



a wholly-owned subsidiary of NorZinc Ltd

POST-EA INFORMATION PACKAGE INCLUDING AN UPDATED PROJECT DESCRIPTION ALL SEASON ROAD TO PRAIRIE CREEK MINE



APPENDIX 17-2

SUBMITTED IN SUPPORT OF:

Water Licences MV/PC2014L8-0006, and
Land Use Permits MV/PC2014F0013

SUBMITTED TO:

Mackenzie Valley Land and Water Board
Yellowknife, NT X1A 2N7

Parks Canada,
Nahanni National Park Reserve
Fort Simpson, NT X0E 0N0

SUBMITTED BY:

Canadian Zinc Corporation
Vancouver, BC, V6B 4N9

February 2019

PRAIRIE CREEK MINE
NORTHWEST TERRITORIES
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Fort Nelson, BC V0C 1R0
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NORTHWEST TERRITORIES
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January 15, 2019

Health, Safety and Emergency
Response Plan



IMPORTANT

DIESEL ONLY

Use only diesel fuel that meets ASTM D-975 or EN 590 Standard

Drain water from fuel filter and tank daily



Health, Safety and Emergency Response Plan

This Health, Safety and Emergency Response Plan is effective until January 14, 2022 and applies for all projects operated by NorZinc Ltd.

ACKNOWLEDGMENTS

Special thanks to the Worker's Safety & Compensation Committee (WSCC) for allowing us to quote numerous sections/articles written by them. Additional gratitude is given to the members of the Northern Mine Safety Forum, and Mine Training Society for providing materials and assistance in the ongoing development of this manual.

All images belong to NorZinc unless otherwise noted.

DISCLAIMER

The applicable laws and regulations may change from time to time. With this in mind, please note that all Federal, Provincial and Safety Association safety laws and regulations must be followed at all times.

DISTRIBUTION

Copies of the Health, Safety and Emergency Response Plan will be available at all NorZinc work sites and copies can be requested from:

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1.0 INTRODUCTION

This manual is to be used by accountable, company management in the implementation and maintenance of our health & safety programs, and by workers, contractors, subcontractors and their employees, for a healthy and safe work environment. The procedures contained in this manual will not be compromised as the mining and mineral exploration industry is a hazardous occupation. All personnel are obliged to use these procedures toward the goal of outstanding performance in safety on our job sites.

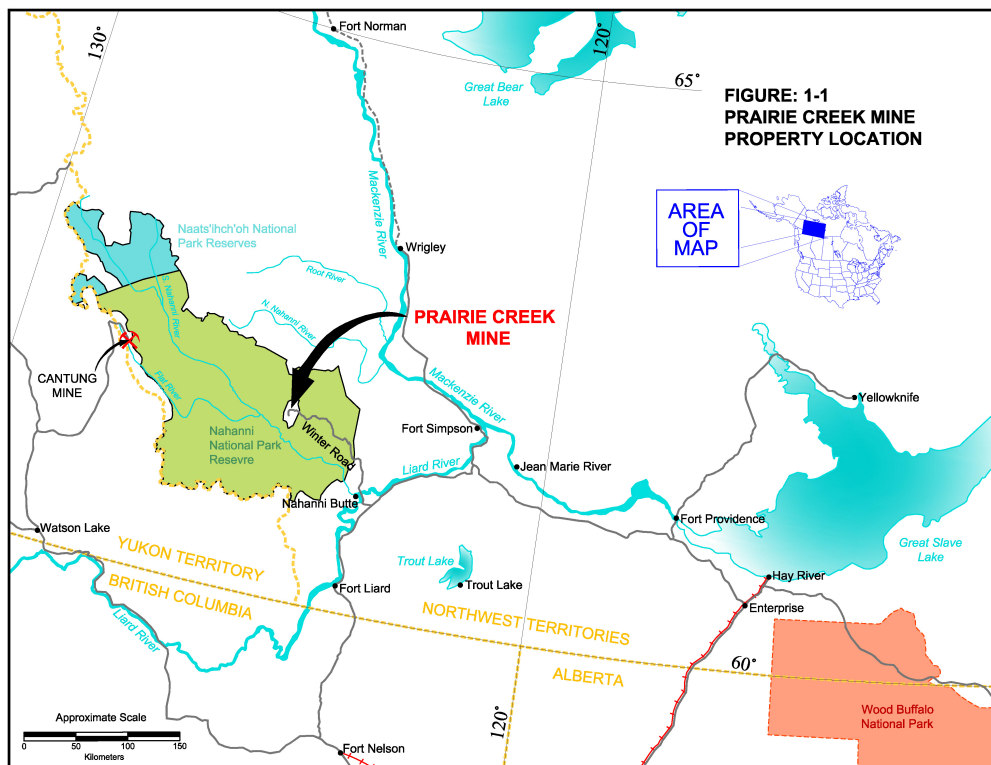
Worker's Safety & Compensation Commission (WSCC) regulates and administers compliance with the Mine Health & Safety Act and the Mine Health & Safety Regulations which provides the legislative safety requirements in the Northwest Territories. WSCC's penalties and fines for non-compliance are among the highest in Canada. All managers, supervision, contractors and sub-contractors, and workers on our job sites are to work at all times in full accordance with the WSCC Act and Regulations, and obey NorZinc's site safety rules and regulations. This manual is intended as an adjunct to these rules and regulations.

No manual can foresee and allow for every situation on a site, competence, training, professionalism, experience and common sense, together with these rules and regulations, become the policy. In the event no rule or guide is found, contact the manager or safety manager for specific instructions.

The procedures outlined, diligently applied together with the application of the respective Mine Act and Regulations, will assist us in achieving our common goal: eliminating all job site accidents. Safety begins with each and every Worker – regardless of position or rank in the organization and his/her positive attitude and resolve. The safe way to do a job must always be found before going ahead. This will continue to reduce and eliminate job site accidents.

All employees and contractors will have access to a copy of NorZinc's Health, Safety and Emergency Response Plan, and will abide by the policies as outlined within the Plan. We welcome and encourage your suggestions for improving this manual, as well as safety at our sites.

FIGURE 1: PRAIRIE CREEK MINE LOCATION



1.1 SAFETY POLICY AND PHILOSOPHY

NORZINC HEALTH & SAFETY PROGRAM

NorZinc Ltd (“NZC” or the “Company”) is committed to providing a safe and healthy work environment for all people working within the organization. The Health and Safety Program developed by NZC is the foundation upon which we will work to promote positive health and safety attitudes in all employees, contractors and visitors, and to comply with legislative and regulatory standards.

The responsibility for health and safety lies jointly with the employer and the worker. Management will provide leadership in the Health and Safety Program with directive documentation to implement health and safety policies, identify and assess workplace hazards, develop and enforce safe work practices, provide education and training and ensure that equipment is adequate for the job and meets appropriate standards.

Workers will ensure that all work is done in a manner consistent with the health and safety of all employees, follow all rules and guidelines outlined in the company’s Health and Safety Program, work with management to identify and eliminate hazards, and participate in the health and safety meetings and inspections.

We are committed to creating a safe and healthy work environment by fostering participation at all levels and working together to continually improve the Health and Safety Program. Safety is everyone’s business, we expect everyone to work together as a team to maintain and improve our safe working environment.

An audit of the program should be performed within every 3 years and the report will be submitted to the NZC Board of Director’s Safety Committee.

“Alan B. Taylor”

 Chief Operating Officer

January 15, 2019

 Date

1.2 EMERGENCY CONTACT INFORMATION – PRAIRIE CREEK

Site Phones	Main	Alternante
Office	778-724-2512	
Public	778-725-2513	
Iridium 9555 Satellite Phone (yellow)	011-8816-315-65365	
Iridium 9505A Satellite Phone (orange)	011-8816-315-65447	
Ground-To-Air Radio Handheld	FREQ 122.800	

Medical Services

BC Ambulance, Fort Nelson	250 774 2344	
Fort Nelson General Hospital	250 774 8100	
Fort Simpson Health Centre	867 695 7000	
Alberta Poison & Drug Information Service [24-Hour Line]	1 800 322 1414	

Incident Assistance

RCMP Fort Simpson Detachment	867 695 1111	
RCMP Fort Nelson Detachment	250 774 2777 [Emerg]	250 774 2700
Fort Nelson Fire Department	250 774 2222 [Emerg]	250 774 3955
Fort Simpson Fire Department	867 695 2222	
Rowe's Construction Ltd. – Owen Rowe	867 695 3243	Cell: 867 445 8462
Northwest Territories Power Corp. - Boyd Mallaley	1 855 575 6872	Cell: 867 695 7113
Todd Roche		Cell: 867 695 7106
Western Canadian Spill Services (24 hr information)	1 866 541 8888	587 393 9620
Kledo Construction Ltd. - Paul Davidson	250 774 2501	Cell: 250 500 2674

Air Charters Services

Villers Air Service, Fort Nelson – Peter Villers	250 774 2072	Cell: 250 500 2072
Wolverine Air Service, Fort Simpson – Jacques Harvey	1 888 695 2263	Cell: 867 695 6744
Thor Moen		Cell: 604 355 6961
Canadian Helicopter, Fort St. John – Kevin Rogers	250 787 0431	Cell: 250 321 1666
Great Slave Helicopter, Fort Simpson – Ron Blauel	867 695 2326	Cell: 867 688 1513

Reporting

Worker's Safety & Compensation Commission (WSCC) [24 hrs]	1-800-661-0792	
Indigenous and Northern Affairs Canada (INAC)	867 669 2500	
Environment Canada Spill Line [24 hrs]	867 920 8130	
Alan Taylor, Chief Operating Officer, NorZinc Ltd.	604 688 2001	Cell: 778 837 2973
Wilbert Antoine, Northern Development Manager, NorZinc Ltd.	867 695 3963	Cell: 867 446 2149

Weather Status (Nahanni Butte): http://weather.gc.ca/city/pages/nt-12_metric_e.html.

Contact list updated June 10, 2018.

REQUIRED DETAILS (BE PREPARED BEFORE YOU CALL) ARE ON THE NEXT PAGE

REQUIRED DETAILS (BE PREPARED BEFORE YOU CALL):

- **Your name:**
- **Location of site:**

Prairie Creek Mine Site (Airstrip LID: CHB4):	Longitude - 124°, 46', 46.0" W / Latitude - 61°, 32', 44.1" N
Nahanni Butte/ Liard Transfer Facility (Airstrip LID: CBD6):	Longitude - 123°, 23', 17.8" W / Latitude - 61°, 01', 49.4" N
- **Type of emergency** (Fatality, Rapid Transit Criteria, Non-Rapid Transit Criteria):
- **Number of injuries and what type:**
- **Special equipment or personnel needed:**
- **What is being done already:**
- **Weather and landing area conditions:**

If a medivac has been called for, be sure to keep landing area clear of debris and people, as the pilot does not have a visual sight below the plane or helicopter.

2.0 KEY SAFETY RESPONSIBILITIES

NZC is committed to avoiding, preventing and reducing loss due to injury, property damage, and reduced productivity. We will maintain a health and safety program that conforms to industry best practices. This requires co-operation in all safety and health matters, not only between supervisor and workers, but also between each worker and his or her fellow workers.

The responsibility for health and safety is shared.

- The executive officers are responsible for the leadership in the health and safety program, its effectiveness and improvement, and the safeguards to ensure safe conditions.
- Managers, supervisors and team leaders are responsible for developing good attitudes towards safety, and for ensuring that all operations are performed with the utmost regard for the health and safety of everyone.
- Workers are responsible for co-operating with all aspects of the health and safety program, including compliance with all rules and regulations.

2.1 EXECUTIVE OFFICERS

The executive officers shall:

- Review regularly, a written Health & Safety Policy Statement.
- Take all reasonable precaution to ensure that NZC complies with the current WSCC Mine Health & Safety Acts and Regulations, including possible directives/requirements from WSCC.
- Make every reasonable measure and precaution to protect the health and safety of employees and other persons at the site.
- Implement and maintain work practices that are safe and that do not present undue risk to health.
- Make provision for supervision, instruction and training as is necessary to protect worker's health and safety.
- Ensure the site is constructed, developed, reconstructed, or altered in accordance with WSCC Act and Regulations.
- Provide machinery, equipment, material and protective devices that are required by the regulations, to be made available for the use of workers at the site.
- Provide personal protective equipment as required by the regulations to employees.
- Determine whether any designated substances are present at the project site, prepare a list of all designated substances and provide the list to contractors.
- Ensure the site is operated in accordance with WSCC Act and Regulations.

2.2 GENERAL MANAGER

A general manager shall:

- Promote health and safety education at all levels.
- Create and update NZC's health and safety policies, procedures, standards, and forms.
- Stays current with WSCC's Mine Act and Regulations.
- Assist and review all safety activities including: Job-site, yard and shop inspections, frequency of safety committee meetings, distribution of safety materials, and all vehicle safety operations.
- Participate with regional and site safety committees.
- Acts as senior officer to liaison between the manager and WSCC.
- Review orders and directives and consult with the manager to ensure that the site complies with such orders and directives.
- Review all accident records and ensures the completion of all required WSCC's forms.
- Assist with accident/incident investigations and analyzes accident/incident records and show trends.
- Provides regular reports to Board Safety Committee on the results of the safety program and provides options and training for corrective actions.
- Consult on Zero Tolerance Policy violations and other disciplinary notices.

2.3 SITE MANAGER OR PROJECT MANAGER (the "MANAGER")

A manager shall:

- Take every reasonable measure and precaution to protect the health and safety of persons at a site.
- Maintain a register of each person working at his/her site.
- Implement WSCC's Mine Act & Regulations and NZC's Health & Safety Program.
- Provide effective documentation of meetings, inspections, hazard/risk assessments, violations, treatments, return-to-work programs, and terminations.
- Review workplace inspections at least once per month for active sites.
- Participate with incident investigations.
- Ensure effective training, information, instruction and supervision to supervisors, workers, contractors and sub-contractors to protect everyone's health and safety.
- Correct substandard acts or conditions.
- Commend employee and supervisors for health and safety performance.
- Participate with site safety committee.
- Ensure that the worker's concern on safety matters should be encouraged and all concerns must be addressed as soon as possible. Such questions are to be recorded on the Tool Box Meeting Form.

In addition to the duties imposed under WSCC's Mine Act and Regulations, the manager shall

- Ensure that machinery, equipment, materials and protective devices required to be used at or available at the mine are maintained in good condition.
- Ensure that the personal protective equipment required to be provided to employees is maintained in good condition.
- When appointing a supervisor or surveyor, appoint a person possessing the prescribed qualifications.
- Ensure that an employee is under the daily supervision of a person possessing the prescribed qualifications.
- Establish and maintain a medical surveillance program for employees.
- Establish and maintain a mine rescue program during active mining operations.

- Provide other documents as required to be posted at a mine under WSCC Mine Act and Regulations is maintained in a legible condition.
- Provide a copy of every order and directive of the WSCC chief inspector of mines to the general manager and to review and consult with the general manager in respect of such orders and directives.

MAINTAIN RECORDS

The manager shall ensure that all pertinent safety records are maintained at job site and electronic copies are forwarded to Head Office. These safety records may include the following:

- Records of all job site safety orientations.
- Site inspections.
- Compliance agreements (Land Use Permits).
- Employee's profile and safety record.
- Violation notices.
- Notices of termination and/or violation of Zero Tolerance Policy.
- Toolbox-talk confirmations.
- Incident & investigation reports.
- Names of current first aid attendants.
- Safety committee reports (if required).
- WHMIS files.
- Employee's training.
- Employee's certifications (i.e. First Aid, WSCC Supervisor, Red Seal).

2.4 SUPERVISOR/TEAM LEADERS

The supervisor/ team leaders shall:

- Implement WSCC's Mine Act and Regulations and NZC's Health & Safety Policy and procedures.
- Acquire WSCC certification as a supervisor for the appropriate level.
- Perform workplace inspections weekly using the Weekly Inspection Report in the Appendix.
- Conduct information sessions (safety talks, staff meetings, tail gate meetings).
- Conduct incident investigations.
- Conduct employee training, information, instruction and supervision to supervisors, workers, contractors and sub-contractors to protect everyone's health and safety.
- Correct substandard acts or conditions.
- Commend employee and supervisor health and safety performance.
- Perform employee safety observations.

Additionally, supervisor/ team leaders shall ensure that:

- A worker works in the manner and with the protective devices, measures and procedures required by WSCC's Mine Act and Regulations.
- A worker uses equipment, protective devices or clothing that the worker's employer requires to be used or worn.
- Workers know of the existence of any potential or actual danger to the health and safety which the supervisor is aware.
- Where prescribed, provide a worker with written instructions as the measures and procedures to be taken for the protection of the worker.

- Provide information, instruction and supervision to protect everyone's health and safety.
- Everyone is accountable for health & safety compliance and acknowledges good performance.
- All workers have a copy of NZC's Health, Safety and Emergency Response Plan.
- Workers attend the regular 5-minute Tool Box Talk.
- Every reasonable precaution is taken in the circumstances of the protection of the worker.
- An internal investigation should be conducted of all accidents and injuries/near misses and the findings immediately sent to the manager.

2.5 WORKERS

NZC considers the safe and proper conduct of all workers, contractors, sub-contractors, suppliers and any other visitors to the project to be of prime importance. The following are personal conduct standards to be followed by all persons associated with the project.

- Understand and abide by this NZC Health, Safety and Emergency Response Plan.
- Always work in compliance with the WSCC's Mine Act and Regulations and any other pertinent regulations such as WHMIS regulations, etc.
- Co-operate with WSCC inspectors, NZC safety coordinators, workers health and safety representatives, supervisors and others who are attempting to achieve and maintain a healthy and safe workplace.
- Report to the employer or supervisor any problem with equipment that may endanger personnel.
- Report to the employer or supervisor any contravention of the WSCC's Act and Regulations or hazards on the project.
- Report all accidents/injuries immediately to a supervisor.
- Do not engage in horseplay or fighting.
- Read and follow all posted notices and warnings.
- Always wear and use properly the personal protective equipment (PPE) that is required when working on the site.
- Rings, jewelry and loose clothing must not be worn in work situations where they present a risk of personal injury.
- Shirts and long pants should be worn at all times to protect all site workers from burns and minor abrasions.
- Intoxication or possession of alcohol or illicit drugs will not be permitted on the job.
- Use of prescription drugs is permitted if used as directed by a medical physician, and provided it does not affect your ability to perform work safely and efficiently.
- If you are not familiar with the use of any equipment, machinery, or tools ask your supervisor for assistance.
- Do not disturb fellow workers while they are setting up or operating any equipment or machinery.
- Always keep work areas and access ways clean and free of spills, scrap, debris, and congestion.
- In order to ensure the security and integrity of the project, inspection of personal property may be conducted randomly by the NZC staff where applicable.
- Any person who commits the act of stealing will be terminated.
- The drivers of all vehicles must adhere to posted speed limits throughout the site.
- Grease, oil spills or other slippery substances are to be cleaned up immediately.
- Personal cell phones/ radios/ audio devices are not to be used by any person while working.
- All personnel using explosive actuated tools shall be in possession of a certificate of the safe operation of that tool and will use all of the personal protective equipment dictated by WSCC.
- Refueling of vehicles and equipment shall only be done while the engine is turned off.
- Throwing material from scaffolding or any above ground elevation will not be permitted.
- Compressed air is not to be used for cleaning the person or his clothing, and anyone in the area where air is being used for cleaning purposes must wear eye protection.

- All air hoses shall be wired together at the couplings.
- There shall be a minimum of 3 m (10 ft.) between operating equipment and overhead power lines, unless the line has been de-energized and safe operating distances shall be those set forth in the WSCC, which vary according to the voltage carried by the lines.
- Attend all orientation, safety meetings, training as required by this project.
- Provide recommendations for improvements.
- Notify NZC immediately if the status their certifications of qualifications required for employment changes.
- Assist as directed during an emergency, but not in a capacity beyond qualification.

No worker shall:

- Remove or make ineffective any protective safety device required by the regulations or by his employer, without providing an adequate temporary device. When the need for removing or making ineffective the protective safety device has ceased, the protective device shall be replaced immediately.
- Use or operate any equipment, machine, device or work in a manner that may endanger himself, herself or any other worker.
- Engage in any prank, contest, feat of strength, unnecessary running or rough, boisterous conduct.

2.6 CONTRACTORS

Contractors shall:

- Ensure its workers and sub-contractors abide by the WSCC's Mine Act and Regulation, and NZC Health, Safety and Emergency Response Plan.
- Provide NZC their confirmation of Clearance from WSCC before beginning work.
- Provide NZC a copy of their Health, Safety and Emergency Response Plan.
- Ensure their workers or sub-contractors are prequalified to perform the work and provide qualification documentation to NZC's manager.
- Give prior notice of medical conditions/ medication required by its workers or sub-contractors.
- Give written notice to NZC of an incident at the worksite or related to the services provided to the project.
- Participate with site orientation before their work begins and attend safety meetings.
- Use equipment in a safe manner.
- Agree that NZC has the authority and responsibility to immediately remove workers who violate NZC's Zero Tolerance Policy, or fail to comply with the WSCC's Mine Acts and Regulations or NZC's Health, Safety and Emergency Response Plan.

When contractors have their own health and safety program, the more stringent of the following shall apply:

- WSCC's Mine Health and Safety Act and Mine Health & Safety Regulations.
- NZC's Health, Safety and Emergency Response Plan.
- Contractor's Health, Safety and Emergency Response Plan.

2.7 CONTRACTOR AND SUB-CONTRACTOR

STANDARD

- Sub-contractor to provide WSCC Clearance certificate to NZC.
- Provide sub-contractor with NZC's Health, Safety and Emergency Response Plan.
- Obtain sub-contractors Health, Safety and Emergency Response Plan and provide copy to NZC.
- All sub-contractors must comply with WSCC's Mine Act & Regulations, and NZC's Health, Safety and Emergency Response Plan, whichever is more stringent.

COMMUNICATION

- Sub-contract Agreement/Purchase Order will include NZC's Health, Safety and Emergency Response Plan.
- Sub-contractors to be included in weekly safety meetings (tailgate talks).
- Supervisors/ team leaders to inform Sub-contractors of;
- Any workers that are trained in first aid.
- Emergency procedures.
- Emergency phone numbers.
- Contractor and sub-contractor to sign-off that information has been communicated and understood by sub-contractor.
- Keep records of communications.

TRAINING

- Obtain relevant records of training from sub-contractor (first aid, traffic control, fall arrest, etc.).
- Keep these records on site and provide copies to NZC's manager.

EVALUATION

- Supervisors/ team leaders to inspect sub-contractors work areas and performance daily.
- Report any safety violations to sub-contractor's supervisor, and provide copy to NZC's manager.
- Follow up on correction of any violations, and document results.

ACKNOWLEDGEMENT SUCCESSFUL/ MAKE IMPROVEMENTS

- Provide a letter to NZC's manager at the completion of job to acknowledge a successful completion.
- Conduct a survey amongst supervisors/ team leader on quality of safety performance by sub-contractors, obtain suggestions for improvement.
- Inform sub-contractors of their evaluation and recommend areas of improvement.
- Refuse to hire sub-contractors that do not comply or have a poor health and safety record.
- Evaluate suggestions and act upon those that have merit.
- Keep records of all acknowledgements and improvements.

3.0 GENERAL SAFETY PROGRAM

3.1 JOINT HEALTH AND SAFETY COMMITTEE

Where more than 15 persons are employed at a project, the manager shall ensure that a Joint Health and Safety Committee (JHSC) are established in accordance with [WSCC Regulation 11](#).

3.2 HEALTH AND SAFETY REPRESENTATIVES

COMPOSITION OF COMMITTEE

A JHSC shall consist of management members appointed by the manager; and an equal or greater number of worker members elected by the workers. The number of management and worker representative should be:

- 4 members, where the number of employees at the mine is 15 or greater but less than 100;
- 8 members, where the number of employees at the mine is 100 or greater but less than 250; and
- 12 members, where the number of employees at the mine is 250 or more.

CO-CHAIRPERSON

A committee shall be chaired by a management co-chairperson selected by the management's members; and a worker's co-chairperson selected by the worker's members. A chairperson is required to:

- Schedule meetings and notify members.
- Prepare and distribute agendas.
- Presides over meetings.
- Guide meetings as per agendas.
- Review and approve the meeting minutes.
- Assign projects to members.
- Ensure that the committee carries out its functions.

ACTING CO-CHAIRPERSON

A co-chairperson may designate a member of the committee to exercise the powers and perform the duties of the co-chairperson during the temporary absence of the co-chairperson.

Decision by Majority

A decision of the committee is determined by a majority of the members participating in the decision.

General Duties

Committee members are required to:

- Attend and participate in regular committee meetings.
- Act as a liaison between employees and management with respect to safety issues.
- Provide a means of communication and resolution for health and safety concerns raised by workers.

- Provide feedback on worker's suggestions.
- Participate in inspections of the workplace to help identify and correct hazards.
- Participate in investigations of incidents and accidents.
- Promote health and safety education programs at the worksite.
- Promote and monitor compliance with government regulations.
- Promote and monitor compliance with company requirements and rules.
- Make health and safety recommendations.
- Maintain records of meetings, accidents and incidents.
- Monitor effectiveness of health and safety program.
- Assist in the development of health and safety rules.
- Assist in the development of safe work procedures.
- Ensure the employer provides the health and safety representatives with any information and assistance necessary to carry out inspections on the job site.
- Identify situations that may be a source of danger or hazard to workers and to make recommendations or report his findings therein to the employer.

General Qualifications

1. The health and safety representative should have current first aid and cardiopulmonary resuscitation (CPR) certificates. This training is available through St. John Ambulance, as well as other certified groups.
2. The representative must be familiar with requirements of the current WSCC's Mine Act & Regulations.
3. The representative should be familiar with the procedures involved in the right-to-refuse work where health and safety is in danger.

SECRETARY

The Secretary is required to:

- Keep the meeting minutes
- Keep records and statistics
- Report on the status of recommendations
- Distribute the minutes after approval
- Post meeting minutes prominently for all workers
- Assist the chairperson as required

AGENDA

Prior to each meeting, an agenda should be prepared and distributed to the Committee members. Agendas should include:

- Call to order
- Approval of previous minutes
- Business arising from previous minutes (follow-up activities, ongoing concerns)
- Review of relevant activities and reports (inspections, accident investigations etc...)
- Recommendations and suggestions
- New business
- Recommendations and suggested follow-up activities
- Adjournment

Minutes

- Minutes of all health and safety committee meetings are required. Attendance should be recorded at meetings.
- Minutes should be kept on file and submitted monthly to WSCC chief inspector of mines.
- Minutes should be posted in a prominent location in the workplace and made available to all employees. Posted minutes should remain so for at least one month.

3.3 ORIENTATION REQUIREMENT

All new and returning workers will be oriented in the company's health and safety program by the safety representative. Orientation for new workers will take place before they begin active duty, and returning workers will retake their orientation when they have been absent from the project for more than 6 months and updated on an annual basis.

Employees, contractors and sub-contractors will receive the health and safety orientation document which will supplement a verbal safety orientation. Workers will be required to acknowledge in writing that they have

- a. Received the safety orientation and,
- b. Agree to comply with all required guidelines and regulations.

Employees will also be asked to (voluntarily) complete a *Confidential Medical Information Form*. This form is kept for emergency use only by the manager or first aid attendant.

The training and orientation needs of employees will be evaluated regularly and adjustments will be made as required. Updated instruction will be required for all employees should there be either:

1. Changes to the Health & Safety Program or,
2. Changes to the activities at the worksite.

Safety orientations will include (as a minimum) the following components:

- Health and Safety Policy review.
- Responsibilities of supervisors and workers.
- Right-to-refuse unsafe work.
- Hazard identification and assessment.
- Emergency procedures and communication.
- How to contact first aid.
- Workplace hazards and safe work procedures.
- Bear & Wildlife Awareness video.
- Nahanni National Park Reserve video.
- Community video
- Working at Prairie Creek handout
- Living at Prairie Creek handout

3.4 RIGHT-TO-REFUSE OR STOP WORK

RIGHTS & RESPONSIBILITIES

Workplace health and safety laws protect you, the worker, against hazards on the job. As a worker, you not only have rights to protect yourself while on the job, but you also have certain responsibilities.

UNDERSTANDING YOUR RIGHTS (WSCC Regulation 4.07)

Right to Know

You have the right to know about hazards in your workplace. Your employer should teach you how these hazards can affect you and your co-workers. The first step is to get proper health and safety training. This includes learning how to identify workplace hazards and knowing what to do if there is an incident or spill.

Right to Participate

You have the right to be involved in health and safety concerns in your workplace. You can participate through a safety representative at your workplace or be involved in your workplace health and safety committee.

Right to Refuse Work

You have the right to refuse unsafe work. If you have reasonable grounds to believe the work you do or the piece of equipment you use is unsafe, you can stop this work immediately. There are steps in place to correct unsafe workplace situations so you can return to work.

