries involving overuse, usually build up over a long period of time.

Whatever control method is used, it should attack the source of the hazard, not its outward signs such as the noise, vibration, fumes, exhaust, etc. that it produces. It is better to replace, redesign, isolate or quiet a noisy machine for example, than it is to provide workers with hearing protection.

Setting priorities

If several jobs or processes are hazardous, they should be prioritized. Since resources are always limited and staffing and money are rarely enough to deal with all hazards at the same time, the employer must somehow distinguish the more important from the less important. To prioritize efforts, consider

- (a) the severity of the hazard,
- (b) the complexity of the causes,

- (c) the potential costs of changing a work area,
- (d) future changes to the work site or process, and
- (e) availability of technology to address causes.

If several jobs or processes end up tied with an identical priority ranking, break the tie using one or more of the following criteria:

- (a) *persons affected* – the more people affected by a hazard, the higher the priority for doing something about it;
- (b) *multiple hazards* – a job or process involving worker exposure to multiple hazards may be more dangerous;
- (c) *lost days* – a job or department with a higher number of days lost should be looked at first;
- (d) *complexity* – if a job or process is very complicated to deal with, it may be a good idea to focus on a simpler problem to gain some early successes and make progress.

If the problem job or process is simple, fix it. If the problem job or process is more difficult, prioritize it for action. The employer should set a schedule based on the above factors to ensure that all hazardous jobs or processes are dealt with.

Engineering controls

Engineering controls provide the highest degree of control because they eliminate or control the hazard at its source i.e. as close to where the problem is created as possible. Engineering controls are the preferred method of eliminating or controlling hazards. Engineering controls include the following:

Elimination – getting rid of a hazardous job, tool, process, machine or substance may be the best way of protecting workers. Examples include:

- using material handling equipment rather than have workers lift, lower, carry, etc. materials manually
- eliminating two-way traffic down a corridor or right-of-way
- selecting containment vessels, structures, material handling equipment, etc. that have appropriate safety factors
- eliminating the need to elevate persons or objects

Substitution – if elimination is not practical, try substituting or replacing one substance or process with another. Examples include:

- substituting a safer substance for a more hazardous one
- replacing hazardous operations with less hazardous operations
- selecting tools, equipment, and machinery that require less maintenance
- replacing heavy, awkwardly shaped loads with lighter loads having handles and/or good gripping surfaces
- storing hazardous materials in smaller quantities and containers

Redesign – hazards can sometimes be “engineered out” through redesign of the work site, workstations, work processes and jobs. Examples include:

- providing fail-safe interlocks on equipment, doors, valves, etc.
- installing guardrails on elevations
- providing non-slip working surfaces
- controlling traffic to avoid collisions
- providing safety and bleed-off valves
- reducing the road grade
- designing roads to allow drivers to respond more appropriately
- locating equipment so that access during operation, maintenance, repair, or adjustment minimizes worker exposure to hazards such as chemicals, energized equipment, cutting edges, etc.
- improving workplace lighting, ventilation, temperature control
- rounding the leaning edges on work benches
- padding low overheads
- providing warning systems and time delays
- reducing the operating speed of assembly line operations that require repetitive manual handling by workers
- using regulators, governors, and limit controls

Isolation – hazards can sometimes be isolated through containment or enclosure. Examples include:

- negative-pressure fume hoods in laboratory settings
- sound reducing enclosures for noisy equipment

Automation – some processes can be automated or mechanized. Examples include:

- mechanical pipetting of substances in a laboratory setting
- spot welding by industrial robots
- assembly line operations that require repetitive manual handling by workers

Barriers – some hazards can be blocked. The further a barrier keeps a hazard away from workers, the more effective the barrier. Examples include:

- guards on machines
- enclosures and covers
- welding screens to prevent welding flash from reaching workers
- walls and shields
- debris and personnel safety nets
- machinery lockout systems that protect maintenance workers from exposure to electricity, heat, pressure, radiation, etc.
- separating vehicle and pedestrian traffic

Absorption – examples include:

- baffles that block or absorb noise
- local exhaust ventilation that removes toxic gases, dusts, or fumes where they are produced

Dilution – some hazards can be diluted or dissipated. Examples include:

- general ventilation that dilutes the concentration of a hazardous gas with clean air from the outside. While suitable for less toxic substances, it is not effective for substances that are harmful at low concentrations.

Administrative controls

When engineering controls are not possible or practical, administrative controls are the next approach to controlling hazards. Administrative controls control hazards at the level of the work. Administrative controls are less effective than engineering controls since they do not eliminate the hazard. Examples include:

- safe work practices, job procedures, policies, rules – safe work procedures describe how to correctly perform a job from start to finish. Not all jobs require written safe work procedures. Written procedures should be created when
 - the steps of the job must be performed in a particular order (most persons can remember up to five steps without difficulty; consider written work procedures when the number of steps is more than five)
 - the required steps are complex
 - the job requires a high degree of skill

- safe work permits
- work/rest schedules to reduce worker exposure to hazardous substances or conditions
- limiting hours of work
- scheduling hazardous work during times when exposure of other workers is limited
- wet methods as opposed to dry sanding or sweeping
- monitors and alarm systems
- transferring an operation to a contract service that has extensive experience in dealing with the hazard (you may still be responsible for the health and safety of workers involved in the operation)
- medical screening, including pre-employment and ongoing examinations
- controls on purchasing
- training, safety meetings
- posters, bulletins, newsletters

Personal protective equipment (PPE)

As a last resort, workers may need to use personal protective equipment (PPE) to reduce the potentially harmful effects of exposure to a hazard. PPE is much less effective than engineering controls since it does not eliminate the hazard. The equipment must be used properly and consistently to be effective. Awkward or bulky PPE may prevent a worker from working safely. In some cases, PPE can increase the likelihood of hazards such as heat stress and tripping and falling.

Examples of PPE commonly used include

- (a) safety eyewear to protect the eyes against flying debris,
- (b) hearing protection if workers are exposed to noise that exceeds allowed levels
- (c) hard hats to protect the head against injury from falling objects
- (d) safety boots to reduce the risk of foot injuries
- (e) respiratory protective equipment to protect the lungs against harmful dusts and vapours.

Ongoing monitoring and follow-up

Controls must be monitored or reviewed regularly to ensure that the hazard(s) is under control. Questions to ask include:

- Is the system working?
- Are all new hazards being identified?
- Are appropriate controls in place for each new hazard?