A worker may refuse to work or do particular work where he or she has reason to believe that:

- Any equipment, machine, device or thing the worker is to use or operate is likely to be dangerous to himself, herself or another worker;
- Physical condition of the workplace is likely to be dangerous;
- Either equipment or physical condition of the workplace is in contravention of WSCC's Mine Act and Regulations and that such contravention is dangerous.

The workers shall promptly report the circumstances of the refusal to the supervisor.

The supervisor shall address the nature of the refusal and take steps to correct the circumstances. If the matter cannot be resolved to the satisfaction of the supervisor and the worker, then the matter is taken to the manager who shall investigate the report and seek resolution following the current [WSCC Regulation 18](#).

3.5 WORKPLACE HARASSMENT / VIOLENCE

POLICY STATEMENT

NZC is committed to provide a work environment that is safe, secure, and free from all forms of violence and all types of discrimination or workplace harassment, including sexual harassment and bullying. NZC will operate in an environment that fosters trust and mutual respect.

CONDUCT PROHIBITED

The company strictly prohibits violence, bullying, harassment, intimidating or threatening conduct of a verbal or physical nature, by or between any manager, contractors, sub-contractors, workers or other persons on company premises or worksites. Such conduct could include but is not limited to: unwelcome, unsolicited encounters, following a request for the encounters to cease; stalking or harassment through electronic means such as e-mail or telephone contact; derogatory comments, slurs, threats, degrading words, stereotyping; offensive objects or pictures; graphic or sexually suggestive verbal or written comments; or flirtations, touching, advances, or propositions of a sexual or aggressive nature. Verbal horseplay and practical jokes can, depending on the circumstances be included within the prohibition.

“Harassment” under the Human Rights Code, means engaging in a course of objectionable conduct, comment or display by a person towards another Worker (on the basis of race, religion, sex, sexual orientation, family status, marital status, disability, physical features, age, ancestry or place of origin) that is known or ought reasonably to be known to be unwelcome. Workplace harassment is a form of discrimination and includes behavior or comments that insult or offend based on the list above.

“Discrimination” means any conduct which constitutes discrimination under the Human Rights Code. This includes discrimination based upon race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, age, record of offences, marital status, family status, or disability as defined in the Human Rights Code.

“Workplace Violence” means the exercise of physical force (does not have to be related to a prohibited ground of discrimination, as defined in the Human Rights Code) by a person against a worker in a workplace that causes, or could cause, physical injury to the Worker; and/or an attempt to exercise physical force against a worker in a workplace that could cause physical injury to the worker.

“Workplace Bullying” means persistent, offensive abusive, intimidating, malicious or insulting behavior, abuse of power or unfair penal sanctions which make the recipient (does not have to be related to a prohibited ground of discrimination, as defined in the Human Rights Code) feel upset, threatened, humiliated, or vulnerable, which undermines their self-confidence and which may cause them to suffer stress.

“Sexual Harassment” means unwelcome sexual advances, requests for favors, and or other verbal or physical conduct of a sexual nature by supervisory or non-supervisory employees.

RESPONSIBILITIES

All employees have a responsibility not to engage in harassment, sexual harassment, violence, bullying or discrimination against another worker and/or supervisor.

All employees of NZC in a supervisory role (including team leaders, others) have a responsibility under this Policy to promote a harassment-free work environment and to ensure that any complaints they receive are processed in accordance with this Policy.

COMPLAINT PROCEDURE

All complaints will be taken seriously. The rights of all concerned will be respected. Workers making a complaint are encouraged to use these steps to address incidents of alleged harassment, sexual harassment, violence or discrimination internally.

STEP 1: A person who believes that he/she has been subjected to harassment is encouraged to clearly/ firmly make known to the alleged harasser that the harassment is objectionable and must stop.

STEP 2: Where this cannot be done safely, if circumstances prevent a worker from taking action or if the harassment continues, the person should report the alleged harassment to their supervisor immediately. The supervisor in turn will inform the manager, and human resource manager or senior management.

STEP 3: Once a manager has received a complaint of harassment, the manager shall immediately bring the complaint to the attention of the general manager, chief operating officer or the president of NZC

STEP 4: Once a complaint has been reported as outlined above, the following procedure will be followed:

STEP 5: The complaint must be documented, signed, and dated. The complaint should include all relevant information about person(s) involved, nature of incident, date, time and place of incident, names of witnesses, if any, and any other information which the individual feels is relevant to the case.

STEP 6: An investigation will then be initiated. The manager will conduct the investigation or an individual(s) from outside NZC may be designated to conduct the investigation.

STEP 7: The investigation will include discussion with the complainant, the person(s) against whom the complaint has been laid, witnesses, if any, and anyone else who may be able to provide useful input into the investigation. The investigation and all discussions will be treated confidentially, to the extent possible, and all involved will be so advised.

STEP 8: All complaints of harassment or discrimination must be investigated to determine the nature and circumstances of the incident(s) and to determine appropriate resolution.

STEP 9: Following the conclusion of the investigation, the manager will inform the complainant and the alleged harasser of the results of the investigation.

Resolution and Corrective Action

Where harassment, sexual harassment, violence or discrimination has been substantiated, the manager will take appropriate corrective action to resolve the complaint. Where harassment, sexual harassment or discrimination has not been substantiated, no action will be taken against a worker who has made a complaint in good faith.

Complaints filed in bad faith may result in appropriate disciplinary action.

Confidentially

All written documentation regarding the incident shall be kept by the manager or human resource manager and kept on file.

EXTERNAL COMPLAINTS

Nothing in this policy prevents or discourages a worker from referring a harassment, sexual harassment or discrimination complaint to the police; Human Rights Commission; and, any other legal avenues available.

VIOLENCE IN THE WORKPLACE

In addition to the procedures and accountabilities set out above, the following will take place to assist in eliminating the risk of violence in the workplace.

WORKPLACE VIOLENCE ASSESSMENTS

As part of the Health, Safety and Emergency Response Plan, NZC will conduct periodic assessments to review the risk of workplace violence that may arise. We will reassess the workplace for workplace violence risks, as often as necessary to ensure the workplace policy and procedures in place, protect the workers.

WORK REFUSAL

The normal work refusal process will be followed if a worker refuses to work where he or she has reason to believe that he or she is in danger of being a victim of workplace harassment or violence.

NO RETALIATION OR REPRISALS

NZC will not permit any form of retaliation or adverse action to be taken against any employee who reports harassment, violence, intimidation, or threatening conduct in the workplace. All employees are assured that quick action will be taken to resolve complaints, and that NZC is firm in its commitment to eliminate such conduct from the workplace.

3.6 DISCIPLINARY ACTION

SAFETY POLICY ENFORCEMENT

All personnel, including contractors and sub-contractors, who do not abide by WSCC's Act and Regulations or NZC's Health, Safety and Emergency Response Plan shall be subject to disciplinary action. Failure to comply shall be considered grounds for disciplinary action including dismissal. Disciplinary action is recorded on an employee or contractor employment file.

3.7 WORKER'S DISCIPLINE NOTICE

If a discipline notice is required to be issued, a copy must be sent to NZC's Head Office and placed on the employee's or contractor's file. This notice is issued to any personnel who through their actions or inaction require an employee discipline notice to be issued.

The degree of the disciplinary action, including immediate dismissal, will depend upon the severity of the infraction. The disciplinary stages include:

1. **First Violation** - Issue a Verbal Order of non-compliance.
2. **Second Violation** - Written Violation Notice, with a mandatory safety talk, with possible training, probation, and added supervision.
3. **Third Violation** - Written Notice of Suspension, signed by both parties, and suspended for a period approved by the manager.
4. **Fourth Violation** – Written Termination.

Both NZC's Head Office and the contractor (if not NZC's employee) are to be notified of the action taken. NZC, at its discretion, may forward a worker's written violations or termination as a breach of conduct to their professional association.

ZERO TOLERANCE POLICY INCLUDES:

Any workers, contractor or sub-contractor found violating the Zero Tolerance Policy will be subject to immediate dismissal, and will have their transportation costs and/or repairs to damaged property deducted from their outstanding wages or invoices.

- Failure to participate in required site orientations.
- Possession, distribution and/or use of illicit or recreational drugs or alcohol (including cannabis).
- Refusal to participate with a breathalyzer test.
- Committing theft or willful damage to property.
- Being involved in the harassment of other workers, including:
 - Threats, intimidation or verbal abuse
 - Unwelcome remarks or jokes about subjects like race, religion, disability or age
 - Displaying sexist, racist or other offensive pictures or posters
 - Sexually suggestive remarks or gestures
 - Unnecessary physical contact, such as touching, patting, pinching or punching
 - Bullying behaviours
- Perpetrate violence, including:
 - Threatening behaviour - shaking fists, destroying property, or throwing objects.
 - Verbal or written threats - any expression of intent to inflict harm.
 - Physical attacks - hitting, shoving, pushing, or kicking
- Modifying or tampering with safety devices, guards, or other protective equipment without clearance from NZC's manager.

NO POSSESSION, DISTRIBUTION AND / OR USE OF ILLICIT OR RECREATIONAL DRUGS AND ALCOHOL
ON COMPANY PROJECT SITES



3.8 HAZARD ASSESSMENT

At the core of prevention of injury and loss is an understanding of the hazards and risks in the workplace. Hazards cannot always be eliminated, but understanding the nature of the hazards in the workplace and their potential consequences is critical to developing acceptable hazard controls.

HAZARD DEFINITION

A hazard is any existing or potential condition in the workplace which, by itself or by interacting with other variables, can result in deaths, injuries, property damage and other losses.

TYPES OF HAZARDS

1. Physical—Slipping, falling, muscle strains etc...
2. Chemical—Toxins which are ingested, inhaled, absorbed or injected.
3. Biological—Bacteria, viruses.
4. Environmental—Heat, cold, noise, air quality.

SOURCES OF HAZARD

1. Employees—as people interact in a work environment they are exposed to hazards and have the potential to cause accidents. Lack of adequate training on a job site may have the potential to cause unsafe acts, which are a source of hazards.
2. Equipment and Materials—equipment, tools and material can often be the source of hazards, particularly if they are inadequately maintained.
3. Environment—environmental factors such as the layout of the worksite, ventilation, walking surfaces, and temperature can all be sources of hazards.
4. Change—Change in any of the above categories can be a source of hazards.

HAZARD ASSESSMENT

A hazard assessment is the procedure of looking at a particular task, dividing it into steps and evaluating each step for potential hazards. Once hazards have been identified, potential solutions can be developed to eliminate or minimize the effects of the hazard.

Basic Steps in Hazard Assessment

- Inventory jobs in the workplace.
- Inventory the tasks within each job.
- Determine the potential hazards for each task. Evaluate the identified hazards by considering:
 - a. Severity of consequences;
 - b. Frequency of exposure; and
 - c. Probability of loss.
- Assign each task a criticality rating.
- Determine which tasks should be prioritized for hazard assessment.
- Divide each task into steps.
- Identify hazards for each step (considering employees, equipment, environment, level of change).
- Identify working solutions.

All employees are encouraged to participate in hazard assessments and are required to report all hazards or potential hazards to their supervisor. Hazard Assessment Forms and instructions for their use are available to all workers.

3.9 HAZARD REPORTING

It is NZC's policy that all hazards be reported and corrected immediately, to ensure a safe working environment. The procedure for reporting hazards is as follows:

- STEP 1.** Any Employee recognizing a hazard is to immediately inform their supervisor (or team leader), describing the hazard and possible outcome.
- STEP 2.** The supervisor will record the hazard information, completing all portions of the Hazard Assessment Form (see appendix).
- STEP 3.** The supervisor, if appropriate will notify other workers of the hazard in person or through warning signs
- STEP 4.** Where the hazard is in the control of the team leader, the supervisor shall give direction to correct the hazard in a safe manner.

- STEP 5.** Where the correction of the hazard is beyond the span of control of the supervisor or team leader, they shall contact the manager and provide a copy of the hazard report form.
- STEP 6.** The manager shall take all necessary steps to correct the hazard and file a completed hazard report noting corrective action in the job binder.
- STEP 7.** General hazards/areas are to be identified and noted on the site inspection forms and provided to health and safety committee.

3.10 RISK ASSESSMENT CHART

Although the risk matrix chart is a simplified form of hazard calculation, it can be very useful. The below priority chart provides the means for estimating the risk from several different hazards. It has a simple ability to quantify the risk, and allows the different risks to be ranked and prioritized. It is a very useful tool. In addition, the results of the matrix can be communicated easily. This communication is important when safety initiatives need to be implemented within an organization and the cooperation of others is needed to be successful.

RISK PRIORITY CHART

Likelihood How likely could it happen?	Consequences: How severely could it affect health and safety?			
	Extreme (death or permanent dismemberment)	Major (serious bodily injury or serious work-caused illness)	Moderate (injury or illness requiring casualty treatment)	Minor (injury or illness requiring first aid only, no lost time)
Very Likely (could happen frequently)	1	2	3	4
Likely (could happen occasionally)	2	3	4	5
Unlikely (could happen, but rare)	3	4	5	6
Very Unlikely (could happen, but probably never will)	4	5	6	7

Score	Action
1, 2 or 3	Do something about these risks immediately
4 or 5	Do something about these risks as soon as possible
6 or 7	These risk may not need immediate attention

3.11 EMERGENCY PROCEDURES

Prior to the start of a project, an emergency assistance procedure and an evacuation procedure will be determined by the manager (WSSC Regulation 8.32). The information contained will include the client's emergency signal system, the method and location of egress, the emergency assembly points, emergency telephone numbers and agreed check-in time schedule. Training will be made available as required. These emergency procedures will be posted for all workers to understand and follow.

PROJECT LAYOUT AND EMERGENCY ACCESS INFORMATION

Work Site Access, Routing and Emergency Communications

As soon as practical, the manager, together with his delegate, will develop an emergency access plan specific to the site with major access routes identified for emergency vehicles, etc. The site drawing or plan shall contain the following minimum information and shall be posted at the site and communicated to all contractors. The drawings shall display:

- Boundaries and workings of the project, and of any other workings, whether or not the workings have been discontinued or abandoned.
- Location of major access routes to site.
- Location of NZC's site office.
- Location of emergency telephones.
- Location of first aid stations and refuge stations.
- Location of washroom facilities.
- Location of storage and parking areas.
- Location of fire hydrants.
- Location of other fire protection equipment (e.g. Fire Extinguishers).
- Location of overhead and underground power lines.
- Location of any hazardous areas such as fuel storage areas.

Also to be posted are:

- Map showing the landing areas for air transport.
- Telephone numbers for emergency contact info.

EMERGENCY RESPONSE

In the event of major or fatal injury, the manager will order all work on the property to halt and nothing be moved, except for the purpose of preventing injury or relieving suffering, until:

- WSCC investigation is complete.
- WSCC informs otherwise.
- NZC accident investigation is complete.
- RCMP or coroner's investigation is complete in the event of a fatality.
- RCMP or coroner informs otherwise in the event of a fatality.

All witnesses to a major or fatal accident must remain on site until all agencies have completed their investigation or interviews.

EMERGENCY RESPONSE TEAM (ERT)

All members of the ERT will have the following qualifications;

- First aid certification.
- Fire response training.
- Evacuation training.
- General rescue training.

All members of the ERT will have the following equipment at their disposal;

- Coveralls.
- Full brim hard hats.
- Level II first aid kit.
- Fall arrest full body harness.
- Flashlight with extra batteries.
- Appropriate Personal Protective Equipment (PPE).
- Backpack to hold said equipment.

The emergency response vehicle on site will be accessible to the ERT members at all times and be equipped with the following;

- Fire-fighting equipment.
- Spill response equipment.
- Emergency rescue equipment.
- Radio communication.

In the event of an emergency, the head of the ERT is in complete charge of the scene until another agency responds, or the matter at hand has been remedied. A report will be filled out and sent to the appropriate agencies after a complete investigation has been done and the manager feels satisfied that the investigation is complete.

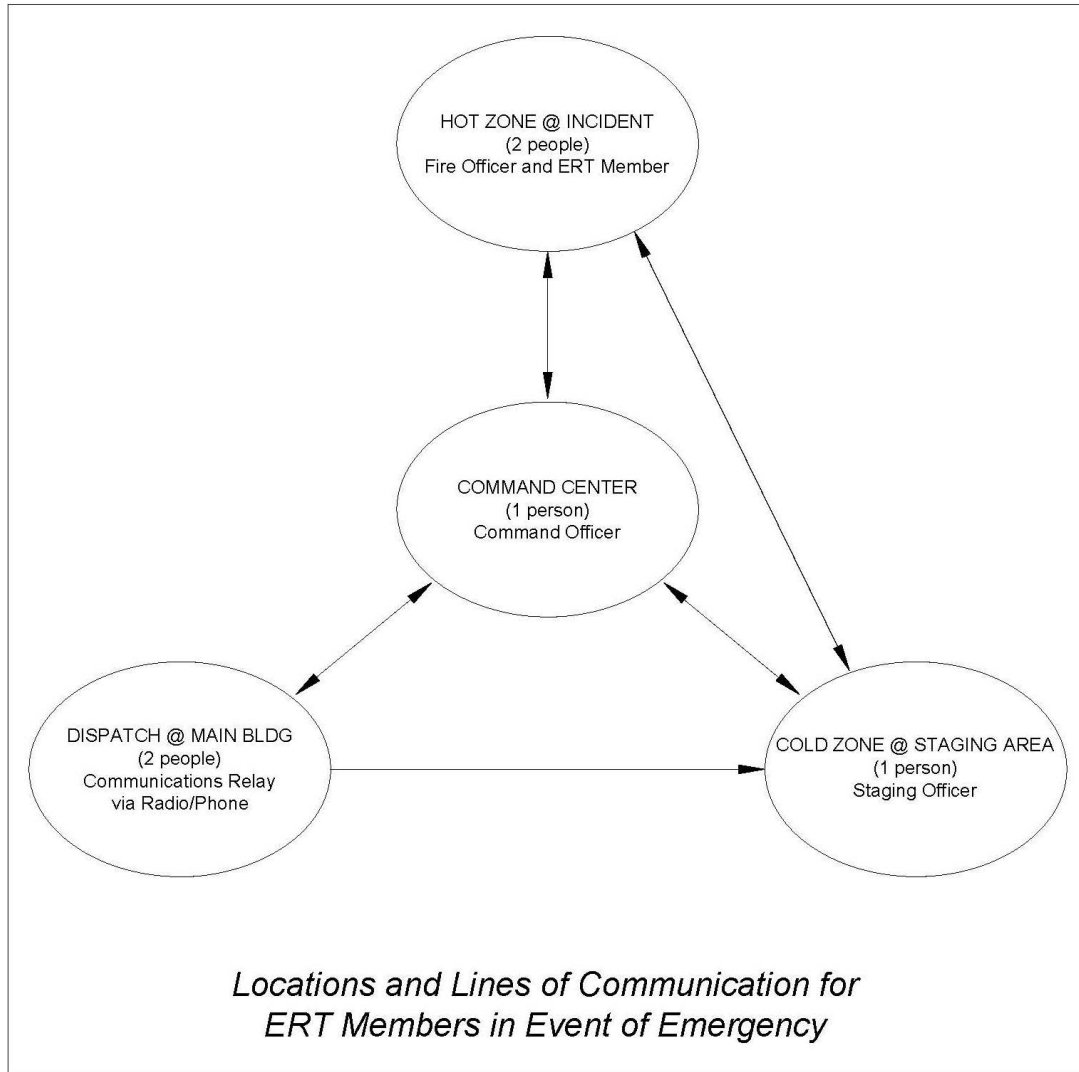
In the event that the ERT feels evacuation of the site is critical, a muster point far enough away from the site will be established, well-marked and accessible 24 hours a day by helicopter.

A map of the camp and surrounding area shall be established and located on the safety board in the main building. Coordinates for precise locations will be marked on the map and a copy will be given to each designated air carrier.

In the event of an aircraft-related incident, the involved air services company will be notified immediately and they will make the appropriate calls to the authorities. The ERT will be trained to respond to the scene of the accident.

Members shall be released from their regular duties to undergo training when necessary.

FIGURE 2: EMERGENCY RESPONSE TEAM COMMUNICATION



EMERGENCY PROCEDURE

In case of an emergency, the trained first responders will:

TABLE 1: EMERGENCY PROCEDURE

1) PERFORM SCENE ASSESSMENT	Check for hazards, do not become a casualty.
2) TAKE COMMAND	Communicate with helpers and assign following duties to specific personnel.
3) PROVIDE PROTECTION	Protect the patient and accident scene from ongoing hazards.
4) GIVE FIRST AID	Perform primary survey, critical interventions/ transport decision, and secondary survey. Do not move the patient unless to prevent further exposure to ongoing hazards or unless the patient is ready for transporting.
5) CONTACT MEDICAL SERVICES	Contact hospital, report medical situation, and maintain contact to inform of the patient's ongoing medical condition. Be prepared to provide: <ul style="list-style-type: none"> • Location of injured person(s) • Number of injured person(s) • Types(s) of injury • Transport decision (RTC, Non-RTC)
7) ADVISE MANAGEMENT	Inform senior management. They will contact relatives, authorities and start the reporting and accident investigation procedures.
8) ISOLATE THE SCENE	Barricade, rope off or post a guard at the scene to make sure that nothing is moved or changed until authorities have completed their investigation.

3.12 FIRST AID

Standard

- First Aid Policy must meet or exceed the **WSCC Regulations 8.48** for work site more than 20 minutes away by land from the nearest hospital.
- First Aid kits are to be provided on first aid rooms, commercial transport vehicles, drilling locations and refuge stations.
- Supervisors/team leaders will ensure that all workers on the job are aware of:
 - Where to find first aid stations and kits.
 - Who on site is trained in first aid?
 - Where to find locate emergency contact numbers.
- Each first responder will be trained to either the **Standard First Aid** certificate level or the **Advanced First Aid** certificate level. All actions performed must be within the limitations of the certificate held for each specific individual.

Keep a written record of any time first aid is administered and report it to your supervisor.

TABLE 2: REQUIRED QUALIFICATIONS OF FIRST AID ATTENDANTS (WSCC SCHEDULE 3.1)

NUMBER OF WORKER	QUALIFICATIONS REQUIRED
1 TO 8	Holder of a current St. John Ambulance Standard First Aid Certificate or Canadian Red Cross Standard First Aid Certificate.
9 TO 20	Holder of a current St. John Ambulance Advanced First Aid, OFA Level 1 Certificate or Canadian Red Cross First Responder Certificate (16-hour course, valid 3 years)
21 TO 60	Holder of a current St. John Ambulance Advanced First Aid, OFA Level 2 Certificate, MER, or Canadian Red Cross First Responder Certificate (36-hour course, valid 3 years)
MORE THAN 60 UP TO 350	Medical professional, including a doctor, nurse, paramedic or emergency medical technician who is currently certified or registered by a Canadian jurisdiction and holds a current St. John Ambulance Advanced First Aid; OFA Level 3 Certificate, AMER, EMT, EMT-P, (70-hour course, valid 3 years)

3.12.1 FIRST AID SUPPLIES REQUIRED (WSCC SCHEDULE 2)

CHECK/DESCRIPTION

- 1 - current edition of the manual First Aid: Safety Oriented
- 5 - pairs of latex gloves
- 200 - adhesive bandages assorted sizes
- 1 - sterile bandage compress, 10.2 cm
- 4 - bandage compresses, 20.32 cm
- 1 - package of 12 sterile burn dressings
- 6 - sterile gauze eye pads
- 1 - package of roller bandages, 2.54 cm
- 3 - triangular bandages
- 12 - large safety pins

- 1 - plastic eye shield
- 1 - package of flexible metallic splints
- 1 - pair scissors
- 1 - basket stretcher
- 1 - treatment record book
- 2 - CPR pocket valve masks
- 6 - sterile bandages, 10.2 cm
- 5 - bandage compresses, 15.24 cm
- 5 - sterile gauze bandages, 91.4 cm
- 1 - elastic bandage, 7.5 cm x 15 cm
- 10 - roller bandages, 5.1 cm x 5.5 m
- 1 - roll of adhesive tape, 2.5 cm x 2.3 m
- 3 - crepe bandages, 7.6 cm long
- 2 - boxes of 6 antiseptic towelettes
- 12 - sterile pads, 5.08 cm
- 1 - nail brush
- 1 - tweezers
- 3 - blankets
- 3 - chemical cold packs
- 5 - envelopes of skin closures, 0.6 cm x 7.5 cm
- 48 - gauze pads, 7.62 cm
- 2 - rolls of adhesive tape, 2.5 cm x 2.3 m
- 6 - crepe bandages, 7.6 cm
- 1 - antiseptic soap, 50 ml
- 1 - glass eye dropper
- 2 - plastic eye shields
- 1 - pair of thin nose sliver forceps
- 2 - packages of flexible metallic splints
- 1 - small kidney basin
- 1 - set of adjustable cervical collars
- 1 - plywood spine board with handholds (2 sides levelled), 44 cm x 1.8 m x 2 cm
- 7 - heavy velcro straps to secure injured person, 5 cm x 1.8 m
- 2 sets of splints each including:
 - 2 splints, 1 cm x 10 cm x 1 m plywood notched and cm padding
- 1 - splint, 1 cm x 10 cm x 1.5 m plywood notched and 2.5 cm padding
- 1 - portable oxygen therapy unit (may be kept in a separate container from the other supplies)
- 1 - pocket mask with a one-way valve (may accompany the portable oxygen therapy unit)
- 1 - oropharyngeal airway kit (may accompany the portable oxygen therapy unit)
- 1 - manually operated self-inflating bag-valve mask with an oxygen reservoir (may accompany the portable oxygen therapy unit)
- 1 - bed
- 1 - bedpan
- 6 - sterile pads, 7.6 cm
- 6 - bandage compresses, 5.08 cm
- 6 - sterile bandages compresses, 7.6 cm
- 6 - abdominal pads, 30.48 cm
- 2 - Esmarch bandages, 7.62 cm
- 1 - eye wash solution, 50 ml
- 1 - glass footed eye bath cup
- 12 - tongue depressors
- 1 - burn trauma kit

FIGURE 3: FIRST AID KIT LEVEL 2



SOURCE: ST. JOHN AMBULANCE

Communication

- First Aid standard is to be included in NZC's Health, Safety and Emergency Response Plan.
- A current list of those workers trained in first aid will be posted on the site bulletin board.
- All communications and treatments are to be documented.

Training

- All training will be carried out by a recognized Certified First Aid training company.
- Keep training records of all Workers who have been trained. Records to include:
 - Date of training.
 - Date of renewal.
 - Name of recognized agency that performed the training.

SUPERVISOR'S/ TEAM LEADER'S RESPONSIBILITIES

- At weekly safety talks meetings, ask who is currently qualified in first aid, and ask workers to identify who their first aid person(s) is (if any).
- Inform workers of the location of the on-site first aid kits.
- Inform workers of the location of the nearest telephone, two-way radio, or satellite (iridium) phone.
- Perform first aid kit inspection checklist once per week.
- Keep records of all evaluation procedures.

WORKER'S RESPONSIBILITIES

Familiarize yourself with your surroundings and if it is your first day on a site, ask your supervisor where the first aid kit is located, who is trained, where is the nearest telephone/two-way radio/satellite phone.

Follow Safety Rules

Safety rules and regulations exist for everyone in every workplace. While your employer has to make sure you know what these are, you are responsible for following these rules. This includes wearing the proper safety equipment. When it comes to safety, there are no shortcuts.

Ask for Training

Your employer is responsible for making sure you have proper safety training, but your employer might not know if there are gaps in your training. If you feel you need more training to do a job safely, ask for it.

Report Incidents and Unsafe Work Conditions

You should report any incidents and unsafe work practices or conditions you see. For example; if you notice a frayed an electrical power cord, notify your supervisor as soon as possible.

Ask Questions

Everyone needs to have their tasks explained. Your employer should first explain your job duties, and then show you what to do. If you understand these tasks, you should be able to explain them back to your supervisor. Remember, if you don't understand the instructions, ask questions. Understanding instructions means you will have a greater chance of doing the work properly and safely.

3.13 HEAD, NECK OR SPINAL INJURIES

Suspect head, neck, or back injuries in casualties who have experienced a violent force, such as in a motor vehicle crash or a fall. In such cases minimize movement of the head and neck when opening the airway. Use the jaw thrust method instead of the head-tilt/chin-lift.

Signs and Symptoms of Head and Spine Injuries

- Changes in level of consciousness
- Severe pain or pressure in the head, neck, or back
- Tingling or loss of feeling in the fingers and toes
- Loss of movement of any body part
- Unusual lumps on the head or spine
- Blood in the ears or nose
- Heavy bleeding of the head, neck, or back
- Convulsions
- Impaired breathing or vision
- Nausea or vomiting
- Persistent headache
- Loss of balance
- Bruising of the head, especially around the eyes and behind the ears.

These signs and symptoms alone do not always mean a serious head or spine injury, but always call EMS when you suspect a serious head or spine injury.

First Aid for Head and Spine Injuries

Follow the emergency action principles whenever you suspect a head or spine injury:

1. Survey the scene to ensure no danger.
2. Check the casualty for unresponsiveness. If the person does not respond, call EMS.
3. Do a primary survey and care for life-threatening problems (ABC's). Call EMS for help if necessary.

4. Do a secondary survey, if needed, and care for other problems.
5. Keep monitoring the ABC's until EMS arrives.
6. Help the casualty rest in the most comfortable position and give reassurance.

Head and spine injuries can become life threatening. Give the following specific first aid while waiting for EMS help to arrive:

1. Keep the head and spine as still as possible.
2. Maintain an open airway.
3. Monitor consciousness and breathing.
4. Control external bleeding.
5. Maintain normal body temperature.

3.14 RESCUE AND EMERGENCY MOVES

Usually in emergencies, you give first aid in the same place you find the casualty. Moving a casualty needlessly can lead to further injury. However, in some cases, the situation is dangerous, and the casualty must be moved or rescued before you can give first aid.

Moving Casualties

Never move a casualty unless there is immediate danger such as fire, poisonous fumes, risk of drowning, risk of explosion, a collapsing structure, or uncontrollable traffic hazards.

Always follow these guidelines when moving a casualty:

- Only attempt to move a person you are sure you can comfortably handle.
- Bend your body at the knees and hips.
- Lift with your legs, not your back.
- Walk carefully using short steps.
- When possible, move forward rather than backward.
- Always look where you are going.
- Support the casualty's head and spine. Immobilize the head, neck, and back if you suspect a neck or back injury. A casualty who is unconscious should be treated as if he or she has neck or back injuries.
- Avoid bending or twisting a casualty with possible head or spine injury.

Move a casualty with a suspected neck or back injury only if it is absolutely necessary. You need a spine board (a flat, non-metal board the same length as the casualty) and at least two other rescuers to assist. One rescuer acts as leader and instructs the others:

1. All rescuers kneel on the same side of the casualty.
2. One rescuer at the head supports the head and neck, while one at the feet supports the feet. Other rescuers pass their hands over the casualty at the chest, hips, and knees.
3. At the leader's signal, the rescuers roll the casualty toward them onto his or her side. The head and neck are kept aligned with the rest of the body.
4. The spine board is placed behind the casualty. On the leader's signal, the rescuers roll the casualty back onto the board as one unit.
5. To secure the casualty immobile on the board, wrap a series of bandages around the casualty and board, including at the forehead, chest, waist, legs, and ankles.

The rescuers can now carry the casualty on the board away from the danger scene.

3.15 LOSS OF CONSCIOUSNESS – USE OF AUTOMATED EXTERNAL DEFIBRILLATOR

In the event of loss of consciousness or sudden cardiac arrest, a casualty's best chance for survival is immediate CPR. A first responder with an automated external defibrillator (AED) AEDs will be available at each of the access road maintenance camps and the mine.

Initially the emergency actions principles should be followed. If the casualty has lost or loses consciousness, the first responder should check the casualty's airway, breathing and circulation and if needed apply AED. The AED can be used by anyone, regardless of First Aid background.

AED Procedures

Initial Steps

- The AED is to be used as the main method for resuscitation of patient.
- Remove all components from the AED bag (AED, pads, small bag containing face shield, gloves, cloth, razor, super scissors, and the instruction placard).
- Put on the gloves and mask supplied in small bag.
- Turn AED on by pressing the green button.
- Listen to the commands from the AED. It will guide the user through the process.

AED Pads

- Shave patient's excess body hair using the razor supplied.
- Remove any metal from patient's chest area (necklaces, upper body piercings, underwire bra, etc.). Use the super scissors if necessary.
- Make sure the pads are firmly connected to the AED and are pressed firmly onto the patient.

Follow AED Commands

- Listen carefully. The AED will let the user know when to shock; when to start CPR, when to stand back, etc.
- Continue rotation of AED and CPR, as prompted by the AED, until the AED detects a pulse or until Paramedics arrive.
- Without defibrillation, each passing minute decreases the chance of survival by 10%.
- CPR cannot restore a patient's heart rhythm.

3.16 ACCIDENT / INCIDENT INVESTIGATION

Accident investigations are an essential element of any safety program. The purpose of an investigation is to illuminate the hazards and problems that resulted in the accident taking place so that measures can be taken to prevent a recurrence of similar events. After causes have been determined, prompt follow-up action is required to achieve the purpose of the investigation. Incident Investigation Form is located in the Appendix.

A worker who sustains an injury or becomes ill as a result of workplace conditions or work activity must report the injury to a supervisor or manager immediately. If, because of the nature of the injury or illness, an employee is unable to report, another worker will report the event to the supervisor.

The supervisor or manager of the area, will:

- Ensure emergency services are initiated and first aid is administered.
- If required, notify additional response / rescue teams.
- Ensure NZC's Head Office has been informed.

Upon being informed of an injured or ill worker, a qualified first aid provider will go to the scene or first aid station and administer appropriate treatment. The treatment and/or advice given are to be recorded in the first aid treatment log provided. As necessary, the first aid provider will assist in ensuring that an injured or ill worker receives subsequent medical attention as required.

INCIDENT TYPE AND REPORTING REQUIREMENTS

The prime objective of reporting and investigating accidents is to prevent recurrence. Knowing how to identify accidents and following the procedures and forms set out hereafter will help prevent the recurrence of accidents. These procedures include the following:

- Accidents and Incidents.
- Investigation Required.
- Action of the Investigation.
- Forms.
- Records.
- Follow-up.

Accidents and incidents vary in severity. Reporting requirements to WSCC are outlined below.

- **Fatality:** Immediately submit oral report to a WSCC's chief inspector of mines and written within 3 days. [WSCC Regulation 16.02\(1\)](#)
- Incident Involving **Serious Injury** or Incident of a **Serious Nature:** Immediately submit oral report to a WSCC's chief inspector of mines. Within 3 days submit written report to WSCC's chief inspector of mines. [WSCC Regulation 16.02\(3\)](#)
- Incident Involving **Non-Serious Injury:** Submit with monthly written reports to WSCC's chief inspector of mines.

Anatomy "**Serious Injury**" of a worker includes:

- Severe brain injury, defined as one or more of the following:
 - Glasgow Coma Score of 13 or less.
 - Pupillary inequality greater than 1 mm and sluggish response to light with altered level of consciousness.
 - Depressed skull fracture.
- Decreased level or loss of consciousness.
- Penetrating injury to the head, eye, neck, chest, abdomen, or groin.
- Severe crush injuries: a fracture of the skull, spine, pelvis, femur, humerus, fibula, tibia, radius or ulna.
- An amputation of a major part (i.e. hand or foot).
- The permanent loss of the sight of an eye.
- Any serious internal hemorrhage (signs of shock).
- Any burn that is caused by electricity.
- Any 3rd degree burn of the body or 2nd degree burn of more than 10% of the body.
- Any injury caused directly or indirectly by explosives.
- Any asphyxiation or poisoning that causes a partial or total loss of physical control.
- Spinal cord injury.

- Suspected heart attack or cardiac arrest.
- Obvious circulatory shock (hypovolemic shock).
- Bleeding requiring the application of a pressure point or tourniquet.
- Respiratory rate of fewer than 10 breaths per minute or severe dyspnea.
- Any condition requiring assisted ventilation.
- Partial or complete airway obstruction.
- Moderate or severe hypothermia.
- Heat Stroke.
- Stroke.
- Anaphylactic reaction.
- Acute poisoning.
- Unconscious for any reason.

Mechanical incident of “**Serious Nature**” includes:

- A worker being exposed to smoke or toxic gas inhalation, or carbon monoxide poisoning.
- A worker falling a vertical distance of 3 meters or more.
- A worker whose fall is arrested by a fall-arrest system.
- Roll-over or loss control of a vehicle or equipment.
- Underground ground instability.
- Structural failure of false work designed by, or legally required to be designed by, a professional engineer.
- Structural failure of scaffold supports.
- Structural failure of supporting member such as a column, beam, wall, or truss.
- Failure of an earth-or-water retaining structure such as dam, trench, shaft, tunnel, caisson, or cofferdam.
- Failure of excavation wall cut and trimmed to a slope, which a professional engineer has specified in writing that will not endanger workers.
- Contact by backhoe, shovel, crane, similar device, or its load with a live power line of more than 750 volts.
- Near-drowning.

THE INVESTIGATION TEAM

- An Investigator will be appointed and an Investigation Team will be formed within 24 hours of the serious incident occurrence.
- The Investigator/Team will be familiar with the equipment, operation or process involved in the incident. Management involvement in the incident investigation is required.
- A trained person who knows the people and the department where the incident occurred will be the person to lead the investigation team.
- A representative from the health and safety committee will be a member of the investigation team.

TABLE 3: WSCC FORMS (NORTHWEST TERRITORIES)

WSCC Form	WEBSITE LINK	EXPLANATION
Employer's Report of Injury	http://www.wcb.nt.ca/Employers/Forms/Documents/101-CS002-1308_E_Fillable.pdf	Must be submitted within 3 days
Worker's Report of Injury	http://www.wcb.nt.ca/Workers/Forms/Documents/101-CS001-1308_E_Fillable.pdf	No time limit
Clearance Request	http://www.wcb.nt.ca/YourWSCC/WhoWeAre/Documents/101-RS020%20E-Electronic_Fillable%20-%20Revised%20October%2021,%202013.pdf	To be completed and submitted before contractor's or sub-contractors begin work
Employer's Report of Fatal Injury	http://www.wcb.nt.ca/Employers/Forms/Documents/Employer%27s%20Report%20of%20Fatal%20Injury.pdf	Immediately submits oral report to a WSCC Chief Safety Officer and submit form within 3 days of incident.

DEFINITIONS:

Environmental Release:	An accidental discharge of a physical, biological or chemical substance into the workplace and/or community.
Fatality:	An injury that results in the loss of life. (WSCC Regulation 24.2a)
Fire/Explosion:	An event where undesired combustion occurs.
First Aid:	Includes but is not limited to: cleaning minor cuts, scrapes or scratches; treating a minor burn, applying bandages and/or dressings, cold compress, cold pack, ice bag, splint, changing a bandage or a dressing after a follow-up observation visit and any follow-up for observation purposes only.
Health Care:	An injury that results in attention received from a recognized health care provider but that does not result in time away from scheduled work nor a wage loss.
Illness:	A deviation from the normal, healthy, state of the body
Injury:	An event that results in physical harm to an employee
Lost Time:	A work related injury that results in the injured worker missing scheduled time from work resulting in a wage loss.
Near Miss:	An event that under different circumstances could have resulted in physical harm to an individual or damage to the environment, equipment, property and/or material.
Occupational Illness:	A condition that results from exposure in a workplace to a physical, chemical or biological agent to the extent that normal physiological mechanisms are affected and the health of the worker is impaired.
Property Damage:	An event where contact is made between two objects resulting in alteration to one or both of the objects.
Serious Injury:	As defined in the above list. (WSCC Regulation 24.2b)
Serious Nature:	As defined in the above list.

ROLES AND RESPONSIBILITIES

Manager/Supervisor/Manager of Safety

- The responsible supervisor investigates the injury/incident and completes the investigation within 24 hours of the injury/incident.
- In the case of personal injury the supervisor ensures that the injured employee(s) receives appropriate healthcare.
- The supervisor contacts a worker's representative from the Joint Health & Safety (JHSC) designated to investigate the injury/incident, to assist in the investigation.
- The supervisor notifies appropriate company personal as soon as possible.

Note: The supervisor and the worker representative can request assistance from other managers, supervisors, or any other source that may be available. They are also responsible for securing the scene of the injury/incident.

COMMUNICATION

The results and the injury/incidents will be communicated to the workers in a number of ways:

- Minutes of the health & safety committee meetings.
- Supervisors holding safety talks with employees.
- Through postings on safety bulletin boards.

The Joint Health & Safety Committee (JHSC) will assist in all areas with remedial actions and recommendations.

Worker designate of the Joint Health and Safety Committee (JHSC):

- The worker representative selected by the worker members of the joint health and safety committee investigates all injuries/incidents.
- The worker representative must be involved in the investigation of a fatality or critical injury.
- The worker representative and the supervisor together conduct the investigation and assist in completing the report, and both sign the injury/incident investigation report.
- Where required by legislation the worker representative submits a copy of the injury/incident investigation to the appropriate authority.
- JHSC Representatives ensure checklist and investigation reports are completed and signed by the appropriate worker and management representative of the JHSC.

PRESERVATION OF THE ACCIDENT SCENE

When a person is killed or seriously injured at the workplace, no person shall interfere with, disturb, destroy, alter or carry away any wreckage, article or thing at the scene of or connected with the occurrence until permission to do so has been given by the WSCC chief inspector of mines ([WSCC Regulation 16.03, 16.04](#)), except for the purposes of:

- Preventing injury, saving life or relieving human suffering.
- Where an inspector is unable to conduct an immediate investigation of a reportable incident, an inspector may authorize a person to move or otherwise interfere with any wreckage or equipment at the scene of or connected with the reportable incident to the extent necessary to permit the resumption of mine operations.
- Where an inspector authorizes a person to move or otherwise interfere with any wreckage or equipment at the scene of or connected with the reportable incident, the inspector may require that the person take photographs, make drawings or take such other action as the inspector considers necessary to facilitate the investigation of the incident.
- Nothing in this section authorizes a person to move or otherwise interfere with any wreckage or equipment at the scene of or connected with the reportable incident where a coroner or a police officer has secured the scene or the equipment under the Coroners Act.

THE ACCIDENT INVESTIGATION PROCEDURE

Accident Investigations will be conducted according to the following steps.

STEP 1: Prepare for the investigation

Investigators should be equipped with the following:

- Additional Personal Protective Equipment (if required)
- Camera
- Tape measure
- Clipboard, paper
- Pens, pencils
- Flagging (tape or spray paint)
- Incident Investigation Form

STEP 2: Assess the scene of the incident

- Secure the scene to minimize the risk of any further injury.
- Ensure that the injured are cared for. Make sure the injured workers have received medical care before starting an investigation.
- Keep the scene as undisturbed as possible.
- Make an accurate record of the accident/incident scene. If necessary, use photographs, measurements and diagrams.
- Identify and interview all witnesses as soon as possible.
- Record all information.
- Identify witnesses for interviews.

STEP 3: Collect Information

- Make observations, on site assessment of the scene (Site, Equipment, Material)
- Use photographs/ sketches/ drawings with several vantage points etc.
- The interviews should be conducted in a quiet place, one witness at a time.
- Ask for their permission to take notes.
- Interview workers involved, witnesses, and outside experts if applicable (i.e. suppliers, equipment designers Etc.).
- Reassure the witnesses the investigation's main purpose is to find the causes NOT to assign blame.
- Go over your notes to ensure that the witness agrees with your interpretation of the account.
- Ask the witness for their suggestions as to how the accident/incident could be avoided.
- Encourage the witnesses to contact you at a later date if they think of something else. Thank the witness.

STEP 4: Evaluate Information and draw conclusions

- Set out the events in chronological order.
- Consider all contributing factors.
- Use the Accident Investigation Form to ensure that everything has been considered.
- Distinguish between direct and circumstantial information.
- Be objective—look at the information and look for possibilities beyond the basic cause.

STEP 5: Write a report

The written report should include:

- A brief outline of the events leading up to and including the accident/incident. Be specific about dates, times, places, people involved, conditions, etc.
- A description of the events in chronological order.
- Diagrams and photos as attachments.
- Recommendations as to the basic causes and contributing factors of the accident/incident.
- Suggestions for corrective action.

STEP 6: Follow-up

- This final stage of Follow-up is the most important step of the accident/incident investigation procedure and needs to entail.
- Ensure that someone is specified to take corrective action.
- Establish a system of follow-up to ensure corrective action took place.
- The recommendations must focus on corrective actions(s) to all the contributing factors identified including:
 - What has been done,
 - Who has completed the actions, and
 - When the actions were completed.
- Post the results of the investigation.
- Post the actions taken and the reasoning behind the actions.
- Consideration is given to lack of safety equipment enforcement and/or the need for safety equipment.

INVESTIGATION PROCEDURE REVIEW

This procedure will be reviewed on an annual basis or if an investigation identifies revisions are required. Review quarterly reports of the following injury / incident types to determine any investigative needs:

- First Aid.
- Health Care.
- Near Miss.

3.17 INCIDENTS INVOLVING OCCUPANTS OR GENERAL PUBLIC

Contact by project personnel (employees/contractors/sub-contractors) with the general public must be limited and must not be confrontational. All incidents, accidents, or near miss occurrences outside the project's property must be reported immediately to the manager or supervisor. Failure to report will result in disciplinary action by NZC. NZC will participate with any contractor/sub-contractor's investigation of an incident, accident, or near miss occurrence on or off the project's property and receive a copy of the final report.

3.18 RETURN-TO-WORK PROGRAM

POLICY STATEMENT

NZC is committed to developing and maintaining a safe and healthy work environment. In keeping with this goal, it is the policy of this company to make every reasonable effort to provide suitable modified or alternate employment to employees who are temporarily or permanently unable to return to work or continue to perform their regular duties as a result of injury or illness.

COVERAGE

This policy applies to all employees at the company's business operations who are unable to perform their regular work as outlined in their job description as a result of:

- An occupational injury or illness and/or;
- Injury or illness unrelated to occupational activity, and/or;
- An active claim with an insurance carrier;
- Persons with disabilities, regardless of the cause or nature of the disability.

KEY CONCEPTS

Accommodation - modification of a job, tasks, equipment or schedule to assist an injured workers in returning to work. Accommodation may include, but is not limited to:

Modified Work

Modifications to a worker's pre-injury duties which may include modification to the job, task, function, hours of work, frequency of breaks, worksite, or any combination of these. Graduated return-to-work, when the worker temporarily works limited hours or limited duties as part of a plan leading to full employment, is included in modified work. Modified work can be temporary or permanent in nature.

Alternate Work

Work that is different from the employee's pre-injury job or illness offered to a worker who is temporarily or permanently unable to perform their pre-injury work.

Restrictions

Physical or psychological limitations resulting from a worker's injury or illness. These can apply to work and activities of daily living. Restrictions may be considered temporary when recovery and rehabilitation is progressing towards full recovery or permanent where no further recovery is expected.

Transitional Work

Most accommodations are considered transitional work which is any group of tasks or specific jobs that are not intended to be the end result of the return-to-work process. The worker is expected to eventually be capable of returning to full pre-injury duties.

Maximum Medical Improvement

The point at which further medical and/or healthcare treatment or intervention will not result in significant improvement in the worker's condition. May require a permanent accommodation.

Permanent Accommodation

When a worker's injury or condition results in permanent limitations that prohibit the worker from returning to their pre-injury work.

Undue Hardship

Refers to the limit of an employer's capacity to accommodate without experiencing an unreasonable amount of difficulty. Workplaces are required to provide accommodation "up to the point of undue hardship". There is no precise legal definition of undue hardship, nor is there a standard formula for determining undue hardship. Each situation is unique and should be evaluated individually. When the employer claims that the accommodation will cause undue hardship, the onus is on the employer to show adequate evidence to support their claim. A number of factors will be considered including:

- Health and safety concerns.
- Business efficacy.
- Interchangeability of employees and facilities.
- Impact on employees and service users.
- Impact on other protected rights.
- Benefit of the accommodation.

Return-To-Work Hierarchy

Return-To-Work Hierarchy - a structured set of steps to follow in determining what type of accommodation is needed. The steps are as follows:

- Determine if the employee can perform his or her existing job;
- If the employee cannot perform his or her existing job, determine if he or she can perform his or her job in a modified form;
- If the employee cannot perform his or her job in a modified form, determine if he or she can perform an alternate job in its existing form;
- If the employee cannot perform alternate job in its existing form determine if he or she can perform an alternate job in a modified form.

When moving through the Return-To-Work Hierarchy, efforts should be made to maximize the injured, ill or disabled employee's knowledge, qualifications and abilities while respecting their outlined restrictions. This means that when looking at alternate and modified jobs, begin with the department in which the employee currently works then expand to other departments within the same division before looking at alternate jobs in other divisions.

ROLES AND RESPONSIBILITIES

Both worker and supervisors have key responsibilities for properly reporting injuries and illnesses. If a worker misses time from work or is unable to perform all aspects of his or her regular job duties, the worker is required to notify his or her supervisor or designate as is reasonable in accordance with provisions in their employment and other organizational requirements. The worker should declare whether or not the injury, illness, or reason for absence is work or non-work related so that the supervisor can initiate the appropriate process.

The success of the disability management program relies on the willingness of the worker and the return-to-work team to cooperatively develop a return-to-work program tailored to the worker's particular needs. All parties have unique responsibilities within the return-to-work planning process. These responsibilities are explained below.

Injured or Disabled Workers

Injured, ill or disabled workers are expected to participate actively in the disability management and return-to-work program. This includes, but is not limited to:

- Obtaining medical treatment and keeping treatment providers informed about return-to-work and accommodation options that are available.
- Reporting absences due to injury or illness to their immediate supervisor as soon as is reasonably possible to obtain the help required for early return-to-work.
- Complying with recommendations of treatment providers (i.e., attending all medical and rehabilitation appointments regularly; attending independent assessments as requested; discussing the company's disability management program with the treatment provider).
- Providing details of functional capabilities and known activity limitations as they are related to the performance of job duties.
- If an injury or illness is work related, notify their supervisor if they have missed time from work or sought medical attention so that the appropriate WSCC reporting procedures can take place.
- Provide documents (i.e., the functional ability form) to the appropriate party within 5 days of receipt of these documents.
- Returning the completed documents to the appropriate party within the outlined timeframe.
- Inform human resources of any concerns related to benefits, work duties, or changes in circumstances.
- Participate in the development of a suitable return-to-work plan.
- Complete worker's application for appreciate benefits as soon as possible and asking for help if required.
- Communicate regularly with human resources, RTW coordinator, insurers and the treating healthcare provider during the return-to-work and follow up process.
- Apply safe work practices and working within outlined abilities to avoid re-injury.

Supervisors

Immediate supervisors are primarily responsible for managing the worker's attendance and participating in initiating and monitoring the return-to-work planning process. This includes, but is not limited to:

- Following policies and disability management procedures and ensuring employees and co-workers are aware and informed of these policies, procedures, and applicable legislation.
- Promote an open, cooperative process, including maintaining regular contact with the worker.
- Involve and assist the RTW coordinator when a workplace accommodation or transitional work arrangement is required.
- Provide information to the RTW coordinator on transitional work options in their area.
- Work with the return-to-work team to develop a suitable return-to-work plan for the worker and stay within outlined abilities/limitations.
- Monitor the progress of the worker through the return-to-work plan and involve the RTW coordinator if there is a change in circumstances.
- Safeguard confidential information in accordance with the company's privacy policy.
- When appropriate, inform co-workers in the immediate area of return-to-work plans while maintaining appropriate confidentiality requirements.
- Ensure a work environment that is conducive for a successful return-to-work or accommodation for a worker with an injury, illness or disability.
- Promote and enforce safe work practices.
- Visibly support the disability management program.

Return-To-Work (RTW) Coordinator

RTW coordinator is the primary contact for employees and outside agencies on matters related to disability management and return to work planning. This individual is responsible for the overall coordination and day-to-day administration of the disability management program. This includes but is not limited to:

- Developing, facilitating and monitoring return-to-work programs.
- Developing and facilitating permanent accommodations.
- Including the workers, supervisors, and managers to facilitate return-to-work programs.
- Assisting the worker in applying for benefits or obtaining appropriate health-care and rehabilitation assistance.
- Monitor as indicated on the return-to-work plans, but no later than one week, and provide progress reports to appropriate individuals.
- Communicated and document with WSCC issues related to each worker's case file.
- If worker is a member of union advise them of their right to union representation.
- Maintain file documentation in a separate, confidential location related to all individuals who participate in the disability management process in accordance with our policies on file retention and confidentiality. Documentation includes phone conversations.
- Facilitate the acquisition of assistive devices, workplace modifications or job restructuring.
- Ensure workers are aware of their rights, obligations and the effect of specific decisions on their entitlement to benefits.

Human Resources

Human resources will often have an active role in the return-to-work planning process. This includes but is not limited to;

- Being aware of all jobs and job duties within the organization.
- Working with the return-to-work team.
- Providing support, guidance and direction to leadership staff.
- Providing consultation and guidance to the RTW coordinator and supervisors.

Co-Workers

Co-Workers should:

- Support injured ill or disabled workers as they participate in the return-to-work process.
- Be sensitive to and maintaining privacy around the issues faced by employees when they are away from as well as when they return to work.
- Notify the employer or their union if they have any concerns or suggestions about the disability management program or the return-to-work process.
- Report unsafe working conditions to the appropriate parties.

Executive Management

Executive Management provides a commitment to:

- A safe and healthy work environment.
- Visibly supporting the disability management program.

Return-To-Work (RTW) Committee

RTW committee is responsible to oversee the development and implementation of the disability management program. The committee will consist of members from management, workers representative, human resources, RTW coordinator or person designated, and a member of the workplace safety and health committee. The responsibilities of the committee include:

- Overseeing the development and revisions to the disability management program policy, including program objectives, dispute resolution, and method for program evaluation.
- Review and evaluate the disability management policy and program to ensure that its program objectives are being met minimum every two years.
- Develop an implementation including communication strategy for the disability management program.
- Review recommended program enhancements and obtain support from management and worker representatives.
- Visibly support the disability management program and promote the program to all employees immediate supervisor.

3.19 PROCESS AND EQUIPMENT MODIFICATION

NZC will ensure that any goods purchased are assessed for existing or potential hazards and ensure that appropriate controls are in place. This procedure applies to any modifications of existing processes or equipment. Regulatory compliance and industry standard practices are expected to be adhered to:

- At the design stage.
- In the purchase specifications.
- During construction and /or,
- Installations phases.

Manager will:

- Review the new/modified main activities to determine whether hazards exist.
- If a major hazard is identified then a safe operating procedure (SOP) will be developed.
- Insure that the new purchase or modification meets all appropriate legislation and industry standards, (i.e. CSA).
- Include a review of any material safety data sheets (MSDS) as they apply to any chemicals being introduced into the workplace.
- Ensure the review outlines the use, storage or disposition requirements.
- Ensure that the appropriate controls are in place to either eliminate, or control the hazard.
- Complete the Equipment / Process Review and or Modification Form with all relevant information.
- Forward the Equipment / Process Review and or Modification Form to the manager and JSHC for review.

Joint Health & Safety Committee (JHSC) will:

- Review the Equipment / Process Review and or Modification Form.
- Provide input on any additional hazards(s) or control(s).
- Provide feedback to the manager.

Supervisor/ Team Leader:

- Assist the manager with the hazard review.
- Train the appropriate staff who will be exposed to or work with the new /modified equipment on the safe operating procedures (SOP).

Pre-start inspections prior to the initial use of new / modified equipment / process will be conducted with the involvement of the:

- Health and Safety Representative or JHSC.
- Manager.
- Supervisors/ team leader.
- Any operators or person who has potential to operate the machinery or involved in the new or modified process.

All new/modified equipment will be added to the existing list of equipment that requires pre-use operator inspections. Implementation of the Pre-use / Pre-shift Inspection Program will commence upon the initial use of the equipment / process.

3.20 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

WHMIS:

In effect across Canada since October 31, 1988, WHMIS is designed to protect the health and safety of workers by providing information about hazardous materials on the job. Controlled products under WHMIS include 8 classes, identified by appropriate symbols.

FIGURE 4: WSCC WHMIS POSTER



SOURCE: WSCC

WHMIS gives everyone the right to know about the hazards of workplace materials and provides information in three ways - labels, MSDS, and workers training.

- Product identifier.
- Appropriate hazard symbol(s).
- Risk phrases (such as "dangerous if inhaled").
- Precautions (such as "wear rubber gloves").
- First aid measures
- Supplier identifier.
- Statement that a material safety data sheet (MSDS) is available for the product.

GUIDE FOR EMPLOYERS AND WORKERS

Supplier Labels

The label is the worker's first source of information about the product's hazards. In WHMIS 2015, the labels of hazardous workplace products must display the information elements shown below:

SUPPLIER LABELS

Product WSNB-1 / Produit WSNB-1

Danger
Fatal if swallowed.
Causes skin irritation.

Hazards:
Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Precautions:
Store locked up.
Dispose of contents/container in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF INHALED: Immediately call a POISON CENTRE or doctor.
Rinse mouth.

ABC Chemical Co., 123 rue Anywhere St., Mytown, ON N0N 0N0 (123) 456-7890

- 1 PRODUCT IDENTIFIER**
The product name exactly as it appears on the container and on the Safety Data Sheet (SDS).
- 2 HAZARD PICTOGRAMS**
Hazard pictograms are determined by the hazard classification of the product. In some cases, no pictogram is required.
- 3 SIGNAL WORD (NEW)**
“Danger” or “Warning” are used to emphasize hazards and indicate their severity. In some cases, no signal word is required.
- 4 HAZARD STATEMENTS**
Brief standardized statements of all hazards based on the product’s hazard classification.
- 5 PRECAUTIONARY STATEMENTS**
These standardized statements describe recommended measures to minimize or prevent adverse effects from exposure to the product, including protective equipment and emergency measures. First aid is included in precautionary statements.
- 6 SUPPLIER IDENTIFIER**
The company that sells or imports the product and is responsible for the label and SDS. Contact the supplier for additional product information.

GENERAL LABELLING REQUIREMENTS

Supplier labels must be bilingual (English/French), easy to read, and durable. If the label is lost, damaged, or no longer readable, the product must be relabelled with a new supplier label.

LABELING REQUIREMENTS

A label or workplace label, the pictogram(s), signal word, and hazard statement(s) must be grouped together on a supplier label. The hatched border previously used by WHMIS is no longer required.

ADDITIONAL INFORMATION

Adapted with permission from WorkSafeBC. Adapted from the WHMIS after GHS Fact Sheets developed by CCOHS in collaboration with Health Canada.

- Product identifier.
- Safe handling instructions.
- Statement that an MSDS is available for the product.

GUIDE FOR EMPLOYERS AND WORKERS

Workplace Labels

The label is the workers's first source of information about the hazards of a product. In WHMIS 2015, the labels of hazardous products must display the information elements shown below:

EXAMPLES OF WORKPLACE LABELS

1 — PRODUCT K1

3 — Fatal if swallowed
Causes skin irritation

4 — See SDS for more information

1 — PRODUCT K1

3 — Fatal if swallowed
Causes skin irritation

4 — See SDS for more information

1 — PRODUCT K1

3 — Precautions:

- Wear protective gloves
- Wash hands thoroughly after handling
- Do not eat, drink or smoke when using this product

4 — See SDS for more information

1 PRODUCT IDENTIFIER

The product name exactly as it appears on the container and on the Safety Data Sheet (SDS).

2 HAZARD PICTOGRAMS (OPTIONAL)

Hazard pictograms are determined by the hazard classification of the product. Hazard statements based on the product's hazard classification may also be included.

3 PRECAUTIONARY STATEMENTS

These standardized statements describe recommended measures to minimize or prevent adverse effects from exposure to the product, including protective equipment and emergency measures. First aid is included in precautionary statements. Pictograms describing control measures can also be used.

4 REFERENCE TO SDS If available.

GENERAL LABELLING REQUIREMENTS

Convey workplace labels in a manner that is appropriate to the workplace, including meeting language requirements. Labels must be easy to read and durable. If the label is lost, damaged, or no longer readable, the product must be relabelled.

Adapted with permission from WorkSafeNB. Adapted from the WHMIS after GHS Fact Sheets developed by CCQPS in collaboration with Health Canada.

An MSDS must provide:

- Product information.
- Hazardous ingredients.
- Physical data.
- Fire and explosive data.
- Reactivity data.
- Information on health effects.
- Preventive measures.
- First aid measures.
- Name and phone number of party preparing the MSDS and date of preparation.
- Must not be more than three years old.

Under WHMIS legislation, the employer must:

- Inform the worker of any hazardous materials that they will encounter on the worksite.
- Ensure that all hazardous materials at the worksite are properly labelled in accordance with WHMIS regulations.
- Define safe procedures for the use, handling, storage and disposal of hazardous materials that are in use on the site.
- Have procedures for handling emergencies involving hazardous materials.

Employers must provide training to the worker on:

- How to use WHMIS labels and MSDS.
- Procedures for the safe use, storage, handling and disposal of the hazardous materials on the site
- Procedures to follow in case of an emergency involving hazardous materials
- Emergency procedures.

Under WHMIS legislation, the worker must:

- Know how to use WHMIS
- Be informed about hazardous materials at the site
- Follow recommended procedures regarding the use of hazardous materials
- Inform the employer of hazards and/or damaged and missing labels

A copy of any MSDS is readily available to all workers upon request.

HAZARDOUS MATERIALS

The general manager shall ensure that workers participate in hazardous materials instruction and training, and that such training shall be:

- Developed in consultation with the JHSC.
- Reviewed at least annually with the JHSC and workers

The manager shall ensure that:

- An inventory of all hazardous materials and hazardous physical agents that are present in the workplace is maintained.
- Prepared in consultation with the JHSC.

- Updated before March 31 of every year if the list is amended.
- Posted at the workplace a floor plan showing the names of all hazardous materials and their locations.
- All hazardous materials present in the workplace are identified with a material safety data sheet (MSDS).
- All MSDS must be current (Note: MSDS expires 3 years after the date of its publication).

3.21 TAG-OUT AND LOCK-OUT

FORMS OF ENERGY

When most people think of uncontrolled hazardous energy, they think of electricity. But crews doing work in industrial or office settings often have to lock out and tag a variety of energy sources. Here are the main types.

- **Electrical**—electrical panels, generators, lighting systems, etc.
- **Mechanical** (the energy of moving parts)—flywheels, blades, fans, conveyor belts, etc.
- **Potential** (stored energy that can be released during work)—suspended loads, compressed air, electrical capacitors, accumulated bulk goods, coiled springs, chemical reactions, changing states (solid—liquid—gas), etc.
- **Hydraulic**—presses, rams, cylinders, cranes, forklifts, etc.
- **Pneumatic**—lines, compression tanks, tools, etc.
- **Thermal**—steam, hot water, fire, etc.
- **Chemical**—flammable materials, corrosive substances, vapours, etc.

Some equipment may involve more than one type of energy and pose unexpected hazards. For example, a machine may have an electrically operated component with a hydraulic or pneumatic primary power source, or it may become activated on a timed schedule. With some equipment, gravity and momentum can present unexpected hazards. You must recognize and control conditions such as these. Switches, power sources, controls, interlocks, pneumatics, hydraulics, computer-controlled sources, gravity-operated sources—all of these must be locked out and appropriately tagged by each worker involved.

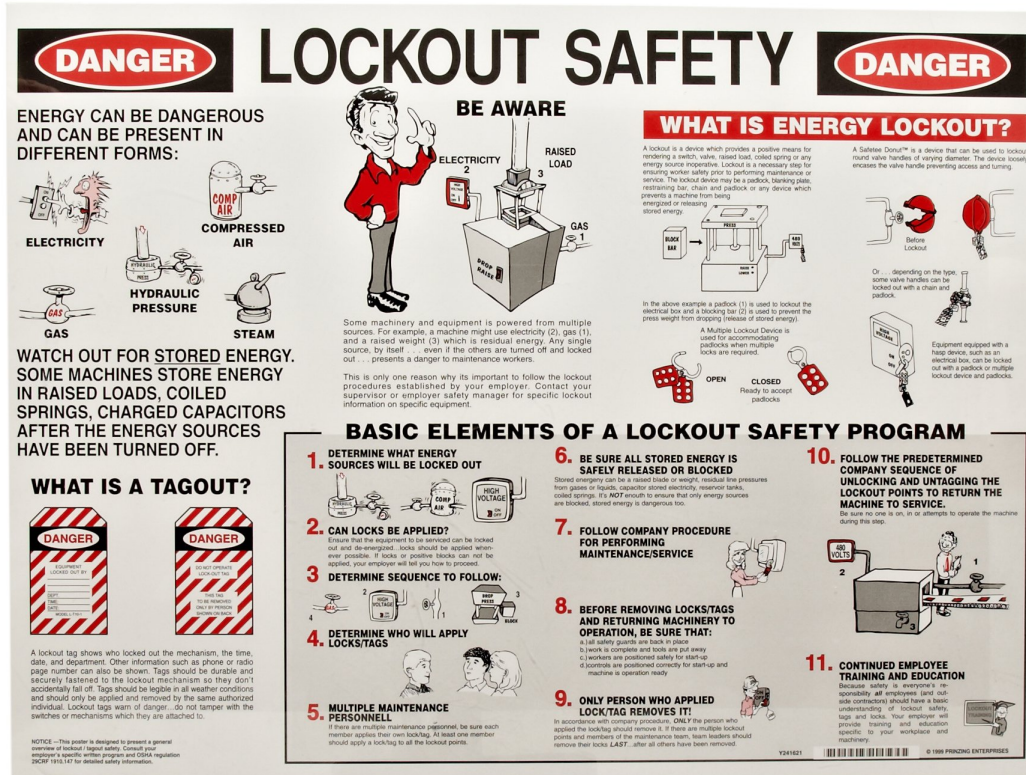
PROCEDURE

Many plants or industrial establishments will have specific procedures for lockout and tagging. Follow these procedures, but also verify that all energy sources have been isolated because work may differ from routine tasks.

A written safe work procedure for lock-out and tagging is essential. Once implemented and followed, a good procedure ensures that no form of energy can harm anyone during a lockout. A written procedure helps to ensure that lockout and tagging have been thoroughly and effectively carried out before work begins. It should include:

- Training requirements for workers and supervisors.
- Quality, type, and colour of locks, scissors, chains, blanks, blinds, and other lock-out devices.
- Method of identifying lock owners.
- Control of keys for locks.
- Colour, shape, size, and material for tags.
- Method of securing tags and information to be included.
- Communication and authorization procedure for shutting down and starting up machinery and equipment.
- Itemized steps to meet lock-out objectives.

FIGURE 7: LOCK OUT/ TAG OUT POSTER



SOURCE: Amazon Supply

EXPLANATION OF STEPS

- STEP 1: Location.** Locate work area and identify equipment, machinery, or other system components to be worked on. Identify the area with references such as floor, room name, elevation, or column number. Identify the equipment that is the subject of the work.
- STEP 2: Assess Energy.** Identify all energy sources affecting the equipment or machinery. Identify the various energy forms to be locked-out such as electrical, momentum, pneumatic, hydraulic, steam, and gravity.
- STEP 3: Identify The Parts To Be Locked Out Or Isolated.** Identify systems that affect, or are affected by the work being performed. These may include primary, secondary, backup, or emergency systems and interlocked remote equipment. Review the current system drawings for remote energy sources and, where required, identify and confirm with the client or owner the existence and location of any switches, power sources, controls, interlocks, or other devices necessary to isolate the system. Remember that equipment may also be affected by time restrictions for completing the work or time-activated devices.
- STEP 4: Determine lock-out methods** and confirm that the lockout of all energy sources is possible. Some equipment may have to be kept operational to maintain service to other equipment that cannot be shut down. Take appropriate steps to provide protection for workers while working near operating equipment. Equipment that can be locked-out should be locked-out by the methods most appropriate to the hazards.

STEP 5: Notify all personnel affected. Shutting down equipment may affect operations in other locations, incoming shifts, or other trades who may be planning to operate the locked-out system. Before proceeding with the lockout, inform all personnel who will be affected. At sites with a large workforce or at relatively large facilities, you may need to have special communication methods and permits or approvals.

STEP 6: Shut Down Equipment And Machinery. Qualified personnel must shut down the equipment, machinery, or other system components, placing them in a zero-energy state. Trace all systems to locate and lock-out energy sources. The main source may be electrical, for instance, but pneumatic and other forms of energy may also be present. Always look for other possible energy sources. All equipment capable of being energized or activated electrically, pneumatically, or hydraulically must be de-energized or de-activated by physically disconnecting or otherwise making the apparatus inoperable.

Always ensure that the client and operators are aware of the plan to shut down and lockout equipment, machinery, or other system components. In some cases, operations personnel or equipment operators may be required to shut down components because of their special qualifications or knowledge of the system. In determining what needs to be shut down and locked-out, consider the different energy sources that may be found in the system.

STEP 7: Install Lock-Out Devices. After the circuit has been de-energized and locked-out by the person in charge, each worker involved in the lockout must be protected by placing his or her personal lock on the isolating device. Remember—even thou already locked-out, you are not protected until you attach your own personal safety lock. Each worker must retain his or her key while the lock is in place. Only the worker in charge of the lock should have a key.

Remember...

- Merely removing a fuse doesn't constitute lockout. The fuse could be easily replaced. The fuse should be removed and the box locked-out.
- The lockout devices attached to one system should not prevent access to the controls and energy- isolating devices of another system.

Locks

Locks should be high-quality pin-type, key-operated, and numbered to identify users.

Multiple locks and lockout bars

When several workers or trades are working on a machine, you can add additional locks by using a lockout bar. You can add any number of locks by inserting another lockout bar into the last hole of the previous bar.

Other lockout devices:

- Scissors—have holes for locks and should be made of hardened steel.
- Chains—should be high quality and snug fitting.
- Pins and clamps—should be of high-quality materials and designed to fit the system.
- Blocks or cribbing—prevent or restrict movement of parts.
- Blanks or blinds—are solid metal plates inserted at flanged connections to prevent the flow of liquids or gases.



Signs must be placed on the system indicating that

- STEP 9: Verify zero-energy state.** After any power or product remaining in the equipment has been discharged or disconnected by qualified personnel, verify that all personnel are clear of the equipment. Then try, with extreme caution, to start the equipment manually. Look for any movement or functions. If none are observed, confirm that all energy sources are at a zero-energy state. Test the system to ensure that all electrical components are de-energized and de-activated, including interlocking and dependent systems that could feed into the system, either mechanically or electrically.

STEP 11: Communicate that work is complete and that all personnel are clear. Ensure that personnel are clear of the locked-out equipment, machinery, or system. Remove only your tags and locks. Tell personnel that were originally informed of the lockout that the equipment, machinery, or system is no longer locked-out.

STEP 12: Restore Power. Return systems to operational status and the switches to power “ON”. Have qualified personnel restart machinery or equipment.

STEP 13: Return Control to Operating Personnel. When all work is completed, the person in charge of the lockout operation should formally return control of the equipment or system to the designated personnel.

STEP 14: Record Date/Time Lockout Removed And System Restored. This last step is important. It saves valuable information that may be lost if not recorded. Staff involved in the shutdown may not remain at the same jobsite. Owners or operators may require this information to help plan future shutdowns.

SUMMARY

Lockout can ensure the safety of a single mechanic working alone or of hundreds of workers in a factory. In either situation, a procedure for safe lockout and tagging must be written, implemented, and followed step by step.

Lockout and tagging procedures help to ensure that

- All energy sources are identified and locked-out.
- Energy is not inadvertently restored while work is proceeding.
- Maintenance, repair, installation, and other jobs can be carried out safely.
- Records are kept.

3.22 HOISTING EQUIPMENT

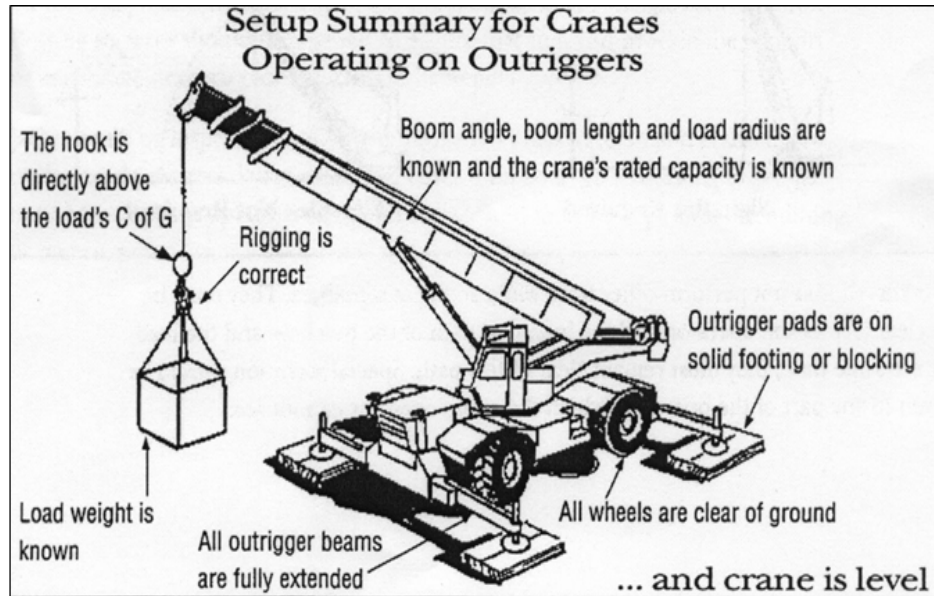
- Hoisting equipment is to be operated by certified personnel only.
- Operator to receive directions/signals from only one competent signal person.
- Loads being hoisted are not to pass over workers, or be handled in such a manner that might endanger a worker.
- The operator of the hoisting equipment must obtain full visibility or in the event that his/her view is obstructed, he/she shall request the assistance of a competent signal person.
- An operator must be aware and make allowances for overhead utilities.

3.23 RIGGING AND LIFTING RULES AND REGULATIONS

- Rigging equipment shall be inspected by a designated, competent employee prior to initial use on the project and regularly thereafter to ensure that it is safe.
- Damaged rigging equipment shall be removed from service immediately.
- All cranes shall be certified as being in a safe operating condition by a competent certified inspector prior to using the crane on this site.
- The manager shall ensure a rigging study is prepared prior to all heavy and critical rigging or hoisting operations.
- Heavy and critical rigging studies are defined as all those lifting operations where the weight of the lift is over 25 tons, or where the material or equipment is large enough to require the use of more than one lifting device (crane) operation will be designed by a professional engineer, and will be conducted according to the procedures set out by him/her.
- At no time shall the operator of the hoisting equipment attempt to lift an object or load that is in excess of the maximum load rated capacity of the hoisting equipment.
- The operator must always ensure that he/she maintains full control of the load being carried.
- Loads are not to be left suspended, unless an operator is at the controls of the hoisting equipment.



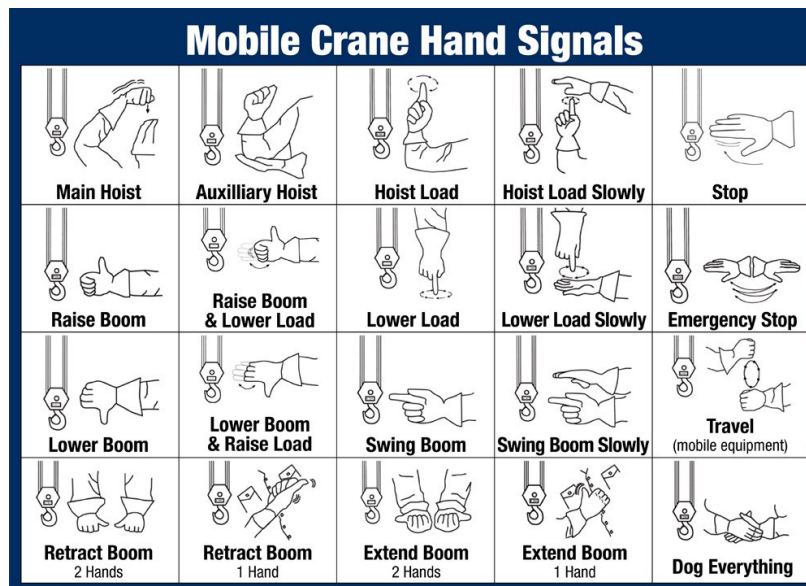
FIGURE 9: SETUP SUMMARY FOR CRANES



SOURCE: RANKIN CONSTRUCTION LTD.

3.24 HOISTING HAND SIGNALS

FIGURE 10: MOBILE CRANE HAND SIGNALS



SOURCE: Amazon.com

3.25 LOGBOOKS AND OPERATOR'S MANUALS

Manuals must be maintained for all incoming mechanical/ electrical machinery or equipment to be used on the project. The logbook will identify previous inspections performed and contain details of the inspection (e.g. frequency of inspections, maintenance and repairs). All logbooks must be maintained as prescribed by the manager and be available for review at any time. Operator manuals must be supplied by the equipment manufacturer, supplier or an equivalent and maintained on the project, readily available to equipment operators. An inspection sticker must be supplied on all equipment new to site.

3.26 PROXIMITY TO ELECTRICAL EQUIPMENT

Electrical hazards are associated with any type of electricity. Electricity can cause serious injury or death. Electrical Shock occurs when electricity enters a person's body. The victim becomes part of the electrical circuit as the current detours from the intended circuit and flows through the body to the ground. An electrical shock can affect many body parts and physical functions including: breathing, heart, brain, nerves and muscles. Heart attacks and respiratory failure are two potentially fatal consequences of electrical shock.

Electrical Equipment

Safe use of electrical equipment includes:

- Only trained and authorized persons are permitted to operate electrical equipment. If in doubt about a piece of equipment, consult the Project/Camp Manager.
- Ensure that equipment is in good repair and conditions are safe before plugging it in
- Report any faulty equipment to the Camp Manager. Label any offending equipment so that it is not used by another worker.
- Never attempt to repair electrical equipment—have a qualified person repair it.
- Use only correctly grounded equipment. Never use cords which have had the third prong removed to fit into a two prong outlet. Make sure grounding connections are secure.
- Do not use electrical equipment that is damp or handle electrical equipment with wet hands.
- When unplugging a cord, pull on the plug rather than the cord.
- Keep electrical cords out of the way so that they cannot be damaged or tripped over
- Do not overload outlets.
- Never use a ladder made of aluminum or one with metal reinforcement when doing any electrical work.
- Never use water on an electrical fire. Use only an extinguisher designed specifically for electrical fire



Power Lines

Working near energized power lines poses great danger and can result in death. Workers performing any work in the vicinity of power lines must receive proper training to understand how to minimize risks. Defined Danger Zones (unknown voltage) and Prohibited Areas (identified voltages) require specific precautions.

Safe Work Practices:

- No worker or equipment shall work within the Danger Zone (within 3 metres of any overhead power line) without notifying the local power company: Northwest Territories Power Corporation.
- No unqualified worker shall enter the Prohibited Zone.

- Work in the vicinity of power lines requires a designated qualified observer/ signaler to ensure workers and equipment maintain safe approach distances from power lines. The observer must be able to clearly communicate to workers by radio or air horn.
- Brushing work around power lines can only be done during daylight hours.
- Before starting work or any other activity in the vicinity of power lines, contact the local power company to establish safe approach distances and required safety precautions.
- Do not place earth or other materials under or next to a power line if it reduces clearance to the power line.
- Do not push snow or other materials at power line poles.
- Do not excavate or perform other similar work near overhead power lines if it reduces the support for the power line.

Tools, ladders, scaffolding and other equipment or materials capable of conducting electricity shall not be stored or used so close to energized electrical equipment, installations or conductors that they can make electrical contact.

No object shall be brought closer to an energized overhead electrical conductor with a nominal phase-to-phase voltage rating set out in Table 1 than the minimum distance specified.



FIGURE 11: WSCC MINIMUM REQUIRED DISTANCE TO POWER LINES

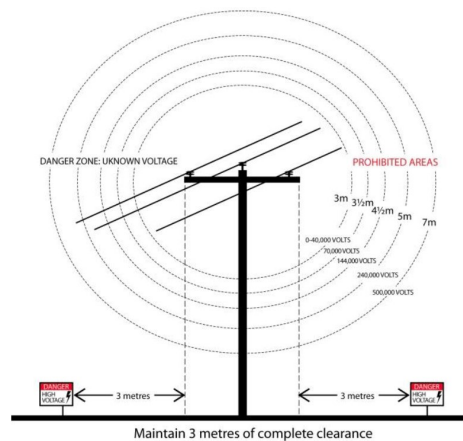


TABLE 4: POWER LINE MINIMAL WORKING DISTANCES

Voltage Range	Minimum Distance
0 to 40,000 volts	3 meters
40,000 to 70,000 volts	3.5 meters
70,000 to 144,000 volts	4.5 meters
144,000 to 240,000 volts	5 meters
240,000 to 500,000 volts	7 meters
Unknown	10 meters

SOURCE: WSCC

If a crane, similar hoisting device, backhoe, vehicle or equipment is operated near an energized overhead electrical conductor and it is possible for a part of the vehicle or equipment or its load to encroach on the minimum distance permitted. The following procedure shall be implemented;

- Establish and implement written measures and procedures adequate to ensure that no part of a vehicle or equipment or its load encroaches on the minimum distance permitted by TABLE 1.
- Make a copy of the written measures and procedures available to every worker on the project
- Conduct a daily tail gate safety meeting to review these procedures

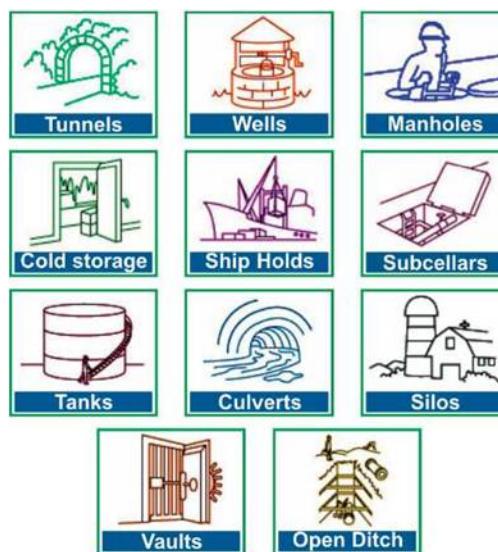
The written measures and procedures shall include taking the following precautions to protect workers:

- STEP 1.** Adequate warning devices, visible to the operator and warning of the electrical hazard, shall be positioned in the vicinity of the hazard.
- STEP 2.** The operator and worker shall be provided with written notification of the electrical hazard before beginning the work. A legible sign, visible to the operator and warning of the potential electrical hazard, shall be posted at the operator's station.
- STEP 3.** A competent worker, designated as a signaler, shall be stationed so that he or she is in full view of the operator and has a clear view of the electrical conductor and of the vehicle or equipment, and shall warn the operator each time any part of the vehicle or equipment or its load may approach the minimum distance.
- STEP 4.** The worker shall follow the written measures and procedures.

3.27 CONFINED SPACE

A confined space means a tank, process vessel, underground vault, tunnel or other enclosure that is not designed or intended for human occupancy and that a person would only enter if there were work to be done. Confined Space Entry Form can be found in the Appendix.

FIGURE 12: CONFINED SPACE EXAMPLES



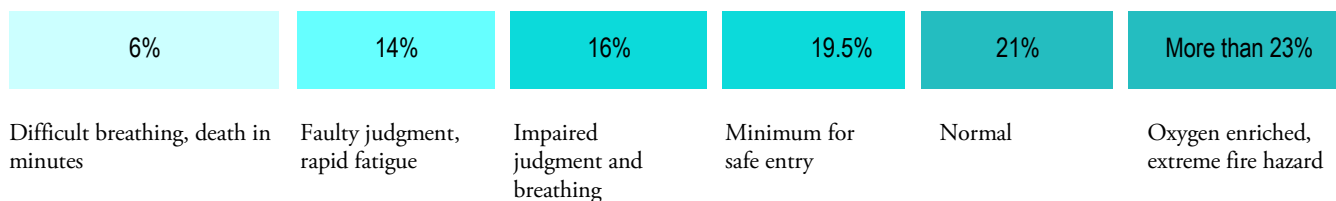
SOURCE: HRDP

WORKING IN CONFINED SPACES (WSCC Regulation 8.28)

The manager shall ensure that procedures are developed and implemented for work in confined spaces where oxygen deficient, toxic, explosive or flammable atmospheres might be encountered.

1. The procedures required by the manager shall be submitted to the committee for review; and sent to the chief inspector of mines for his or her approval.
2. The procedures required by subsection (1) shall provide for:
 - The use of lifelines and safety belts and for the stationing of a person outside the confined space to check on the workers in the confined space at suitable intervals;
 - Where lifelines and safety belts cannot be used, the stationing of two persons, with respiratory protective equipment and capable of performing a rescue, outside the confined space in which persons are working to visually check the workers in the confined space at frequent intervals;
 - Maintenance of an effective means of communication between persons inside and outside the confined space;
 - Specified time intervals for making periodic visual contact with persons inside the confined space;
 - Specific procedures to be followed whenever welding or burning operations are to be conducted in the confined space;
 - Provision of appropriate breathing apparatus at every confined space in which persons are working and provision for the ready availability of persons trained in its use;
 - Provision for compressed air used for breathing complying with the requirements of the standard CAN-3-Z180.1-M85, Compressed Breathing Air and Systems;
 - Disconnecting, blanking or sealing pipes carrying substances that could be hazardous to the persons entering the confined space;
 - The method of purging and ventilation to provide a safe atmosphere inside the confined space;
 - Specific time intervals for testing the atmosphere in the confined space during work in progress;
 - Recording the results of tests taken under paragraph (j) in a logbook; and
 - Action to be taken in the event of a power failure.

FIGURE 13: OXYGEN SCALE



SOURCE: RANKIN CONSTRUCTION LTD.

Air Quality

- Before work begins in any confined space where there may be hazardous fumes or oxygen deficiency, the air quality must be tested by a person trained to use the appropriate air-quality test equipment.
- Where proper tests competently performed indicate safe air quality, workers may be allowed to enter the work area.
- Where tests indicate a hazardous level of fumes, gases or oxygen deficiency, entry must not be allowed until space has been adequately ventilated / subsequent tests indicate safe air quality.
- Where possible, mechanical venting should be continued in any confined space found to contain hazardous levels of fumes, gases or oxygen deficiency, even after mechanical venting has corrected the hazard. The confined space must also be continuously monitored while personnel are working there.

- Where mechanical venting has corrected hazardous levels of fumes, gases or oxygen deficiency in a confined space but cannot be continuously provided, workers entering the space must wear rescue harness attached to individual lifelines. A worker must be posted at the entrance prepared and equipped to provide rescue in case of emergency. In some situations, workers entering the confined space should also wear supplied-air respirators.

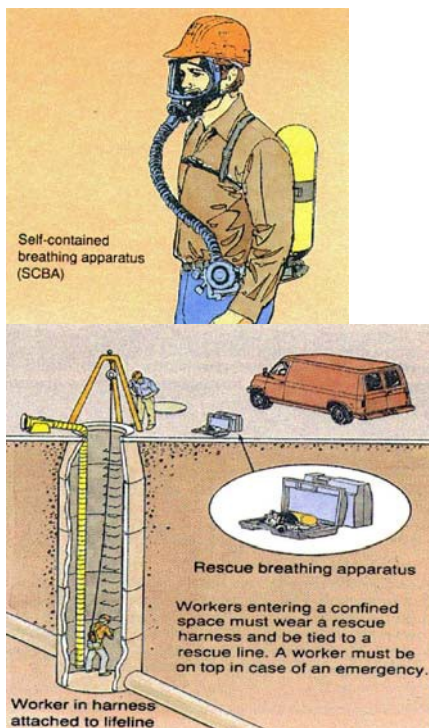
Immediate Danger to Life and Health (I.D.L.H)

- Atmospheres - which include oxygen deficiency and atmospheres approaching Lower Exposure Limit (LEL). The LEL of flammability of gas, vapour or dust or any combination of these at ambient temperatures.
- Oxygen Deficient Atmosphere - is an atmosphere where the **oxygen content is less than 19.5%**.

Respiratory Protection

- Self-Contained Breathing Apparatus (SCBA) - A unit with an air cylinder which contains at least a nominal 30 minute supply of respiratory air with a full face piece, operating in the positive pressure mode.
- Air Supplied Breathing Apparatus (work mask) - A unit with a full face piece and equipped with an auxiliary self-contained air cylinder for escape capable of operating in the positive pressure mode. This apparatus normally draws its air through an air hose connected to: a large pressurized source of respirable air such as one or more large cylinders, or an air compressor with suitable filters to ensure air meets the respirable air standard.

FIGURE 14: SELF CONTAINED BREATHING APPARATUS (SCBA)



SOURCE: SPILL DEPOT LTD.

Air Purifying Respirators



FIGURE 15: AIR PURIFYING RESPIRATORS

A unit which absorbs or filters dusts, fibers, mists, vapours or gas from the ambient air.

Note: Do not use air purifying respirator units in oxygen deficient or other I.D.L.H. (Immediate Danger to Life and Health) atmospheres.

Portable Instruments

Usually hand held instruments used to test an atmosphere electronically or chemically for presence of toxic gases and vapours, flammability, oxygen content or particulate contaminant. Some instruments detect more than one contaminant and some operate continuously for several hours and may be placed in or near the working area. Operators must know the capabilities and limitations of these instruments and ensure an instrument is functional before using it to test an

atmosphere. Wear respiratory protection when testing an unknown atmosphere.

Respirable (Compressed) Air

Compressed breathing air that meets the purity requirements of CSA Standard compressed Breathing Air.

Toxic Atmosphere

An atmosphere which contains greater than the Occupational Exposure Limit (O.E.L.) of a gas, vapour or particulate according to the values established by government regulation, chemical hazard regulation, whichever is applicable to the work location.

CONFINED SPACE PROCEDURE

Hazards inherent in confined space entry can be avoided or overcome if the following procedures are applied every time a worker enters a confined space. Remember, even a partial entry (i.e., head and shoulders) may be dangerous to life and health if toxic or inert, odorless gases such as nitrogen are present.

Where it is likely that a person will, in order to perform work, enter a confined space, as the employer we shall appoint a qualified person to:

1. Carry out an assessment of the physical and chemical hazards to which the person is likely to be exposed in the confined space or the class of confined spaces.
2. Specify the tests that are necessary to determine whether the person would be likely to be exposed to any of the hazards identified.

The Following Procedures Are To Be Followed:

- STEP 1: Prepare Written Plan.** Prepare a plan for the work to be performed and document it on a safety permit and safety meeting report form. Include considerations contained in this guideline, plus additional information needed to accomplish the task safely. Write procedures for hazards peculiar to the job (i.e., welding and/or open flame equipment and rescue procedures).
- STEP 2: Appoint Safety Person.** Ensure a safety person is appointed for the job and is aware of the responsibilities. The safety person is positioned at the confined space entrance and is equipped with respiratory protection and applicable emergency equipment. The person must be capable of rescuing if required and must be able to communicate constantly with the worker(s) inside. The safety person does not leave the post unless relieved by a qualified person. The supervisor notifies the safety person of dangerous situations that arise in the confined space.
- STEP 3: Set-Up Sign In/Out System.** Set up a blackboard or similar log system adjacent to the vessel or confined space. Persons entering the vessel sign in and out and record the time of entry and exit.
- STEP 4: Set-Up Communications.** Ensure a communications system is in place between the safety person and worker.
- STEP 5: Define Responsibility.** Work is performed under the direction of a supervisor who is familiar with possible hazards, fire and accident prevention requirements, first aid and rescue. Throughout confined space work it is the supervisor who is responsible for safety. This includes taking steps to eliminate or control hazards.
- STEP 6: Identify Hazards.** Hazards commonly encountered in confined spaces include; Toxic vapours in excessive concentrations. These result from known materials in work areas that are inadequately ventilated naturally or mechanically. Other instances may be due to the gradual release of toxic substances from sludge scale or slow chemical reactions that could permit over time significant gas or vapour concentrations to develop.
- Lack of oxygen causing asphyxiation may result from chemicals absorbing or replacing oxygen to reduce possible explosions. Air in clean tanks closed for an extended period may become oxygen deficient because of rusting (oxidation) in the metal of the tank.
 - Flammable gases, vapours and liquids with potential for fire or explosion.
 - Electric shock from portable lights, tools or associated electrical equipment. In areas where moisture exists, portable lighting equipment shall be operated at a maximum of 24 volts.
 - Injury from mechanical equipment such as mixers, conveyors, etc., inadvertently activated.
 - Bodily injury or harm from chemical hazards and contaminants.
 - Ignition from static electricity.
- STEP 7: Identify Safety Equipment.** Wear personal protection (i.e., clothing, gloves, boots, face shields and respiratory apparatus) to meet job requirements. Respiratory protection may range from chemical cartridge CSA Standard approved respirators to self-contained or air supplied breathing apparatus.

Warning: Chemical cartridge respirators protect against specified concentrations of contaminants and are not to be used in oxygen deficient atmospheres.

When combustible gas concentrations or vapours are below 10% of the lower explosive limit (LEL), entry into a confined space is allowed provided the appropriate respiratory and/or skin protective devices are used.

Entry without respiratory and/or skin protection is allowed only if the atmosphere is tested for contaminant(s) and monitored throughout the job to ensure concentrations remain below the Occupational Exposure Limit (OEL). These

values are the maximum average atmospheric concentrations of contaminant(s) workers may be exposed to during an eight hour day.

When the confined space work calls for workers to wear self-contained or air supplied breathing apparatus and rescue in an emergency may be difficult, provide workers with a body harness with life line attached. If this is unworkable due to space limitations, provide an alternate system. Have this alternate approved by the chief inspector of mines before the job starts.

STEP 8: Rescue Planning. The following operating procedure ensures an effective rescue plan is included as part of the job plan prior to commencing work within a confined space.

Preparation or Pre-Job Meeting: Supervisor and safety staff conduct a pre-job meeting to determine the confined space preparation, type of work to be performed, i.e., inspection, sandblast, cut and weld, personnel required, (safety persons inspection people, specialists, etc.). Establish an emergency gathering area.

Documentation of the Rescue Planning: The written rescue plan shall consider; entry style (i.e., off ladder scaffold, from ground level) and safety equipment required (i.e., basket stretcher, lifelines, air equipment) and emergency alarm or signals. In addition, rescue procedures to remove workers from the confined space must be examined.



STEP 9: Written Instructions. All workers are to receive written instruction to be followed for the specific confined space. Furthermore, a checklist of all the hazards and precautions developed for that site will be completed and signed by the supervisor before anyone enters the confined space. Detail the control of workers entering and leaving confined space.

STEP 10: Train and Instruct. Before entry into a confined space (refer to definition) or suspected contaminated atmosphere, inform the worker of possible hazards, precautionary measures and emergency rescue methods as per WSCC Regulations or other applicable guidelines. All workers unfamiliar with confined space must be trained in the use of respiratory protective equipment and all other safety and rescue equipment pertaining to the job.

STEP 11: Testing. A competent person shall test for airborne contaminants (combustibles, oxygen, toxic gases and chemical hazards) in the confined spaces. The atmosphere shall be tested for those contaminants determined by the safety manager and as often as necessary. All the results of these tests shall be recorded.

STEP 12: Isolating of Confined Space. The confined space shall be isolated from all sources of hazards and energy, such as flooding from chemical or water, mechanical actions, steams, electrical, etc. All lines will be blanked and purged. Lock power driven internal equipment (such as agitators) and power sources in the off position at the main fuse or breaker panel and tag-out. Before entry, operate the machine control switch to ensure the power source is de-energized.

Where purging is necessary to remove hazardous atmospheres in the confined space, use water, sweet gas, steam and/or inert gas. Conduct tests before entry to determine the level of toxic, explosive atmospheres and oxygen content.

STEP 13: Ventilation. Open confined spaces with clean out doors and ventilate as necessary with a positive method of mechanical ventilation. Arranged to produce sufficient fresh air and remove contaminants from pockets or corners to avoid re-circulating contaminated air.

After the confined space is cleaned and ventilated, keep the mechanical ventilation equipment operating to provide secondary protection in case of accidental introduction of harmful substances and to remove contamination or heat produced by the work (i.e., welding and cutting, painting and coating).

Excessive environmental heat can develop when welding and cutting in confined spaces. Local exhaust ventilation that is usually effective for fume control may not control the excessive heat exposures. General exhaust ventilation at the minimum rate of 2,000 cubic feet (56.6 cubic meters) per minute per welder controls the welding fumes as well as the heat developed during welding. Additional air or supplied air-cooling may be necessary to maintain desirable work place temperatures for torch cutting.

STEP 14: Cleaning. Depending on the confined space contents, empty the vessel of residual material by: draining, pumping out, or floating off. Clean the vessel by one of the following: hot or cold flushing, steaming, chemical neutralization or inert gas and/or air purging. Remove sludge when possible from outside the confined space. Keep iron sulphide damp until removed and disposed of. Enter only after thorough review of these guidelines as well as any site-specific instructions have been complied with.

STEP 15: Hot Work. Unless a qualified person has determined that the work can be performed safely, hot work shall not be performed in a confined space that contains an explosive or flammable hazardous substance. Hot work shall not be performed in a concentration in excess of 10% of its lower explosive limit or oxygen in a concentration in excess of 23%. Where hot work is to be performed in a confined space that contains hazardous concentrations of flammable or explosive materials, specific guidelines shall be produced by a qualified person to ensure the safety of all workers.

STEP 16: Complete Job. At the end of a job the supervisor shall ensure no tools, equipment or workers have been left behind. Double-check and ensure that personnel are accounted for before leaving the confined space. Ensure blinds are removed and valves returned to correct positions. Return Work Permit to the responsible supervisor for finalization before the unit is returned to service

3.28 HOUSEKEEPING

- A neat, orderly job is essential to efficient, accident-free performance and the worker is responsible for maintaining this principle.
- Immediate work area shall be kept clean at all times.
- Rubbish and waste material must be removed from the site as soon as possible and lumber shall have all nails removed or bent over to prevent injuries when handling.
- Material not being used must be stacked neatly at the job site.
- Space used for passages such as walkways, stairways, scaffolds and ladders shall be kept clean at all times.
- Eliminate the slipping and falling hazard caused by oil and liquid spills by immediately cleaning them up.

Winter Precautions:

Snow and ice on walkway, platforms, stairs, and work areas should be removed or salted to prevent slipping. Overhead icicles should be carefully removed in order to avoid any hazards or falling icicles injuring personnel or damaging equipment. A job is considered complete only when it is cleaned-up and tools and equipment are returned to their proper storage place.

3.29 UNDERGROUND UTILITY LOCATION

Prior to any site excavation of any material, the manager shall be requested to locate and identify in the field all services that could pose a hazard. Where underground utilities have been identified, any excavation within one meter of the service shall be undertaken by hand.

- Supervisor will have a current locate sheet on site prior to starting work.
- All operators will be shown and have a current locate sheet of all overhead and underground service locations.

- The supervisor will ensure that all service locates are kept current if the job lasts longer than 30 days by requesting new locates.
- NZC will document and monitor all service locates.

3.30 TRENCHES AND EXCAVATIONS

Supervisors and workers must be familiar with the terms “trench” and “excavation.” Simply stated, an excavation is a hole left in the ground as the result of removing material. A trench is an excavation in which the depth exceeds the width).

The various types of soils specifies the required type of shoring and timbering to be used for each. WSCC provides the requirements for trench support systems that must be designed by a professional engineer.

Soil Type

Type of soil determines the strength and stability of trench walls (Figure 20). Identifying soil types requires knowledge, skill, and experience. Even hard soil may contain faults in seams or layers that make it unstable when excavated.

Supervisors must be aware of the soil types to be encountered during a job and plan protection accordingly.

Vibration

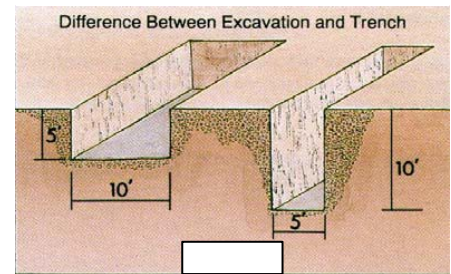
Vibration from various sources can affect trench stability. Often trench walls are subject to vibration from vehicular traffic or from construction operations such as earth moving, compaction, pile driving, and blasting. These can all contribute to the collapse of trench walls.

Surcharge

A surcharge is an excessive load or weight that can affect trench stability.

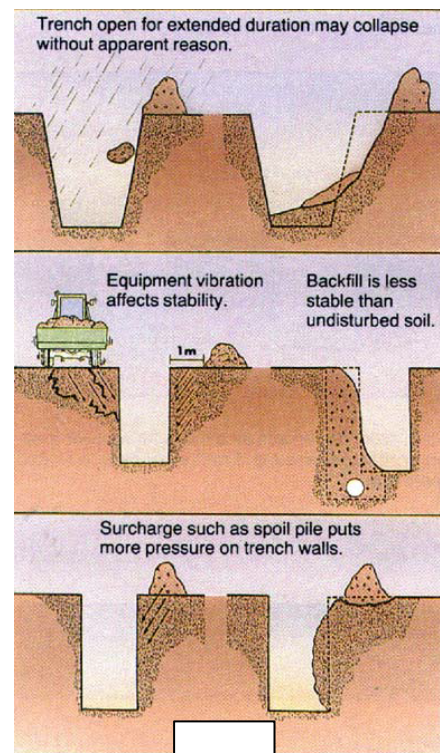
For instance, excavated soil piled next to the trench can exert pressure on the walls. Placement of spoil piles is therefore important. Soil should be kept as far as practical from the edge of the trench. Mobile equipment and other material stored close to the trench also add a surcharge that will affect trench stability. One meter from the edge to the toe of the soil pile is the minimum requirement. The distance should be greater for deeper trenches.

FIGURE 16: TRENCH & EXCAVATIONS



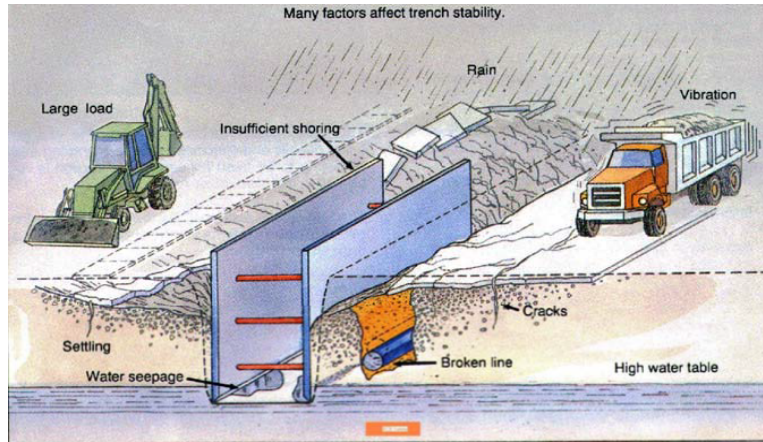
SOURCE: RANKIN CONSTRUCTION

FIGURE 17: TRENCH HAZARDS



SOURCE: GOOGLE.COM

FIGURE 18: TRENCH STABILITY FACTORS



SOURCE: GOOGLE.COM

Existing Foundations

Around most trenches and excavations there is a failure zone where surcharges, changes in soil condition or other disruptions can cause collapse.

When the foundation of a building adjacent to the trench or excavation extends into this failure zone, the result can be a cave-in. Soil in this type situation is usually considered Type 3.

Weather

Rain, melting snow, thawing earth, and overflow from adjacent streams, storm drains, and sewers all produce changes in soil conditions. In fact, water from any source can increase the rate of seepage and reduce soil cohesion.

PROTECTION AGAINST CAVE-INS

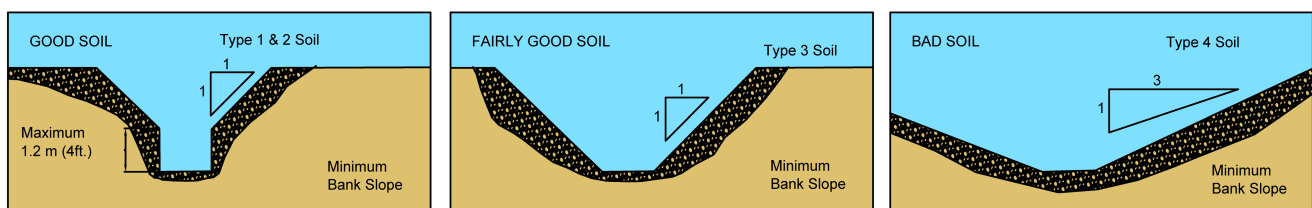
Most fatal cave-ins occur on small jobs of short duration such as service connections and excavations for drains and wells. Too often people think that these jobs are not hazardous enough to require safeguards against collapse.

Unless the walls are solid rock, never enter a trench deeper than 1.2 meters (4 feet) unless it is properly sloped, shored, or protected by a trench box.

Sloping

One way to ensure that a trench will not collapse is to slope the walls. Where space and other requirements permit sloping, the angle of slope depends on soil conditions.

FIGURE 19: SOIL SLOPING METHODS



- For Type 1 & 2 soil, cut walls at the maximum trench height of 1.2 m (4 feet) at a gradient of 1 to 1 from the maximum top of trench.
- For Type 3 soil, cut walls back at a gradient of 1 to 1 from the trench bottom.
- For Type 4 soil, slope the walls at 1 to 3. That's 3 meters back for every 1 meter up from the trench bottom.

Although sloping can reduce the risk of cave-in, the angle must be sufficient to prevent soil not only from sliding back but also from exerting too much pressure on the trench wall.

Sloping is commonly used with shoring or trench boxes to cut back any soil above the protected zone. It is also good practice to cut a bench at the top of the shoring or trench.

Trench Boxes

Trench boxes are not usually intended to shore up or otherwise support trench walls. They are meant to protect workers in case of a cave-in. They are capable of supporting trench walls if the space between the box and the trench wall is backfilled.

Boxes are normally placed in an excavated but unshored trench to protect workers. A properly designed trench box is capable of withstanding the maximum lateral load expected at a given depth in a particular soil condition.

Trench boxes are commonly used in open areas. Trenches near utilities, streets, and buildings may require a shoring system.

As long as workers are in the trench they should remain inside the box and leave only when the box is being moved. A ladder must be set up in the trench box at all times.

Excavation should be done so that the space between the trench box and the excavation is minimized. The two reasons for this are

- Allowing closer access to the top of the box.
- Limiting soil movement in case of a cave-in.

Shoring

Shoring is a system that “shores” up or supports trench walls to prevent movement of soil, underground utilities, roadways, and foundations.

Shoring should not be confused with trench boxes. A trench box provides workers safety but gives little or no support to trench walls or existing structures such as foundations and manholes.

The two types of shoring most commonly used are timber and hydraulic. Both consist of posts, wales, struts, and sheathing.

“Hydraulic shoring” means prefabricated strut and/or wale systems in aluminum or steel. Strictly speaking, these may not operate hydraulically. Some are air-operated or manually jacked.

One major advantage of hydraulic shoring over some applications of timber shoring is safety during installation. Workers do not have to enter the trench to install the system. Installation can be done from the top of the trench. Most hydraulic systems are:

- Light enough to be installed by one worker.
- Gauge-regulated to ensure even distribution of pressure along the trench line.
- Able to “pre-load” trench walls, thereby using the soil’s natural cohesion to prevent movement.
- Easily adapted to suit various trench depths and widths.



Where possible, shoring should be installed as excavation proceeds. If there is a delay between digging and shoring, no one must be allowed to enter the unprotected trench. All shoring should be installed from the top down and removed from the bottom up.

Access/Egress

Whether protected by sloping, boxes or shoring, trenches must be provided with ladders so that workers can enter and exit safely.

Ladders must:

- Be placed within the area protected by the shoring or trench box.
- Be securely tied off at the top.
- Extend above the shoring or box by at least 1 meter (3 feet).
- Be inspected regularly for damage.

Ladders should be placed as close as possible to the area where personnel are working and never more than 7.5 meters (25 feet) away.

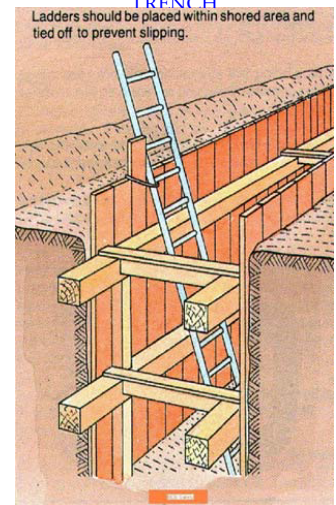
Anyone climbing up or down must always face the ladder and maintain 3-point contact. This means that two hands and one foot or two feet and one hand must be on the ladder at all times. Maintaining 3-point contact means hands must be free for climbing. Tools and materials should not be carried up or down ladders.

Pumps, small compactors, and other equipment should be lifted and lowered by methods that prevent injury from overexertion and falling object.

References:

1. “Trenching Safety” produced by the Construction Safety Association of Ontario,
2. The current OHSA and Regulations for Construction Projects.

FIGURE 20: LADDER IN TRENCH



SOURCE: RANKIN CONSTRUCTION

3.31 GUARDRAILS

- Where there is a possibility of a worker falling from one level to another or more than 1.2 meters, guardrails must be provided (i.e., scaffolds, floor openings, stairs, ramps).
- Guardrails must consist of a top rail, intermediate rail and toe-board or be otherwise approved by WSCC to meet the criteria for guardrails (i.e., safety fence). See current [WSCC Regulations 1.91 & 1.92](#).

- Guardrails removed temporarily for the purpose of doing work must be replaced in a proper manner immediately after the work is completed. Where removed, the worker must use a fall arrest system and post “DANGER” signs and caution tape or otherwise prevent access.

3.32 FLOOR OPENINGS

Floor openings not protected by guardrails must be covered with securely fastened planks capable of supporting all loads they may be subjected to, and marked “DANGER FLOOR OPENING”.

When a platform consists of wooden planks, the planks shall (WSCC Regulation 1.94):

- Be sound, unpainted and free of large knots;
- Provide a minimum safety factor of three times the maximum load to which it is likely to be subjected; and
- Be nailed or otherwise secured against movement.

3.33 ACCESS/EGRESS

- Access to and egress from work areas that are above or below ground must be appropriate for work being done and maintained in a safe condition (i.e., ladders, scaffolds, stairs, ramps, runways, etc.).
- Overhead protection or other appropriate barricades or warnings must be provided where work is being carried out above a means of access/egress.
- No means of access or egress to a building or to the site in general shall be blocked or restricted without prior notification to the manager (due to emergency access/egress). The manager will only allow this condition under strict supervision.

3.34 BARRICADES AND GUARDRAILS

Hazardous areas shall be cordoned off by the worker/contractor performing the work with barricades or danger tape to warn workers. Seek current WSCC guidelines for proper warning signs.

Guardrails consisting of a top rail (0.9 metres to 1.07 metres high), mid-rail and toeboard (floor to not less than 0.01 metres high) must be provided.

- At all edges or openings where workers may fall more than 1.5 meters (5 feet).
- At all edges or openings where workers may fall into operating machinery, toxic substances, liquid tanks or other hazardous materials.
- Around the open sides of work platforms such as scaffolds.

When barricades, guardrails or covers over floor openings must be removed for work to proceed, first obtain permission from the supervisor. Once guardrails or covers are temporarily removed, workers in the area must be protected by a safety harness with the lanyard properly tied off.

Barricades, guardrails and covers must be replaced immediately after work is completed by the person or company that removed them.

When timber shoring is used, it must be installed progressively as the trench is being excavated. Excavations which workers are required to enter must be kept reasonably free of water.

Tools, equipment and excavated soil must be kept at least one meter (3 feet) from the edge of the excavation or trench.

Buried services such as gas lines, water lines, sewers and electrical services must be located and marked before excavation starts (Reference: see current [WSCC Regulations](#)).

3.35 FALL PROTECTION

See current fall protection [WSCC Regulations 8.11](#) and the manager pertaining to:

- Written fall protection procedures.
- Worker training.
- Written training and instruction record requirements.
- Record accessibility.
- Written rescue procedures.

Unless a safety net or travel restraint system is being used, you must wear a “Fall Arrest System” if you may possibly fall:

- A distance of more than 3 meters (ten feet).
- Into operating machinery.
- Into water or another liquid.
- Into or onto any hazardous substance or object.

A “Travel Restraint System” means a mechanism that restricts the movement of a worker on a work surface whereby the individual cannot fall off the edge of a floor/roof (work surface).



A “Fall-Arrest System” consists of the following:

- Full body harness.
- Fixed support.
- Regulation lanyard.
- Shock absorbing unit.
- Independent lifeline which extends to the ground or is provided with a positive stop preventing the lifeline from running off

3.36 HARNESES AND LANYARDS

- All safety harnesses, lanyards and shock absorbing units must be CSA certified ([CAN/CSA-Z259.10-M90 Full Body Harnesses](#)).
- Safety harnesses must be snug fitting and worn with all hardware and straps intact and properly fastened.
- Lanyards must be 16 millimetre (5/8 in.) diameter nylon or equivalent.
- Shock absorbing unit may be attached to a harness, lanyard or be built into the lanyard.
- Safety belts, harnesses, lanyards and lifelines shall not be knotted and shall not be allowed to become knotted or damaged.

3.37 LIFELINES

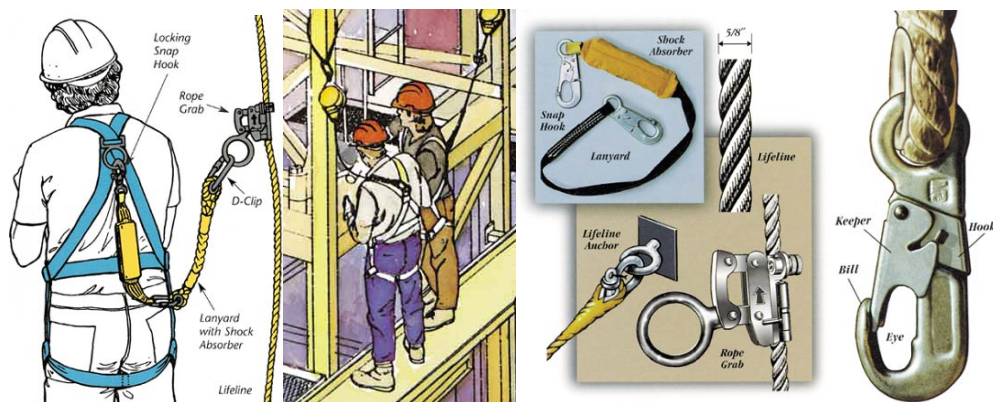
All lifelines must be:

- 16 millimetre (5/8 in.) diameter polypropylene or equivalent.
- Used by only one worker at a time.
- Free from any danger of chafing.
- Free of cuts, abrasions and other defects.
- Long enough to reach the ground or knotted at the end to prevent the lanyard from running off the lifeline.
- Secured to a solid object.

3.38 ROPE GRABBING DEVICES

To attach the lanyard of a safety harness to a lifeline, use a mechanical rope grab that meets [CSA Standard Z259.2](#). Some mechanical grab devices have been CSA-certified. Look for the CSA certification stamp. A triple sliding hitch may also be safely used if it is tied properly according to the CSA guidelines.

FIGURE 21: FALL ARREST SYSTEM



SOURCE: ELCOSH

3.39 LADDERS/RAMPS

Types of Ladders:

FIGURE 22: TYPES OF LADDERS



SOURCE: HOUSE OF LADDERS

LADDER DESCRIPTIONS

1. Twin [Step Stools](#) are ideal for assortment of types and sizes. They can stand on the top, using with planks. Planks or handle an extremely wide range of tasks platforms should be secured at varying elevations and are the most to the step stools. *
2. Create productive climbing often used by electricians for installing equipment systems with extension wire between framing studs ladders, ladder jacks and aluminum stages. [Extension Ladders](#) are available in a wide assortment of types, and sizes. They can handle an extremely wide range of tasks at varying elevations.
3. These special purpose [Work Stands](#) are great for wallboard installers and general contractors. All units have steps on both sides and they are available in three sizes: 2', 3' or 4' high and 30" wide. The extra width provides versatility as a portable work stand, sawhorse or material support. The 2' high models can also be used as a step stool.
4. The [Multi-Master Aluminum Ladder](#) offers 18 positions including a stepladder, double stepladder, straight ladder, and scaffold. These positions are made possible by Werner's unique Multi-Lok hinge system. The Multi-Master can be used in place of several conventional ladders and offers versatility, convenience, and value. The ladder is compact and fits in most car trunks. Additional equipment is required for certain scaffold & other configurations (not included with ladder). *
5. [Stepladders](#) are the most popular of all ladder styles. These ladders are often used for applications at low or medium heights. Ladder tops and pail shelves can hold tools, small parts and paint buckets.
6. [Stocker's Ladder](#) combines a twin stepladder with a revolutionary warehouse type ladder with a large Pinch-Proof platform. Steps on both sides allow two people to work together. Safety guard rail encourages proper use. Ideal for industrial stockrooms, carpenters and framers. Folds to less than 12" for easy storage. Also available with 4 casters for increased mobility.
7. [Adjustable Center Trestle System](#). Often used in pairs with either a 12" or 14" wide stage or plank to work inside industrial buildings, and by sign hangers to work for long time periods at fixed heights. The center section can be extended to approximately 20 feet on the 12' models. *

8. Lightweight, sturdy and compact, **Step Stools** are handy for many applications. Unlike regular stepladders, you can stand on the top.

9. **Tripod Ladders** enhance stability on uneven surfaces such as construction sites. The back rail fits easily into tight corners and other confined spaces. Often used by electricians for installing wire between framing studs.

10. **Single one-section non-extendible Ladders** provide easy access to mid-range heights. They are favored by craftsmen, maintenance personnel and industrial users for repeated tasks at the same height.

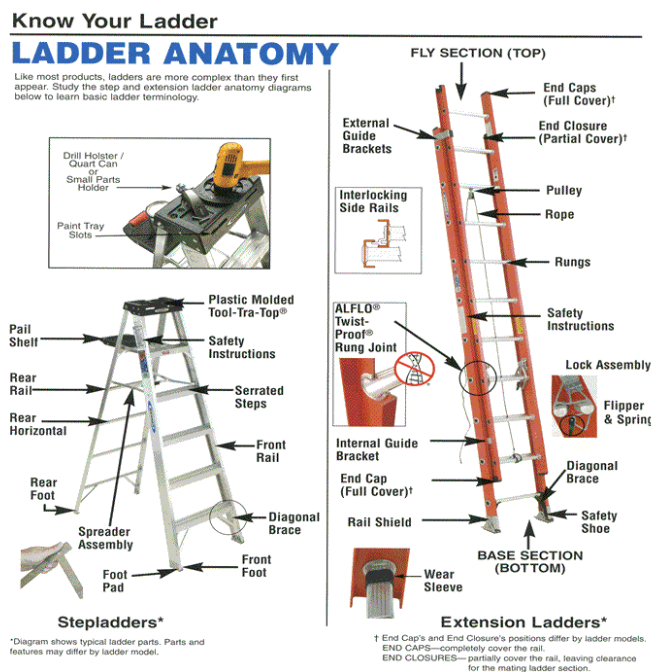
11. The **Telescoping Multi Ladder** can be used as a Twin Stepladder, Extension Ladder, or Stairway Stepladder or 2-Scaffold bases offering telescoping design for maximum versatility and Extra wide flared bottom for firm support.

12. **Extension Ladders** are available in a wide assortment of types and sizes. They can handle an extremely wide range of tasks at varying elevations and are the most popular kind of long ladder.

13. **Sectional Ladders** are designed for use mainly by electrical, telephone and cable utilities. They provide versatility in applications where transit, storage or access requires short sections to be coupled together.

* Positions 1, 4 & 7 are not recognized by OSHA

FIGURE 23: LADDER ANATOMY



SOURCE: HOUSE OF LADDERS

Ladder Safety

- All ladders are to be examined by the worker/contractor prior to each use.
- Always visually inspect ladders prior to using them. Ladders with weakened, broken, bent or missing rungs; broken or bent side rails; broken, damaged or missing non-slip bases; or otherwise defective must not be used and are to be removed from the service immediately.
- Ladders should be set up on a firm level surface. If the base is to rest on soft non-compacted or rough soil, a mudsill must be used.
- All portable ladders must be equipped with non-slip bases.
- Ensure ladders are of proper length (extended 3 feet or 90 cm beyond the landing).
- Landing areas at both ends of the ladder must be clear of debris and materials.
- Unless suitable barricades have been erected, or other adequate protection provided, do not set up ladders in passageways, doorways, driveways or other locations where they can be struck or bumped
- All access ladders must be tied off or otherwise secured to prevent movement.
- Wooden ladders are to be constructed of straight grain wood, not painted or coated, equipped with filler blocks, etc.
- Depending on length, straight ladders should be set up on an angle such that the horizontal distance between the top support and the base is not less than one-quarter or greater than one-third the vertical distance between these points.
- Always maintain three-point contact when climbing a ladder (e.g. two feet and one hand or one foot and two hands).
- When a task must be performed while standing on an extension ladder, the length of the ladder should be such that the worker stands on a rung no higher than the second from the top and with his body between the side rails.
- Ladders should not be erected on boxes, carts, tables, scaffold platforms or on vehicles.
- Metal ladders, or ladders with metal reinforcing, shall not be used on site.
- Ladders should not be used horizontally as substitutes for scaffold planks, runways or other services for which they have not been designed.
- All ladders erected between levels must be securely fastened, extend 90 centimeters (3 feet) above the top landing, and afford clear access at top and bottom.
- Do not use ladders horizontally as scaffold platforms, runways or any other service for which they are not designed.
- Never straddle the space between a ladder and another object.



Fall Protection - Working from Ladders

A worker must wear a safety harness with the lanyard tied off to either a fixed support or lifeline whenever the Worker is:

- 3 meters (10 feet) or more above the floor.
- Above operating machinery above hazardous substances or objects.

FIGURE 24: SAFE CLIMBING ON LADDERS

Safe Climbing Habits

THE RIGHT WAY

Ladders are such common tools that many people assume they know how to climb safely when in fact they don't. Safe and efficient use of ladders is not complicated or difficult, but it does require that users learn and practice proper ladder safety habits. Start by carefully reading and following all instructions.

- ✔ Climb facing the ladder. Center your body between the rails. Maintain a firm grip.



- ✔ Move materials with extreme caution.
- ✔ Be careful pushing or pulling anything while on a ladder. You may lose your balance or tip the ladder.



- ✔ Keep your body centered on the ladder while working.
- ✔ Hold the ladder with one hand while working with the other hand whenever possible.
- ✔ As a general guide, never let your belt buckle pass beyond either ladder rail. Otherwise, you could lose your balance or tip the ladder.



- ✔ Use extra caution in windy weather.
- ✔ Climb a ladder in rain or other severe weather only in emergency situations and with the ladder fully secured.
- ✔ Have another person hold the ladder.



- ✔ Get help with a ladder that is too heavy to handle alone.
- ✔ If possible, have another person hold the ladder when you are working on it.



- ✔ Haul materials up on a line rather than carry them up an extension ladder.



SOURCE: HOUSE OF LADDERS

3.40 SCAFFOLDS

- The erection and dismantling of scaffolds must be carried out under the supervision of personnel knowledgeable and experienced in such operations.
- Scaffolds must be equipped with guardrails consisting of a top rail, mid-rail and toe board.
- Scaffold platforms must be at least 46 centimeters (18 inches) wide and if they are over 2.4 meters (8 feet) high they must be planked across their full width.
- Frames must be properly pinned together where scaffolds are two frames or more in height or used as rolling scaffold towers.
- Scaffold planks must be good quality, free of defects, rough sawn, No. 1 spruce or better when new, and secured to prevent sliding.
- Scaffolds must be erected, used and maintained in a plumb condition.
- Scaffolds must be equipped with a proper ladder or stairs for access. Vertical ladders must be equipped with 15 centimeters (6 inch) standoff brackets.
- Castors on rolling scaffolds must be equipped with braking devices. Castors should be securely pinned to the scaffold frame so they cannot drop off over holes or depressions.
- No one is to ride on a scaffold while it is being moved.

Fall protection

Workers erecting and dismantling a scaffold more than 1.5 meters (5 feet) high must be protecting from falling by using a fall arrest system. See the Guideline developed by [WSCC Regulation 10.133](#).

3.41 ELEVATING WORK PLATFORMS (EWPs)

In accordance with the current WSCC Regulations, a worker who operates an elevating work platform (EWP) must, before using it for the first time, be given oral and written instruction on the operation of the elevating device. Therefore a EWP shall only be operated by a worker who has been instructed in:

- Operating the machine and the daily inspections required by the manufacturer.
- The types of working surface on which the machine is designed to be used.
- Its maximum rated working load and any special machine limitations.
- The significance and location of alarms and emergency controls.
- The proper use of fall arrest systems.

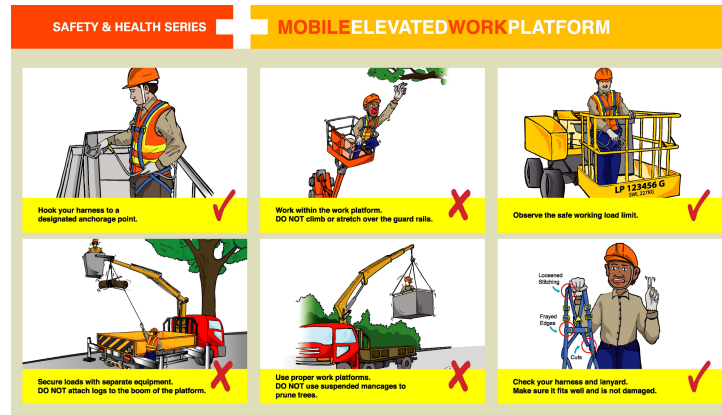
FIGURE 25: ELEVATING WORK PLATFORM TYPES



[SOURCE: Global Safety Group](#)

A EWP shall not be moved unless all workers on it are protected against falling by a fall arrest system. A EWP device which is not working properly or which has sustained damage to critical components must not be used until repaired by a qualified mechanic. In the raised position and EWP shall only be used on surfaces specified by the manufacturer. A EWP must not be driven in a raised position close to holes, depressions, trenches or similar hazards. A EWP must not bear more than its rated working load and where possible the loads shall be distributed over the platform. When EWPs are used to lift materials, care must be taken to ensure that the materials are firmly secured to the platform. Do not place makeshift platforms such as boxes or proper access equipment such as ladders and scaffolds on a EWP to gain access to areas above. Overhang loads must not be lifted on a EWP – (See Operator Manual)

FIGURE 26: EWP SAFETY TIPS



SOURCE: Galmon

3.42 AERIAL DEVICES

- Vehicle-mounted aerial devices must be used only in accordance with the manufacturer's safety procedures.
- While aloft, workers must not climb from an aerial device to another elevated position.
- Workers aloft in an aerial device must wear approved fall arrest systems with the lanyard properly tied off.
- Aerial device must not be moved closer to a live line conductor than the minimum distance listed in the table below:

Minimum Distance for Power Lines (See Sub-section 3.25)

Workers on the ground must keep clear of the vehicle when the aerial device is close to live conductors. Mechanically operated aerial ladders must not be raised or lowered, extended or retracted while a worker is on the ladder. Only one worker at a time must be aloft on an aerial ladder.

In case of emergency, a hand line long enough to reach the ground when the aerial device is fully extended to its maximum height must be carried in the device.

One 20 pound (18 kg) or two 10 pound multi-purpose fire extinguishers must be kept in the vehicle in case of a hydraulic fluid or other fire.

For more information, refer to manufacture's safety procedures and get approval from manager.

Riding on Equipment

Under no circumstances is a worker to ride on any piece of equipment unless properly occupying a place or seat designated for that purpose. This is especially important around forklifts, aerial devices, hoists and cranes.

3.43 FLAMMABLE LIQUID AND GAS

All fueling of equipment must be done after the piece of equipment has cooled and proper conditions are met (i.e., fire extinguishers readily available, no sources of ignition of any type present).

1. A flammable liquid or gas shall be stored in a building or storage tank that is suitable for the purpose and, if practicable, not less than 100 meters from a magazine for explosives.
2. No more than one work day's normal supply of a flammable liquid shall be stored in a building or structure on a project unless it is stored in a container that is suitable for the particular hazards of the liquid and in a controlled access area or a room:
 - a. That has sufficient window area to provide explosion relief to the outside
 - b. That is remote from the means of egress from the building or structure
3. Portable container used to store or transport flammable liquids:
 - a. Shall be approved for use for that liquid by a recognized testing laboratory; and
 - b. Shall have a label stating the use for which the container is approved and the name of the testing laboratory which gave the approval required by clause (a).
4. Gasoline engines must be outside of any structure, shut off and allowed to cool before refueling.
5. If exhaust fumes become a problem the use of catalytic converters may become mandatory.

All supervisors/contractors shall ensure that their fire extinguishers are kept in the immediate work area and readily available in case of accidental ignition. This also refers to all forms of storage and use of gas cylinders and when any cutting or burning is in process.

Note: See [Canadian Standards Association B376-M1980 Portable Containers for Gasoline and Other Petroleum Fuels](#).

Propane:

- Unless designed for horizontal use, propane cylinders shall be kept in an upright position.
- Propane cylinders must be stored in a well-ventilated area away from heat sources, outdoors and above grade.
- Propane is heavier than air and can settle in dangerous concentrations at the bottom of trenches, manholes, vaults, basements, sumps and other below-grade areas.
- When not in use, propane cylinders and hose-connected devices must not be left in trenches or other low-lying areas.
- When testing for leaks on any cylinder - use only soapy water - never test for leaks on any cylinders or pressurized equipment using a match or torch.

Note: A Record of Training (ROT) is required for workers who handle, transport or store propane. See the [Storage, Handling and Utilization Code](#) available through the [Canadian Gas Association, Toronto, Ontario](#).

3.44 COMPRESSED GAS CYLINDERS

Compressed gas cylinders should be handled only by those who are familiar with the hazards and who know the procedures for proper handling. Improper handling of compressed gas cylinders can result in physical injury or, if gas escapes accidentally as a result of improper handling, can result in fire, explosion, chemical burns and poisoning.

Handling

When handling compressed gas cylinders, never:

- Drag, drop or allow cylinders to forcefully strike against each other.
- Lift a cylinder by its cap.
- Handle cylinders while smoking or near an open flame.
- Permit oil, grease, or other combustible substance to come into contact with cylinders or valves.
- Tamper with any pressure-relief devices.

When handling compressed gas cylinders, always:

- Ensure empty containers have the valve properly closed, the valve seal in place and the cylinder cap on.
- Have the cylinders filled by a qualified professional.
- Use two people manually handle cylinders, or use a suitable hand cart when moving cylinders alone to avoid injury.
- Avoid manual handling of cylinders over rough terrain.

Transportation

- Transport compressed gas cylinders in an upright position and ensure that cylinders are properly secured.
- Never transport compressed gas inside a vehicle.
- Ensure that appropriate WHMIS labelling is clearly visible on all cylinders.
- Use placards on transportation vehicles in accordance with Transportation of Dangerous Goods regulations.

Storage

- Store cylinders (empty and full) in an upright position with valve outlet, seals and valve protection caps in place
- Store cylinders in a dry, cool, well-ventilated area
- Storage area temperatures should never exceed 52 degrees Celsius
- Separate full and empty cylinders in storage areas
- Do not permit smoking within 20m of a storage area
- Use a first in-first out approach to avoid full containers from being stored for long periods of time
- Restrict access to cylinder storage areas.
- The control valve of a compressed gas cylinder, other than a cylinder connected to a regulator, supply line or hose, shall be covered by a protective cap that is secured in its proper position.
- Empty cylinders shall not be stored inside a building. No cylinder for propane shall be placed closer than three meters to a source of ignition or fire. All propane cylinders shall be stored outside.





MAXIMUM PENALTIES
Employers - \$5,000
Workers - \$500



















All combustible, corrosive or toxic substances shall be stored in a suitable container. All compressed gas cylinders shall be stored, transported and secured in an upright position with their caps on.

3.45 FIRE EXTINGUISHERS

1. The person in charge of an exploration camp shall ensure that every free standing structure and kitchen is equipped with one or more fire extinguishers of at least 4 kg capacity.
2. Fire extinguishers must be readily accessible, properly maintained, regularly inspected and promptly refilled after use.
3. Extinguishers must be readily available at all times where an open flame is present or other sources of ignition are present, such as grinders, torches, chop saws, etc.
4. A fuel transfer system shall be equipped with a fire suppression system and shall have adequate fire extinguishers.
5. Portable extinguishers must be secured to all moving vehicles and machines (i.e., backhoes, crane cabins, etc.).
6. Portable extinguishers are classified according to their capacity for handling specific types of fires. Underwriters Laboratories of Canada 4A40BC ratings are the only acceptable type on projects.

- Class “A” Extinguishers - For fires of ordinary combustible materials such as wood and wood products where a quenching cooling effect is required.
- Class “B” Extinguishers - For flammable liquids/gases, such as oil, gasoline, paint, grease, and other petroleum-based products where oxygen exclusion or flame-interruption is essential.
- Class “C” Extinguishers - For fires involving electrical wiring and equipment where the non-conductivity of the extinguishing agent is crucial.
- Class “D” Extinguishers – For combustible metals

FIGURE 28: FIRE EXTINGUISHER RATINGS

Letter Symbol	Types of Fires	Picture Symbol	Types of Extinguishers
	For wood, paper, cloth, trash and other ordinary materials.		Class A   
	For gasoline, grease, oil, paint and other flammable liquids.		Class AB   
	For live electrical equipment.		Class BC  
	For combustible metals		Class ABC   

3.46 GENERAL MATERIAL STORAGE

- Large shipments of materials and equipment must be pre-arranged with NZC’s manager.
- All materials are to be stored in an organized manner in the designated storage areas.
- Materials must be stored in such a manner that they will not tip, collapse or fall.
- Objects or materials must not project from loads in a dangerous manner.
- Doorways, aisles, roadways and other work areas are to be kept free of any obstruction.
- Materials must not be stored within 1.8 m from the edge of a roof, floor, excavation or other openings.
- Materials must be adequately secured in place to prevent movement in strong winds or other inclement weather conditions.
- Approval must be obtained from the manager or supervisor for receiving of materials from a major roadway to ensure appropriate signaling, traffic control and electrical conductor precautions must be taken.



3.47 GENERAL EQUIPMENT

- Equipment is to be operated and maintained only by competently trained and authorized personnel.
- Inspect all vehicles and tools for damage before using them.
- Never use damaged equipment and report damaged equipment to manager or supervisor immediately.
- All trucks, equipment and tools that are defective should be immediately taken out of service and tagged "Out of Service" with a brief description of the defect.
- An operator must never leave any running equipment unattended and hydraulic equipment shall never be left unattended while any part is in a raised position.

- An operator must ensure there are adequate clearances for underground utilities prior to excavation.
- In the event that the operator's view is obstructed, he/she shall request the assistance of a competent signal person.
- Excavating equipment shall be equipped with rollover protection as required by the WSCC Regulations.
- Prior to use on site, equipment must be inspected and a competent maintenance person must attach a certificate of maintenance to the equipment.

3.48 SIGNAGE

Appropriate signage shall be provided, as required, to ensure the appropriate identification of site areas, access routes, parking areas, overhead dangers, electrical conductors and the boundaries of the project. In the absence of signage the "yellow" or "orange" snow fence or hoarding signifies the project boundaries and should not be crossed by unauthorized non-construction personnel or the general public.

Signage must also be provided to identify hazards to other workers, visitors, general public or occupants of existing buildings. In addition to signage, hazardous areas or operations must be restricted from access by unauthorized persons.

3.49 TOOLS

1. General

- All equipment/tools must be effectively guarded and used in a safe manner.
- Ensure electrical tools are effectively grounded and if the cord is cut/ frayed, or the motor casing is defective, they must not be used on site.
- Do not operate electrical power tools or run electrical cords in very damp or wet areas.
- Ground fault circuit interrupters (GFCI) must be used on all electrical tools used outdoors.
- Do not leave power tools/equipment "On" when unattended.
- All tools and equipment must be stored so they do not create a hazard for other Workers on site.
- Do not operate any tool without proper instructions.
- Tools and equipment must be in good condition and maintained in such condition.
- Only qualified persons are to use tools & equipment.
- Tools and guards are not to be altered and are to be used only for their designated purpose.
- Personal tools are subject to inspection at any time.

2. Hand Tools

- Every tool was designed to do a certain job, and must only be used for its intended purpose.
- Keep your hand tools in peak working order, sharp, clean, oiled and not abused.
- Tools subject to impact (chisels, star drills, etc.) tend to "mushroom" and care must be provided to keep them dressed to avoid flying spills.
- Don't use tools for pry bars.

3. Portable Power Tools (Major Hazards)

- Torque is the circular or rotating motion in tools such as drills, impact wrenches and saws that results in a strong twisting force. Be prepared in case of jamming.
- Have good footing and use two hands.
- Contact with moving parts can be hazardous and moving parts must be directed away from your body.

- Never touch a power part (e.g., drills, chucks, blades and bits) unless the power source is disconnected.
- Beware of others near you and beware of moving power tools around you, as others may be operating power equipment near you.
- Tool condition should be inspected on a regular basis and examine each power tool before using it.
- Tag and return defective tools for repair.
- Proper guards or shields must be installed on all power tools before being used and no “home-made” handles or extensions are permitted.

3.50 FENCING, HOARDING AND OTHER PRECAUTIONS

- Appropriate fencing, hoarding, covered ways and other precautions (i.e., fire routes/escapes) will be provided, as required, to ensure the appropriate restriction of work areas and safe access to existing buildings or through the project (if necessary), for the general public or occupants.
- Fencing, hoarding, covered ways and other precautions may only be altered or removed with the express authorization of the manager or supervisor and/or governing authorities (i.e., WSCC, Fire Marshall, etc.).
- Additional precautions must be taken to ensure appropriate protection of occupants or the general public where work conducted creates unsafe conditions or exceeds safety factors provided by existing precautions (i.e., removal of windows, work performed outside project boundaries, etc.).

3.51 SITE ACCESS AND PARKING

- All site personnel must use “designated” access routes and parking areas as outlined on the site layout. Site vehicle pass system will be in effect.
- Driveways, lane-ways, walkways or emergency vehicle routes must not be blocked or restricted at any time by vehicles, machinery, equipment or materials.
- No vehicle is to be left without appropriate brakes/blocking, unlocked or with keys in place.
- Construction equipment such as “zoom booms”, scissors lifts, bulldozers, forklifts, etc., must have all moveable parts kept in their lowered positions when left unattended.

3.52 DESIGNATED SUBSTANCES

- Only trained personnel shall work with designated substances.
- Make sure proper equipment is used when working with designated substances. If in doubt, ask your supervisor.
- Some examples of designated substances are:
 - Acrylonitrile.
 - Arsenic Asbestos.
 - Benzene Coke Oven Emissions.
 - Ethylene Oxide Isocyanates.
 - Silica Vinyl Chloride.
 - Oxy-Fuel Cutting – Set-Up.
 - Sodium Sulphate

3.53 HYGIENE

Reference: See current Act and Regulations

1. Supervisors/contractors shall ensure that a reasonable supply of potable drinking water is kept readily accessible at the project for use by their workers.
2. The supervisor/constructor shall ensure that toilet and cleanup facilities are provided or arranged for.
3. Workers, who handle or use corrosive, poisonous or other substances likely to endanger their health, shall be provided with washing facilities with clean water, soap and individual towels. See current WSCC Act and Regulations.

3.54 PERSONAL PROTECTIVE CLOTHING, EQUIPMENT AND DEVICES

The manager will establish the Personal Protective Equipment standards in accordance with **WSCC Regulations 8.04 to 8.08**, as follows:

1. A worker shall wear such protective clothing and use such personal protective equipment or devices as are necessary to protect their workers against hazards to which the workers may be exposed.
2. A worker's employer shall require the workers to comply with subsection (1).
3. A worker is required to wear protective clothing or use personal protective equipment or devices shall be adequately instructed and trained in the care and use of the clothing, equipment or device before wearing or using it.

FIGURE 29: PERSONAL PROTECTIVE EQUIPMENT (PPE)



SOURCE: WSCC

HEAD PROTECTION –To be provided by NorZinc Ltd

Under this regulation, hard hats are mandatory for all site workers. The hard hat must protect the wearer's head against impact and against small flying objects, and must be able to withstand an electrical contact equal to 20,000 volts phase to the ground. At the present time, the WSCC considers the following classes of hard hats to be in compliance with the regulation.

- Class B - manufactured and tested in accordance with **CSA standard Z94.1-1977 & ANSI Z89.1 -1986**
- Class E - manufactured and tested in accordance with **CSA Standard Z94.1 – 1992**
- Class E Type I & II - manufactured and tested in accordance **ANSI Z89.1-1997**

The Act calls for the safety hat to be worn at all times while on the job. Safety hats must not be painted, drilled or cracked. The shell and suspension of safety hats must be inspected regularly and replaced if cracks, deep scratches, or other defects are noted.

HEARING PROTECTION - To be provided by NorZinc Ltd

NZC provides, and the worker shall wear CSA approved hearing protection whenever there is risk of hearing impairment while on the job. Protective equipment is provided when required and the worker must use it when so instructed by the supervisor or manager. Hearing protection is available in three general types:

- Disposable plugs (made of pliable material, one size fits all but they should be used only once)
- Permanent plugs must be fitted to provide a good seal (they are made to be washed and reused)
- Earmuffs generally provide more protection than earplugs.

Exposure Guide

A Worker exposed to 94 decibels is at risk after one hour, but could safely work the shift if properly fitted hearing protection is worn. The decibel scale is logarithmic. Therefore, 93 decibels is **twice** as much noise as 90 decibels; 100 decibels is **ten times** more than 90!

TABLE 4: NOISE EXPOSURE TIME

Unprotected Exposure Chart	Noise Level (DBA) Exposure
82 dBA	16 Hours
83 dBA	12 Hours
84 dBA	10 Hours
85 dBA	8 Hours
88 dBA	4 Hours
91 dBA	2 Hours
94 dBA	1 Hour
97 dBA	½ Hour
100 dBA	¼ Hour

SOURCE: WSCC Schedule 5

FIGURE 30: NOISE LEVEL REFERENCES

TYPICAL NOISE LEVEL MEASUREMENTS FOR CONSTRUCTION		MAXIMUM NOISE LEVEL (dBA)	RECOMMENDED CLASS OF HEARING PROTECTOR
* EQUIPMENT	NOISE LEVEL (dBA) AT OPERATOR'S POSITION	Less than 85 dBA	No protection required
Cranes	78 – 103	Up to 89 dBA	Class C
Backhoes	85 – 104	Up to 95 dBA	Class B
Loaders	77 – 106	Up to 105 dBA	Class A
Dozers	86 – 106	Up to 110 dBA	Class A plug + Class A or Class B muff
Scrapers	97 – 112	More than 110 dBA	Class A plug + Class A or Class B muff and limited exposure
Trenchers	95 – 99		
+ Pile drivers	119 – 125		
Compactors	90 – 112		
+ Explosive-actuated tools	120 – 140		
Grinders	106 – 110		
Chainsaws	100 – 115		
Concrete saw	97 – 103		
Sand blasting nozzle	111 – 117		
Jackhammers	100 – 115		
Compressors	85 – 104		
* Generally, newer equipment is quieter than older equipment. (For noise levels of specific equipment, contact the Construction Safety Association of Ontario.)		Recommended criteria for selecting a class of hearing protector, based on a daily 8-hour exposure to noise levels in dBA. Adapted from CSA Standard Z94.2-M1984.	
+ Pile drivers and explosive-actuated tools generate intermittent or "impulse" sound.			

SOURCES: RANKIN CONSTRUCTION LTD.

Use the tables above to provide guidelines for proper selection. The upper limits of noise levels can be used as a guide in selecting a specific class of hearing protectors.

EYE PROTECTION – To be provided by NorZinc Ltd

- You shall wear CSA approved safety glasses or face shields at all times unless otherwise approved by manager.
- Full face shields are to be used when grinding or chipping concrete, using masonry saws and explosive-actuated fastening tools and otherwise when there may be flying particles. Consideration should be given to the severity of all hazards in selecting the most appropriate eye protection. (e.g., glasses/goggles/ face shields).



SKIN PROTECTION – Sunscreen to be provided by NorZinc Ltd

The WSCC Regulations require protection where there is a risk of injury from contact between a worker's skin and

- A noxious gas, liquid, fumes or dust.
- An object that may puncture, cut, or abrade the skin.
- A hot object, hot liquid or molten metal.
- Radiant heat.

All workers on-site shall wear long pants and short-sleeve shirts as a minimum standard. Items such as denim coveralls and long-sleeve cotton shirts can provide improved protection against minor scrapes and bruises as well as harmful ultraviolet exposure outdoors. Clothes are your first line of defense against hazards on the job. Dress suitably for work; do not use synthetic clothing as it can ignite or melt when hit with sparks from equipment. Sunscreen will be available for every jobsite.

FIGURE 31: CSA

FOOT PROTECTION – TO BE PROVIDED BY WORKERS

You must wear safety footwear at all times while on the job site. These must be CSA certified shoes and boots with steel toes and puncture resistant boots. Such boots bear a green triangular patch stamped with the CSA registered trademark on the outside and a rectangular green label on the inside.



RESPIRATORY PROTECTION – To be provided by NorZinc Ltd

- Work areas must be ventilated to reduce hazards from dusts, fumes, gases or vapours.
- When ventilation is not practical, Workers must be provided with respirators appropriate to the hazards and be trained to use and maintain the respirators properly.
- All workers required to use respirators shall be properly fit tested with the appropriate type of respirator by a competent workers and these training records shall be retained at head office.
- Refer to Respirator Selection Guide for Common Activities in Appendix.

PROTECTIVE CLOTHING – To be provided by NorZinc Ltd

Any worker who may be endangered by vehicle traffic shall wear a reflective garment that covers at least his or her upper body and has the following features:

- The garment shall be fluorescent blaze or international orange in colour.
- On the front and the back, there shall be two yellow stripes that are 5 centimetres wide. The yellow area shall total at least 500 square centimetres on the front and at least 570 square centimetres on the back.
- On the front, the stripes shall be arranged vertically and centred and shall be approximately 225 millimetres apart, measured from the centre of each stripe. On the back, they shall be arranged in a diagonal “X” pattern.
- The stripes shall be retro-reflective and fluorescent.

- If the garment is a vest, it shall have adjustable fit.
- On and after January 1, 2001, a nylon vest to which this section applies shall also have a side or front tear-away feature.

In addition, a worker who may be endangered by vehicle traffic during night-time hours shall wear retro-reflective silver stripes encircling each arm and leg, or equivalent side visibility- enhancing stripes with a minimum area of 50 square centimetres per side.

3.55 EMERGENCY EVACUATION

This procedure provides the guidelines to develop emergency site evacuation requirements. All elements herein shall be included within the site evacuation procedure. This procedure applies to all NZC personnel and contract workforce working on projects where emergency evacuation requirements are applicable.

To provide for the safety of personnel it may be necessary to evacuate the project promptly. Some causes of site evacuation could be fire, explosion or potential explosion, flooding, or structural failures. An effective evacuation procedure saves lives and property. The manager is responsible for implementing and enforcing this procedure. The safety representative is responsible for monitoring compliance with this procedure.

ORGANIZATIONAL FUNCTIONS

The manager or his delegate will act as the evacuation coordinator and perform the following functions:

- Approve the evacuation procedures and location of the assembly area(s).
- Determine whether there is a need for evacuation.
- Order the evacuation alarm and direct the evacuation activities.
- Maintain a current list of outside emergency services: ambulance, hospital, doctors, fire department, police, etc., to be called for assistance.
- Supervisory personnel shall be assigned to pre-designated locations that house emergency utility switches and valves to ensure orderly shutdown procedures immediately, if required.
- Each supervisor with an evacuation function shall appoint an alternate, runners, and other required assistants.
- The supervisor or his delegate shall also relay instructions from the evacuation coordinator to those in the assembly area as to whether they shall stay, return to work, or leave the project.
- Team leaders, and supervisors shall submit an accounting of their crews; names, employee numbers, and last known whereabouts of missing people shall be forwarded to the manager.
- When directed, the safety representative shall obtain outside aid: fire companies, mutual aid help, ambulance service, or law enforcement agencies. The safety representative shall ensure that the fire brigade is in action and that first aid is alerted. Personnel trained in first aid shall attend to the injured and transport them to the first aid station. The safety representative shall also act as a liaison between the manager and the first aid personnel.
- First aid attendant shall direct the care and treatment of the injured.
- The site security shall permit only the entrance of emergency vehicles with their crews.
- The communication coordinator shall maintain the incoming/outgoing calls until directed otherwise by the manager. Emergency calls shall have top priority. The communication coordinator shall notify the location of the emergency and expected time of arrival (ETA) of emergency services.
- Upon hearing the evacuation signal, employees shall shut down all equipment, proceed quickly to the assigned assembly areas, and wait for further instructions from their supervisors.
- Where possible, a recognized warning signal, i.e., horn, whistle, siren, or public address system, shall be audible to all areas. Special provisions shall be made for remote work areas.

Assembly Areas

- Employees shall be assigned definite locations to assemble. The assembly areas shall be located at strategic places, close enough to work areas for access, but far enough away from potential disaster areas to afford protection to personnel.
- Procedures shall be established for an orderly shutdown of work at the sounding of the emergency warning signal. Equipment shall be secured; burning, heating, gas systems and other potentially hazardous devices shall be turned off. Personnel shall then proceed to designated emergency assembly areas.
- When employees are assembled, supervisors shall immediately account for their crews. The names and badge numbers of any employees not accounted for shall be obtained.
- Employees shall remain in the assembly areas pending instructions. Supervisor shall inform employees of the type of emergency and plans for the resumption or suspension of work. If the work is to be resumed, employees who elect to leave the job shall be informed that they will receive pay only for time actually worked.

Security

- Means of alerting the site security force shall be established.
- A planned program of action for security personnel shall be clearly outlined.
- Announcements over a public address or paging system shall alert pre-designated supervisory personnel.

Training

It is essential that all employees are aware of the evacuation procedure. The evacuation procedure shall be discussed at safety meetings. Upon completion of an emergency plan and procedure for the project, notices shall be posted for the information.

3.56 SEVERE WEATHER RESPONSE

There are a number of environmental situations that could constitute an emergency and require the activation of the Emergency Response Plan. They may include, but are not limited to, severe storms (including tornadoes, lightning, blizzards; floods; and toxic spills or gas clouds.

TO ACTIVATE THE EMERGENCY RESPONSE PLAN:

1. Declare Code 1 on 2-way radio.
2. Call Police, Fire Department, or Ambulance.
3. Evacuate to a safe location if ordered to do so by the Emergency Response Team (ERT), Manager, Police, Fire Department, or if you are in danger.
4. Involve the appropriate personnel (i.e. Medical, Police Department, Fire Department) and provide the following information:
 - Your name.
 - Your present location and phone number.
 - Nature of the emergency.
 - Whether the people involved are employees, contractors, visitors.
 - The actions you have taken to this point.

Follow the instructions that have been given to you by the appropriate personnel. Do not leave the safe area you are in unless you are advised to do so or are in danger.

SEVERE WEATHER GUIDELINES

Before a severe storm is forecast;

- Know what forecast are you are in so that you will know if a “Weather Warning” or a “Weather Advisory” has been issued in your area.
- Know what types storms could occur in your area and what time of year they are most likely to strike.

Weather conditions, forecast, advisories, and warnings are broadcast continuously. Environment Canada operates a website to provide weather updates. The link is: http://weather.gc.ca/city/pages/nt-12_metric_e.html.

When a severe storm is forecast;

- Manager will monitor and communicate weather conditions.
- Evacuate only if directed by manager, ERT personnel, Police, Fire Department, or by an Environment Canada.
- Shut off electrical devices, including computers and lights, as you evacuate.
- Remain calm. You will be able to deal with emergencies more effectively.

Tornadoes

Tornadoes or ‘twisters’ are violent windstorms characterized by a twisting shaped cloud that forms a base of a cloudbank and extends towards the ground. Tornadoes occur in conjunction with severe storms and are often accompanied by lightning, heavy rain, and hail. Although small in size, often less than 100-meters wide, they are nature’s most violent storms, with winds that can reach 450/km/hr, and capable of causing severe damage over areas several hundred kilometers in length.

Tornadoes strike suddenly; their loud roaring noise will alert you that one is coming. They move rapidly, between 50 – 70 km/hr, and normally touch ground for less than twenty minutes. They usually move from southwest to northeast and usually occur from May to September, with June and July being the peak months.

Before the Tornado:

- Choose a sheltered area in advance; preferably on the first floor. If the first floor is not accessible, move to the center of the building away from perimeter windows on the side of the approaching tornado. Avoid large open areas; their roofs are more likely to collapse.
- If a tornado catches you outdoors, take shelter immediately. As a last resort, lie flat in a ditch, excavation, or culvert.
- If you are driving and spot a tornado in your direction, drive away from its path at a right angle. Do not remain in your vehicle, as you may be trapped if it overturns.

Lightning

Lightning is an electrical discharge resulting from build-up of static electricity between clouds and ground. During a lightning storm:

- Stay indoors and do not go outside unless it is absolutely necessary.
- If you are outdoors, keep away from doors, windows, and any large metal items that could act as an electrical conductor. If the lightning storm is centered in your area do not handle the electrical appliances or telephones, turn off your personal computer and accessories.
- Stay away from wire fences, metal pipes, rails, and other metallic paths that could carry lightning to your location.
- Do not be the tallest object in an open area. Stay away from hilltops and trees. Never take shelter behind a tree.

- If you are in a car, stay there. It will give you excellent protection from lightning. Park away from trees that may fall on the car. Stay in your car until the storm passes and it is safe to drive again.
- If you are hopelessly isolated in a level field and you feel your hair stand on end – indicating lightning is about to strike – drop to your knees and bend forward, putting your hands on your knees. Do not lie flat on the ground; if you are struck by lightning you will likely sustain greater injuries.

Flood

Guidelines - Before the flood:

- Listen to the local radio or television stations for public information and instructions.
- Move to a safe location before flood waters isolate you.
- Do not call emergency contact numbers unless you require immediate emergency assistance.
- Stay out of flood areas.
- Do not attempt to walk or swim across any flowing water.
- Do not attempt to drive across a flooded road, as you become stranded.

After the flood:

- Check with local health authorities on drinking water purity.
- Local evacuation and relief centers will be established to provide emergency medical and social assistance.
- Do not visit the disaster center. Your presence could hamper rescue operations.
- Report broken utility lines to local authorities.

Toxic Spills or Gas Clouds - During a toxic spill or gas cloud:

- Follow instructions of ERT.
- Stay indoors; close and keep doors and windows shut tight.
- Report spill to regulatory agencies.
- Turn off air conditioners, furnaces, water heaters, pilot lights, and gas supply valves.
- Close all exterior air intakes and vents.
- Do not operate any devices that are vented to the outside.
- Do not operate light switches.
- If outside, seek shelter in a large enclosed building.
- If in a vehicle, move away from identified 'danger areas' as announced and follow instructions of ERT.

EMERGENCY EVACUATION PROCEDURE - When the emergency signal, consisting of Code 1 on the 2-way radio, three repeated long blasts of the job horn or whistle, is sounded, all employees shall immediately cease work, secure all equipment, and proceed directly to the designated assembly area (parking lot, change house, or other appropriate area) and remain there until further instructions are assigned by the supervisor.

3.57 WILDLIFE AWARENESS

GENERAL POLICY

At NO time on this site is hunting permitted. The only exception to this rule is if you or a partner is in LIFE THREATENING DANGER due to actual or imminent animal attack. If an animal is killed or wounded, the Territorial Department of Environment and Natural Resources is to be notified immediately.

Please do not torment ANY animals on site. This includes ground squirrels, crows, or any other “annoying” animal. All project related wildlife fatalities must be reported immediately, accidental or otherwise.

Feeding wildlife is not allowed. Look around frequently for bears and remember your bear safety training. Record significant wildlife sightings on the wildlife map by the notice board. These significant wildlife sightings could include:

- Bears
- Wolves
- Caribou
- Moose
- And others

BEAR AWARENESS

Bears are curious, and often investigate a strange object, smell, or noise. They also have a tremendous and constant drive to find as much nutritious food as they can during their time out of the den. These two traits, coupled with a bear's remarkable sense of smell, often lead bears to areas of human activity. The outcome of a bear's visit to a camp or community will influence its future behaviour. If it does not find food, it may not return once its curiosity has been satisfied. If it successfully obtains food from a human source - such as a garbage dump, backpack, or unclean camp - it begins to associate food with anything human, and investigate areas used by humans whether or not food is actually detected. A bear will gradually lose its tendency to avoid people as it learns to associate them with food. It may become bold and aggressive. It is your responsibility in bear country to ensure that your actions do not encourage those habits so all site personnel can avoid conflicts with bears.

General Conduct

General guidelines at the site to reduce conflict include:

- Be alert at all times.
- Respect all bears - they can be dangerous.
- Never approach a bear for any reason.
- Photographs should be taken from a safe distance with a telephoto lens.
- Never feed bears or other wildlife.
- Have a plan of action for dealing with bears and be sure everyone understands it.
- Be trained in the use of bear deterrent.

FIGURE 32: BEAR DETERRENT



SOURCE: Counter Assault

Field Workers

If you are approaching your work area from the air, check for bears from the aircraft before landing. Work in pairs and stay alert. Alternate responsibilities so one person is watching for bears. If both partners are busy working, a bear may approach unnoticed.

Make sure someone knows where you are going and when you plan to return. Include bear deterrent and a satellite radio as part of your field Personal Protective Equipment to communicate with the aircraft or base camp.

Encountering a Bear

The Bear's Behaviour

Given the opportunity, bears usually avoid people. Some bears are more dangerous or aggressive than others. Old or wounded bears may be in pain or starving. They may aggressively seek food from people if they are unable to obtain enough on their own. Any bear that has become accustomed to people and shows no fear of them is dangerous.

Every bear defends a critical space. The size of the space varies with each bear and each situation: it may be a few metres or a hundred metres. Intrusion into this space is considered a threat and may provoke an attack. All female bears will aggressively defend their cubs and is likely to charge.

Bears also aggressively defend their food and are often reluctant to leave it until it is all eaten. In some cases, a bear that is threatened may engage in displays intended to scare away an opponent. These may include huffing, panting, hissing or growling; looking directly at you, sometimes with lowered head or ears laid back; slapping one or both feet on the ground; jaw-popping; or charging to within several metres, then stopping suddenly or veering to the side. Threat displays may be followed by an attack, but may end with the bear walking or running away.

A bear standing on its hind legs is probably trying to pick up your scent. It may sniff the air or swing its head from side to side. Bears do not charge on their hind legs.

Most grizzlies avoid contact with humans if possible. However, there is good reason for their reputation for ferocity. If cornered, threatened, or surprised, the grizzly can be very aggressive, and will usually stand its ground or charge.

Black bears are often less aggressive and flee from danger. However, because they are more curious and adaptable than grizzlies, they quickly become accustomed to human activity, and may develop aggressive food-seeking habits which make them dangerous. Therefore, treat all black bears with caution. In very few cases, a bear has stalked a person that it apparently considered potential prey.

Although such incidents are rare, you should know the difference between the behaviour of a hunting bear, and the behaviour of a threatened bear. A hunting bear does not bother with displays and shows no signs of annoyance or fear. It may approach you directly at a fast walk or turn, follow you, or circle carefully, making cautious approaches.

Your Behaviour

The thought of facing a bear can be frightening. However, bears rarely attack a person on sight, and only a very small percentage of charges result in serious injury or death.

There is always a possibility you may surprise a bear at close range or encounter a problem bear which is not afraid of people. There is no guaranteed formula for reacting to a bear encounter because every encounter is unique. There are, however, guidelines which may help. Most are based on good judgment, common sense, and familiarity with bear behaviour.

Stop, stand still, and stay calm.

- If you are carrying a means of communication, alert others to your situation and ask for assistance.
- If the bear is aware of you, help it identify you as a person. It may leave. Staying upwind will help it to smell you. Talk in low tones and slowly wave your arms.
- Do not run from a bear unless you are sure you can reach a safe place before the bear catches up. Running may cause the bear to chase you, and a bear is faster than you are.
- Always leave a bear an open avenue of escape.
- If you see a bear at a distance, alert the bear to your presence. Quietly walk back the way you came or make a wide detour around the bear. Do not come between a bear and its cubs.
- If time, distance and circumstances permit, try to scare the bear away by firing flare cartridges or noisemakers.
- In a close encounter, stand still and assess the situation. Do not shout or make sudden movements which might provoke the bear, and avoid direct eye contact. At 50 feet, even if the bear is displaying threat behaviour, there is probably still time for you to avoid an encounter.
- Back away slowly. Only leave behind an article of clothing or gear if the bear is still trying to identify you. This will not work if the bear is following you. Leave food or an article of clothing only as a last resort.
- Climb a tree if one is available. You will have to climb higher than four metres - grizzlies can reach that high. Remember that black bears can also climb trees.
- If the bear is very close (30 ft.), it is usually best to stand your ground.

If A Bear Charges

A bear charges at high speed on all four legs. Many charges are bluffs. Bears often stop or veer to the side at the last minute. However, if contact appears unavoidable, you should play dead if you are attacked by a grizzly, or fight back if attacked by a black bear.

Playing Dead

Playing dead may prevent serious injury if you are attacked by a grizzly bear. Do not play dead during a black bear attack or if a grizzly bear is treating you as prey. Playing dead will help protect your vital areas, and the bear may leave if you appear harmless. There are two recommended positions:

- lie on your side, curled into a ball, legs drawn tightly to your chest, hands clasped behind your neck;
- Lie flat on the ground, face down, fingers intertwined behind your neck.

Stay in these positions even if moved. Do not resist or struggle - it may intensify the attack. Look around cautiously, and be sure the bear is gone before moving.

Fighting Back

If a black bear attacks you or a grizzly bear shows signs that it considers you prey, do not play dead. Act aggressively. Defend yourself with whatever means are available. You want to appear dominant and frighten the bear. Jump up and down, shout, and wave your arms. It may help to raise your jacket or pack to make you look bigger.

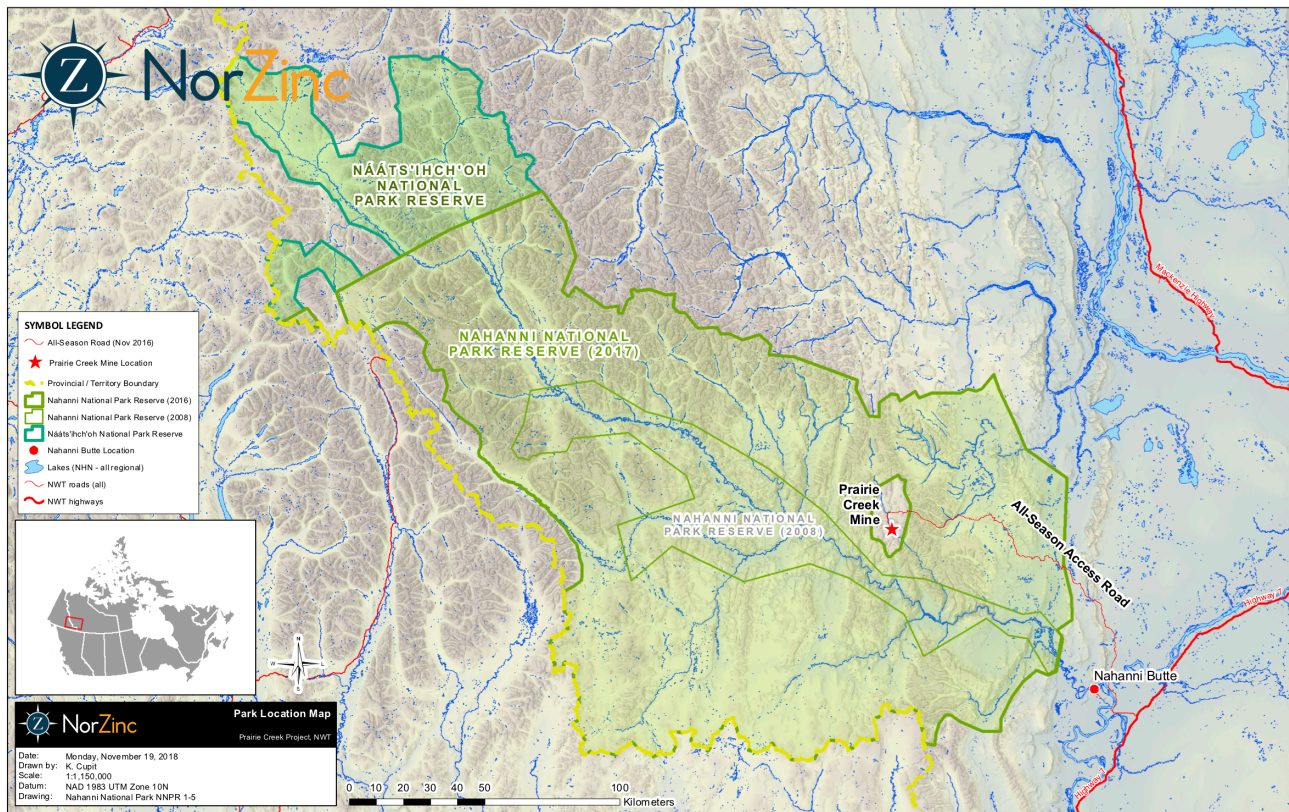
3.58 ENVIRONMENTAL POLICY

NZC will ensure that this policy is subject to a process of regular reviews so that new developments in legislation and technology as they affect the environment have been effectively addressed. NZC's objective is to balance the need to achieve its business aims and to improve the quality of the environment which may be affected by its operations.

The primary responsibility for implementation lies with the manager who will assist in maintaining compliance with Land Use Permits (LUP) and carrying out periodic environmental audits. The manager is responsible for ensuring that:

- A high standard of housekeeping is maintained and, where possible, take steps to reduce odor, noise, dust, atmospheric pollution and other impacts thereby avoiding complaints arising out of operations in the work place.
- In planning the operations on the jobsite the social and environmental consequences are considered.
- The site is kept in a clean and tidy manner and maintaining a high standard of appearance at the site.
- All records of environmental monitoring are maintained and available for inspection in accordance with current legislation.
- The workforce is regularly informed of the environmental conditions at the site and is trained to operate the equipment with proper regard for the environment and is involved in any proposed changes.
- Any complaints regarding work operations are dealt with fairly and promptly; and the details of the investigation and the action taken are recorded and reported back to the complainant.
- There is continual improvement in environmental performance.

FIGURE 33: NAHANNI NATIONAL PARK RESERVE



3.59 FROSTBITE

- Frostbite is an injury caused by the actual freezing of tissues.
- Wind chill contributes markedly to frostbite risk.
- If the casualty shows signs of both frostbite and hypothermia, **give first aid first for the hypothermia** because it can lead to death if the person is not warmed immediately. Even in this case do not ignore frostbite, which, if serious, can require the amputation of the affected part.
- Factors that predispose a person to frostbite include poor circulation (caused by previous cold injuries, tobacco use, alcohol ingestion, diseases of the blood vessels, constricting garments, poorly fitting boots, and old age) and extremes of cold exposure.
- During exposure, once the temperature of a hand or foot drops to 15° Celsius, the blood vessels maximally constrict and minimal blood flow occurs.
- As the limb temperature declines to 10° Celsius, there may be brief periods of blood vessel dilation, alternated with constriction, as the body attempts to provide some protection from the cold.
- Below 10° Celsius, the skin becomes numb and injury may go unnoticed until it is too late.
- Tissue freezes at or below a temperature of -4° Celsius.
- Once circulation is abolished, the skin temperature may drop at a rate in excess of 0.56° Celsius per minute

PREVENTION

1. Dress to maintain body warmth.
 - Wear adequate, properly fitting clothing, particularly boots that can accommodate a pair of polypropylene socks and at least one pair of wool socks without cramping the toes or wrinkling the socks.
 - Take care to cover the hands, feet, and face (particularly the nose and ears).
 - Wear mittens in preference to gloves, to decrease the surface area available for heat loss from the fingers.
2. Keep clothing dry
 - Avoid perspiring during extremely cold weather.
3. Do not touch bare metal with bare skin
 - Remember that certain liquids (such as gasoline) become colder than frozen water before they freeze, and can cause frostbite.
 - Cover all metal handles with cloth, tape, or leather.
 - For brief periods of exposure when dexterity is required, wear silk or rayon gloves.
4. Do not maintain one position in the cold for a prolonged period of time
 - Avoid cramped quarters
5. Wear a sunscreen with a cream or grease base to prevent windburn
6. Stay well hydrated
 - Eat enough food to maximize body-heat production. Avoid becoming fatigued.
7. Do not over wash exposed skin in freezing weather.
 - The natural oils are a barrier to cold injury.
8. Shave sparingly or not at all for cosmetic reasons.
 - If skin becomes exceedingly dry, apply a thin layer of petrolatum-based ointment.
9. Do not drink alcohol or use tobacco products.

Signs and Symptoms of Frostbite

- The major immediate symptom of a frostbite injury is numbness, occasionally preceded by itching and prickly pain.
- The frostbitten area will appear to be white, with a yellow or bluish (grayish) waxy (sometimes mottled) tint.
- If the injury is superficial, as commonly occurs on the face, the skin is firm and may indent with a touch, because the underlying tissue is still soft and pliable.
- If the injury is deep, the skin may feel hard and actually be frozen solid.
- A hand or foot may feel clumsy or absent.
- The area most commonly affected are the fingertips and toes (particularly in cramped footwear); followed by the earlobes, nose tip, cheeks, and other exposed skin. These parts have little heat-generating capability and no significant insulation.

Treatment of Frostbite

- If the victim is hypothermic, attend first to the hypothermia.
- If frostbite is suspected, seek help. If this is not immediately possible rapid re-warming is the standard therapy.
- Do not thaw out a frostbitten body part if it cannot be kept thawed.
- Frostbitten tissue is severely damaged and is prone to re-injury; refreezing causes an injury that will far exceed the initial frostbite wound. If refreezing is likely, pad the affected body part, apply a protective splint, and get the patient to the site where the definitive thaw will take place.
- Once the patient has reached a location (shelter) where refreezing will not occur, remove all constrictive jewelry and wet clothing.
- Replace wet clothes with dry garments.
- Immerse the frostbitten part in water heated 39 to 42.2° Celsius.
- Do not induce a burn injury by using hotter water. You can estimate the water temperature by considering it to be water in which normal skin can be submerged for a prolonged period with minimal discomfort.
- Heated tap water is too hot.
- Never use a numb frostbitten finger or toe to test water temperature. It is best to use your own hand or the patient's uninjured hand to test the temperature. Circulate the water to allow thawing to proceed as rapidly as possible.
- When adding more hot water, take the body part out, add the water, test the temperature, and then re-immerses the part.
- It is best to use a container in which the body part can be immersed without touching the sides.
- If the skin is frozen to mittens or metal, use heated water to remove them.
- Never re-warm the skin by vigorous rubbing or by using the heat of a campfire, camp stove, or car exhaust, because you most certainly will damage the tissues.
- Thawing should not be undertaken until the core body temperature has reached 35° Celsius.
- Thawing of the skin usually requires 30 to 45 minutes.
- It is complete when the skin is soft and pliable, and color (usually red; rarely, bluish) and sensation have returned.
- Allowing the limb to move in the circulating water is fine, but massage may be harmful.
- Moderate to extreme burning pain may occur during the last five to 10 minutes of re-warming.

Thawed Frostbite

Thawed frostbite may be present in a number of stages, much like a burn injury. These are recognized as:

First degree.	Numbness, redness, and swelling; no tissue loss
Second degree	Superficial blistering, with clear (yellowish) or milky fluid in the blisters, surrounded by redness and swelling
Third degree	Deep blistering, with purple blood-containing fluid in the blisters
Fourth degree	Extremely deep involvement (including bone); induces mummification

Blisters Appear six to 24 hours after rapid re-warming. Leave these blisters intact.

After thawing the skin, protect it with fluffy, sterile bandages (aloe vera lotion, gel, or cream should be applied, if available). Pad gently between the digits with sterile cotton or wool pads, held in place by a loose, rolled bandage.

Transport the patient to a medical facility.

3.60 HYPOTHERMIA

Hypothermia occurs when the body core cools below its normal temperature of 37 degrees Celsius. Death usually results when the body core temperature drops below 27 degrees Celsius.

Types of Hypothermia

There are three types of hypothermia. The progression of hypothermia leads to predictable physiologic responses, which roughly correspond to different body temperatures. Although not invariable, the signs and symptoms are as follows:

Type	Body Core Temperature	Signs and Symptoms
Mild	35 to 37° Celsius.	<ul style="list-style-type: none"> • Sensation of cold • Shivering • Increased heart rate • Urge to urinate • Slight lack of coordination in hand movements • Increased respiratory rate • Increased reflexes (leg jerk when the knee is tapped) • Red face. •
Moderate	32.2 to 35° Celsius.	<ul style="list-style-type: none"> • Decreased muscular coordination • Stumbling • Decreased or absent shivering • General weakness • Apathy • Drowsiness, and/or confusion • Slurred speech.
Severe	29.4 to 32.2° Celsius	<ul style="list-style-type: none"> • Inability to shiver • Confusion progressing to coma • Inability to walk or follow commands • Paradoxical undressing (inappropriate behavior) • Complaints of loss of vision • Decreased respiratory rate • Decreased reflexes. • <u>Below 29.4° Celsius.</u> • Rigid muscles • Decreased blood pressure, heart rate, and respirations • Dilated pupils • Appearance of death.

Conditions Contributing to Hypothermia

On the land, three conditions contribute to hypothermia:

Moisture	When a person becomes damp or wet there is a layer of water on the surface of the skin. Heat is transferred from the body to that layer of water. The water layer then evaporates, causing heat to be lost from the body. This causes the body temperature to cool.
Wind	The body heats a layer of air around it. Windy conditions will cause the layer to be removed, causing the body to heat a new layer which in turn will be removed. Eventually, the body cannot keep up with the loss of heat and begins to cool down.
Cold	When the temperature is cold, the body will lose heat to the surrounding air. The body will lose heat to the colder air around it. The colder the air the more heat will be lost.

Prevention

- Carry adequate food and thermal wear, such as polypropylene (“polypro”) or wool undergarments.
- Anticipate the worst possible weather conditions.
- Dress in layers so that you can adjust clothing for overcooling, overheating, perspiration, and external moisture.
- Use a foundation layer to wick moisture from the body to outer layers.
- Add an insulation layer to provide incremental warmth.
- For shirts, use wool or polypropylene. Consider a turtleneck or neck gaiter.
- For pants, wear wool or pile, with a fly.
- Carry windproof and waterproof outer garments, mittens or gloves (with glove liners), socks, and a hat. In very cold weather, up to 70% of generated heat may be lost by radiation from an uncovered head.
- Boots should be large enough to accommodate a pair of polypropylene socks plus at least one pair of heavy wool socks without cramping the toes.
- Stay dry.
- Do not exhaust yourself in cold weather.
- Avoid perspiring.
- Do not sit down in the snow or on the ice without insulation beneath you.
- Seek shelter in times of extreme cold and high winds.
- Don’t sit on cold rocks or metal.
- Insulate yourself from the ground with a pad, backpack, log, or tree limb.
- Do not become dehydrated. In the cold, dehydration is caused by evaporation from the respiratory system, increased urination, and inadequate fluid intake.
- Drink at least 3 to 4 liters of fluid daily. During extreme exercise, drink more — 5 to 6 litres per day.
- Do not skip meals.
- Do not consume alcoholic beverages in cold weather.

Hypothermia in most cases results from moist and windy conditions, not those of extreme cold.

Most hypothermia occurs at air temperatures of between -1 and 10 degrees C

Never ignore shivering if it is persistent or uncontrollable. It is a warning that you are showing signs of hypothermia.

Hypothermia in Cold Water

- Always wear a personal floatation device. It will keep you afloat if you are injured or unconscious. It will also help to conserve body heat. You will not have to waste energy staying afloat.

- If you end up in cold water, you will find that your body will lose heat much faster than when exposed to cold air.
- Do not remove clothing. It will keep a layer of warmer water next to the body. Only remove clothing if you are unable to keep yourself afloat due to the extra weight of the clothing.
- Try to keep as much of your body out of the water as possible. This may mean pulling yourself up on wreckage or overturned boat. If more than one person is involved, huddle together to conserve heat. If you are alone in the water, draw your knees close to your chest to conserve heat.
- Get to land as soon as possible and follow the rules for treatment for hypothermia.

TREATMENT

STEP 1: Handle all victims gently. Rough handling can cause the heart to fibrillate (cause a cardiac arrest).

STEP 2: Prevent the victim from becoming any colder.

STEP 3: Provide a shelter. Remove all wet clothing and replace it with dry clothing. Never subject yourself to hypothermia by giving away all of your own clothing. Replace wet clothing with sleeping bags, insulated pads, blankets, or even newspaper. Cover the patient's head and neck. Insulate the patient from above and below with blankets. (Do not change blankets unless necessary to keep the victim dry). If possible, put the patient in a sleeping bag sandwiched between two warm rescuers. Hot water in bottles, well insulated with clothing to prevent skin burns, may be placed next to the victim in areas of high heat transfer, such as the neck, chest wall, and groin.

STEP 4: Do not attempt to warm the victim by vigorous exercise, rubbing the arms and legs, or immersing in warm water. This is "rough handling" and can cause the heart to fibrillate if the victim is severely hypothermic.

STEP 5: Seek assistance as soon as possible.

In cases of severe hypothermia, the casualty may be unconscious. Breathing may have slowed or stopped. The pulse may be slow and irregular. Take up to 45 seconds to check the pulse. The body may feel stiff. Monitor the ABC's until EMS arrives, and give rescue breathing if necessary. Be prepared to start CPR.

3.61 SNOW-BLINDNESS

Snow reflects 85% of UVB (UVB wavelengths cause snow blindness). High exposure to UVB can cause a corneal burn within one hour although symptoms may not become apparent for 6-12 hours.

PREVENTION

Wear proper UV eye protection where snow blindness is a hazard

Signs and Symptoms

- Excessive tearing
- Pain
- Redness
- Swollen eyelids
- Pain when looking at light
- Headache
- Gritty sensation in the eyes

- Decreased (hazy) vision
- Similar symptoms occur when the surface of the cornea is scratched.
- Treatment
- The primary treatment is to patch the eye closed.
- The surface of the cornea will regenerate spontaneously in 24-48 hours.

3.62 HEAT RELATED ILLNESSES

Workers that are required to work under conditions of extreme heat, or that are subject to prolonged exposure to warmer conditions are susceptible to a number of heat related illnesses. Heat stroke, heat exhaustion and heat cramps are all serious conditions that can result from heat exposure.

HEAT STROKE

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Recognizing Heat Stroke

Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally).
- Red, hot, and dry skin (no sweating).
- Rapid, strong pulse.
- Throbbing headache.
- Dizziness.
- Nausea.
- Confusion.
- Unconsciousness.

What to Do

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim alcohol to drink.
- Get medical assistance as soon as possible.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

HEAT EXHAUSTION

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting
- The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:
 - Symptoms are severe.
 - The victim has heart problems or high blood pressure.
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than 1 hour.

What to Do

- Cooling measures that may be effective include the following:
- Cool, nonalcoholic beverages, as directed by your physician
- Rest
- Cool shower, bath, or sponge bath
- An air-conditioned environment
- Lightweight clothing

HEAT CRAMPS

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms — usually in the abdomen, arms, or legs — that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity, and sit quietly in a cool place.

- Drink clear juice or a sports beverage.
- Does not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in 1 hour.

Prevention

- Drink more fluids (nonalcoholic), regardless of your activity level. Don't wait until you're thirsty to drink.
- Don't drink liquids that contain caffeine, alcohol, or large amounts of sugar—these actually cause you to lose more body fluid. Also, avoid very cold drinks, because they can cause stomach cramps.
- Protect yourself from the sun by wearing a wide-brimmed hat (also keeps you cooler) and sunglasses and by putting on sunscreen of SPF 15 or higher (the most effective products say “broad spectrum” or “UVA/UVB protection” on their labels).
- Wear lightweight, light-colored, loose-fitting clothing.
- If you feel you are becoming overheated, rest often in shady areas.

3.63 INSPECTION POLICY

NZC will conduct documented workplace inspections no later than monthly for the purpose of identifying and correcting unsafe conditions and behaviour. The inspections will cover premises, job sites, buildings, temporary structures, excavations, tools, equipment, machinery and work methods and practices. The sites safety inspection form is to be used as a guideline since specific sites may have unique situations and potential hazards that may not be covered by this list.

PERSONAL EFFECTS INSPECTION

NZC will inspect worker's personal effects in the presents on a worker's representative to ensure compliance with the Zero Tolerance Policy. This could be done:

- Prior to loading on chartered air services.
- While at the job site.
- While performing work related duties while outside the job site (i.e. Carriers on public highways).

SITE HEALTH & SAFETY INSPECTIONS

Planned site inspections will occur no later than monthly unless approved by the manager. Supervisors representing the contractor and/or sub-contractors and the health and safety representative will be involved in workplace inspections.

All health and safety inspection reports must be reviewed during toolbox safety talks and management meetings. All completed health and safety inspection reports will be evaluated and monitored by NZC's management and the JHSC. Reports will be filed with the health and safety documentation, and will be forwarded to the WSCC chief inspector of mines.

Inspection Procedure

Review previous inspection records and note any commonly reported hazards.

STEP 1. Familiarize yourself with the type of workplace and unique hazards.

STEP 2. Use your eyes, ears and other senses to identify actual or potential problems as you go about your inspection, and record the hazards on the Monthly Site Safety Inspection Form.

STEP 3. When unsafe conditions are noted requiring immediate action, correct the situation immediately.

STEP 4. Look for basic causes of sub-standard conditions, practices and procedures.

STEP 5. Keep a copy of the inspection form on the site and forward to general manager.

STEP 6. Review items with the Health and Safety representative and during toolbox talks and management meetings.

STEP 7. Follow-Up Actions to Health and Safety Inspections

Where unsafe conditions, practices or procedures are noted:

- Take action immediately to rectify the problem if possible.
- Place warning signs and barricades to keep workers away and use verbal warnings if applicable.
- Notify management to rectify conditions, record conditions, actions taken and the date on the inspection form.
- Record and complete the site health and safety inspection form and file it with safety documentation.

When a worker is noted performing an unsafe act:

- Inform him/her of the unsafe situation.
- Discuss the unsafe condition with him/her.
- Advise on how to correct the unsafe condition.
- Re-visit the area to ensure the safe practice is being followed.
- Discuss with the supervisor.
- Provide disciplinary action in accordance to (See 3.5).

4.0 WORKPLACE SAFE WORK PROCEDURES

4.1 AIRCRAFT SAFETY

Aircraft safety procedures are included in the Appendix and are extracted from the PDAC e3+ Program.

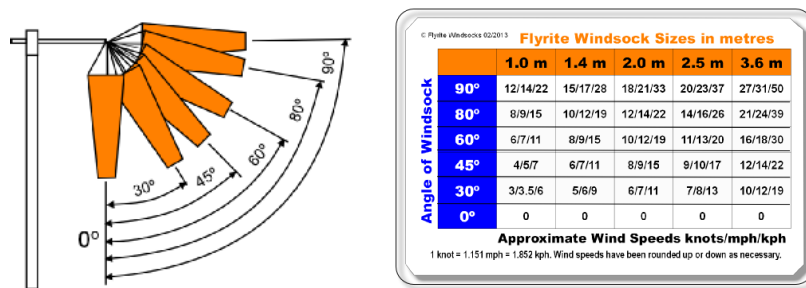
4.2 AIRCRAFT ACCIDENT RECOVERY PROCEDURES

PROTOCOL FOR AIRCRAFT ARRIVAL/ DEPARTURE (AIRSTRIp ID: CBH4)

When expecting an arrival, be present at the airstrip before the ETA (Estimated Time of Arrival) with ground-to-air radio communications set to freq. 122.800 so weather and any other relevant information can be communicated to the inbound pilot. When a plane is departing, you must stay at the airport until the aircraft is safely airborne.

Notify air service provider of departure time after plane has left the site. Log time of arrival and departure.

FIGURE 34: WIND SPEED INFORMATION FROM WINDSOCK



SOURCE: FLYRITE WINDSOCK

Airstrip Inspection and Maintenance

Prior to aircraft arrival, check airstrip for wildlife, large rocks and debris. Airstrip markers and sock should be checked for visibility. The airstrip should be closely inspected at least every month and more frequently when marginal conditions exist.

Overdue Aircraft

An aircraft is considered overdue if it has not arrived or no communications have been made within 30 minutes of the ETA. If an aircraft is overdue, confirm the flight's ETA into the site and contact the air service provider.

Procedure after an Aircraft Accident

STEP 1. Report any aircraft accident by the fastest means possible to the air service provider involved.

STEP 2. Those members of the camp who are trained in ERT procedures and trained to provide care for the injured should be available and in attendance PROVIDED IT IS SAFE TO BE IN THE AREA. Untrained individuals should NOT enter the crash site. A well-intentioned but untrained and ill-equipped person who enters the crash site risks serious injury or death. DO NOT approach a crash site if it could place your life in peril.

STEP 3. An airplane crash is often accompanied by smoke and fire. The smoke can be very toxic, and it is important to protect yourself. You must be aware of all other hazards when entering the crash area such as: explosion, falling trees/branches if in a wooded area, metal debris, etc.

STEP 4. If you need to move any debris material to make a safe rescue, make notes of what was moved and where, this information will be required by investigators following up on the incident.

ERT actions to be taken in the event of an aircraft accident:

- Report of crash – note time.
- Initiate Emergency Response (Code 1) – site ambulance, medic, ERT member assist.
- Arrive at scene – report immediately to base, description of injuries, type of disaster, ID number of patients.
- Hazards involved – fire, smoke, fuel leak, condition of aircraft.
- Establish a command safe zone – command officer (1).
- Call for backup – i.e.: ERT, fire truck, extinguishers, rescue equipment, extrication.
- Establish a cold zone – Stage Officer (1) – coordination of the equipment, rescuers, communications with the command zone, and sending rescuers with equipment on the command zone's advice into the hot zone.
- Command communications with base – 2 people responsible as dispatcher and phone communications with outside agencies (Airline, Hospital, etc). Communications with other agencies such as the RCMP, and WSCC will be notified by the air service provider.
- Logging the time and information is the very important.
- Keep communication lines clear for emergency purposes only.

Remember to remain calm and assist those who need help. The people involved, injured or not, will be experiencing a great deal of stress. If you panic, the patient will likely panic as well, so maintain composure and assure that the patient is as comfortable as possible.

4.3 BOATING

There are many hazards associated with boating. Boaters may become lost or be injured by equipment. An overturned craft may result in hypothermia, injury or death.

Legislation

The Competency of Operators of Pleasure Craft Regulations (Under the Canada Shipping Act) requires that operators of pleasure craft fitted with a motor and used for recreational purposes have proof of competency on board at all times.

An operator is considered to have Proof of Competency if:

- They have proof of having successfully completed a boating safety course in Canada prior to April 1, 1999 or,
- They successfully complete a Canadian Coast Guard accredited test and obtain a Pleasure Craft Operator Card.

General Rules

- Wear a Canadian-approved personal flotation device (PFD) at all times. A highly visible PFD will improve your chances of being seen by other boaters. If the water is cold, wear some thermal protection.
- Know how to operate the boat you are using. Read the owner's manual before setting out when operating a craft you are unfamiliar with.
- Attach engine stop line securely to your wrist or PFD.

- Respect the speed limits and other boating restrictions.
- Be cautious and courteous.
- Navigate with care. At high speed it is very difficult to see swimmers, water skiers, divers and other operators.
- Don't ride after dark or in reduced visibility.
- Gasoline vapours may cause fire or explosions. Do not start the boat if gasoline or vapours are present in the engine compartment. Always replace the engine cover or seat before starting.
- Do not operate a boat while impaired in any manner. It is illegal. In Canada, authorities can ticket offenders on the spot with fines starting at \$600 and prohibition that can last for up to 3 years.
- Ensure that the required safety equipment is on board

Safety Equipment

The Canadian Coast Guard, minimum required safety equipment for a <6m Powered Pleasure Craft includes the following:

- One Canadian-approved personal flotation device or lifejacket of appropriate size for each person on board
- One buoyant heaving line of not less than 15 m in length
- One manual propelling device OR an anchor with not less than 15 m of cable, rope or chain in any combination
- One Class 5BC fire extinguisher, if the pleasure craft is equipped with an inboard engine, a fixed fuel tank of any size, or a fuel burning cooking, heating or refrigerating appliance
- One bailer or one manual water pump fitted with or accompanied by sufficient hose to enable a person using the pump to pump water from the bilge of the vessel over the side of the vessel
- A watertight flashlight OR 3 Canadian approved flares
- A sound-signaling device or a sound-signaling appliance
- Navigation lights that meet the applicable standards set out in the Collision Regulations if the pleasure craft is operated after sunset and before sunrise or in periods of restricted visibility

Pre-trip Checklist

Before starting out on a trip, operators should consider the following checklist items:

- ✓ What is the weather forecast?
- ✓ Any local hazards or boating restrictions?
- ✓ Do you have maps or charts?
- ✓ Are there enough personal flotation devices of appropriate size for everyone on board?
- ✓ All safety equipment in good working order?
- ✓ Ample reserves of fuel for the trip or will you need to refuel?
- ✓ Is your communication equipment working properly?
- ✓ First aid kit, basic tools and spare parts?
- ✓ Have you let someone know where you're going, when to expect you back and what your boat looks like?
- ✓ Is your drainage plug in place?

4.4 DIAMOND DRILLING SAFETY

Each drill will be equipped with the following:

- First aid kit.
- Eye wash station.
- Emergency stretcher.

- Means of communication.
- Fall arrest equipment.
- Fire Extinguisher.
- Spill kit.
- Copy of the Land Use Permit.

Each worker of a drill team shall have, or be provided with the appropriate Personal Protective Equipment as indicated by the manager:

Each worker of a drill crew shall have a valid standard first aid certificate and the foreman shall additionally possess a minimum WSCC Supervisor's Level 1 certificate. Copies of these tickets shall be kept on file for future reference.

All safety mechanisms will be installed and in place before drilling commences. These will be inspected weekly and after a drill has been transferred to a new location. Also, all guards, lifelines, etc. shall be repaired or replaced, as necessary.

Each drill site shall be equipped with appropriate means to fight a fire at the drill. Each worker will be trained in its use and care before drilling commences.

Drill shacks shall have a means of illumination inside and out. All power cords will be kept in such a manner so as not to cause a tripping, hanging or otherwise harmful hazard to workers.

Shacks are to be kept free of flammable and general debris. Garbage cans are to be used and emptied after each shift so as not to attract animals.

Drill crew members shall be trained in EMERGENCY SURVIVAL in the event an overnight stay in the shack is required and each shack shall be provided with emergency rations and drinking water. Rations should be sealed and safely stowed so as not to attract animals.

Workers employed at drill sites will be trained in the prevention and management of heat stroke and hypothermia, and in emergency evacuation of the drill site.

Driller helpers, while in the basket, will wear the fall arrest equipment provided. Proper use of this equipment will be shown to those new on the site or who have not previously been certified in fall arrest procedures.

In the event of an injury, contact the medic via radio and explain what happened, drill location and condition of the patient. Be prepared to assist the medic as necessary upon his/her arrival.

Any person who enters a drill shack while drilling is in progress shall wear appropriate protective clothing.

Drillers shall inspect all wire lines and cables before and after their shift for any wear or stress. Worn cables will be replaced immediately.

Drill personnel shall install a guard or take other precautions so that they do not get pant legs caught in drill rods while in motion. No work is to be done on or near spinning rods.

Drill rods will be inspected regularly to check for stress and cracks. Damaged rods will be taken out of service and replaced as needed.

All vehicles that are used to transport drill personnel shall have flood lights installed to assist in night vision while driving in steep mountainous terrain. These same vehicles will be equipped with the following:

- Radio communication.
- First aid kit.
- Spare tire and related equipment.
- Extra fuel.
- Fire extinguisher.

Drill towers will be inspected regularly to check for cracks or stress wear. Damaged towers will be repaired before work commences with that drill.

Any unsafe action, accidental or otherwise, will be reported to the supervisor immediately for investigation.

Personnel working on drill sites who do not conform to personal or general safety procedures will be reprimanded and possibly dismissed from the site.

4.5 CORE SPLITTING

Core splitting can present a number of hazards to the splitter. Improper use of Personal Protective Equipment can result in hearing damage, eye injuries and soft tissue injury. Improper technique can result in soft tissue injury, sprains and strains. Using proper equipment, and technique can minimize the hazards of core splitting.

PERSONAL PROTECTIVE EQUIPMENT

The following PPE is required for splitting:

Hearing protection

- Earplugs or earmuffs are required at all times to protect eardrums.
- Repeatedly listening to loud noises *may* damage hearing.
- Change earplugs as often as necessary to keep them clean.

Eye protection

- Safety glasses (with side protection) are required at all times to protect eyes from flying pieces of rock and rock dust.
- Make sure that glasses fit properly and that they are cleaned regularly.

Hand protection

- Gloves-(preferably with padding on the palms) are required at all times to protect hands from the impact of the hammer and to prevent blisters.
- If hands or elbows ache regularly—see the first aid attendant. Gloves with more padding or may be needed or adjustments to splitting technique may be necessary.

Respiratory protection

- Respiratory protection in the form of half-face air purifying respirators (APR) equipped with P100 filters, with an assigned protection factor of ten times (10x), and that has been properly fit tested, shall be worn by the core technician.

Foot protection

- Steel-toed footwear is required for moving core ready to be split.

First Aid Equipment

The following first aid equipment should be readily available in the core shack:

Eye wash station

- First aid kit (Level 1)

All splitters must:

- Wear all necessary personal protective equipment
- Be properly trained before commencing work

4.6 FUEL (GASOLINE & DIESEL)

Fueling of equipment should only be performed by those who are familiar with the hazards and who know the procedures for proper handling. Fueling operations can result in physical injury, fire, explosion, chemical burns, inhalation injury and environmental damage if performed incorrectly.

Handling

- Only authorized individuals should handle fuel or perform fueling operations.
- Prior to fueling, ensure that the fuel type is appropriate for the equipment being fueled
- Ensure that engines are shut off prior to fueling.
- Extinguish all sources of open flame or spark while performing fueling operations.
- Avoid splashing fuel and overfilling tanks.
- Avoid inhaling vapours.
- Ensure that fuel does not come in direct contact with the skin. Wear appropriate hand protection where necessary.
- Where the risk of fuel splash on a hot manifold exists, allow the engine to cool before fueling.
- If in doubt about a fuel's identity-don't use it, and advise the Camp/Project Manager.
- No smoking is permitted within 10 feet of any fuel drum.
- No smoking is permitted within 20 meters of fuel storage tanks or any fuel drum cache.
- A spill kit will be readily available at fueling locations.
- A fire extinguisher will be readily available at all fueling locations.
- In the unlikely event of a spill, of any size, notify the Project/Camp Manager immediately.

Transportation

- Transport fuel in CSA approved containers with the appropriate WHMIS labeling clearly visible
- Transport containers in an upright position only and ensure that containers are secured properly.
- Never transport fuel inside a vehicle.
- Display the necessary placards for transportation of fuel on the side of a vehicle in accordance with Transportation of Dangerous Goods requirements.

Storage

- Store fuel only in certified containers with the appropriate WHMIS labeling clearly visible.
- Identify fuel caches with appropriate signage.
- Post “No smoking” at fuel caches.
- Post signs to ensure that no smoking takes place within 20m of a fuel cache.
- Keep a fuel spill kit readily accessible at fuel cache locations.
- Keep a fire extinguisher readily available at all fuel cache locations.

4.7 HELICOPTER

There are serious hazards associated with working in and around helicopters. Incidents involving helicopters can result in injury, death and extensive equipment damage. Specific protocols must be followed when working with helicopters and everyone traveling in or working around the machines must have, at minimum, a full orientation by the pilot. New orientations are required every time there is a change in the type of equipment being used.

Flight Protocol

- Before leaving, ensure that weather conditions are acceptable for flight.
- Inform base office of precise destinations, travel routes and return times.
- Inform base office if the flight will not be returning at the scheduled time.
- Inform base office of arrival upon approach to base.

On the Ground

If you have not flown with a particular pilot or in a particular type of machine request a helicopter safety orientation from the pilot.

- Bring maps, GPS, etc, in case of bad weather and/or poor visibility.
- Dress for the weather.
- Don't smoke around the helicopter.
- Stay well to the side of the helipad or staging area when the helicopter is arriving or departing.
- Secure your clothing and headgear against rotor winds.
- Use safety glasses to protect your eyes against blown dust and particles.
- Keep the helipad or staging area clear.
- Wait for instructions to approach or leave the helicopter.
- Approach and leave to the side or front of the helicopter in a crouched position—never by the rear of the helicopter!
- Where necessary, approach and leave by the downslope side.
- Carry gear firmly at your side, never over your shoulder or above your head.
- Never throw items towards or out of a helicopter.
- Load cargo carefully and secure it against movement.
- Ensure baggage compartment doors are properly closed and latched.
- Take a reserve of special medications and food you require in the event of enroute delays—including, in some cases, the need to stay overnight in the fields

In the Helicopter

- Secure seatbelts (and shoulder straps, if provided) while in flight.
- Use a helmet or headset if provided.
- Remain in your seat with your seatbelt fastened until you are given permission to move

- Do not smoke.
- Do not distract the pilot during takeoff, maneuvering or landing.
- Read instructions on the operation of doors, emergency exits, and the location of the ELT (emergency locator transmitter) and emergency equipment. When in doubt ask the pilot for confirmation.

During an Emergency

- Follow the pilot's instructions.
- Do not distract the pilot.
- Check that any loose gear in the cabin is secured.
- Wear a helmet if provided.
- Remove eye glasses and put into your pocket (you might need them later).
- Assume brace position.
- Tighten seatbelt—with shoulder straps, tighten and sit upright, knees together, arms folded across chest. Without shoulder straps, bend forward so your chest is on your lap, head on knees, arms folded under thighs

After and Emergency Landing

- Wait for instructions to exit, or until rotor stops turning.
- Assist others to evacuate well clear of the aircraft.
- Remove first aid kit and other emergency equipment if there is no threat of fire.
- Administer first-aid if required.
- Remove ELT, read instructions and activate.
- Set up camp to be as comfortable as possible.
- Make the site as conspicuous as possible from the air.
- Stay near the aircraft—do not wander from the site.

When Flying Over Water

- Listen carefully to the pilot's over water pre-flight briefing.
- Wear a lifejacket if provided.
- Know seatbelt fastening, tightening, releasing procedures...
- Know the location and operation of doors and emergency exits
- Know the location and operation of the ELT.
- During an emergency obey the pilot's ditching instructions, loosen any constricting clothing, and assume the brace position when advised by the pilot.
- Wait for instructions to exit, or until rotor stops turning.
- After ditching—establish a reference position, release seatbelt, inflate lifejacket and life raft when clear of helicopter.

Slings Operations

- When directing the helicopter, stand with your back to the wind. Wear, steel-toed footwear, gloves, safety goggles, hard hat and hearing protection.
- Coordinate in advance with the pilot for hand signals, or radio communication.
- Exaggerate hand signals so that they can be seen by the pilot.
- No passengers are permitted in the aircraft during slinging operations.
- Ensure all loose material on the ground has been secured.
- When attaching a cable to a load, do not lay the cable over the skids of the helicopter.
- Only use designated cables and lanyards for slinging operations.
- If using a cargo net, inspect it carefully for any damage.
- Inspect cables, slings and load handling devices. Cables should not be frayed.

- Attach the load as quickly as possible to avoid having the pilot hover over you.
- Watch the load while it is being lifted for hang-ups or other problems. Signal the pilot immediately if a problem is noticed.
- If you cannot see the pilot, the pilot cannot see you.
- Take the time to set up the load properly.

4.8 SURFACE FLEET

Accidents are the most serious hazards associated with motor vehicle operation. Accidents can result in personal injury, death and extensive property damage. Accidents can be a result of improper vehicle handling, inadequate driver training, improper loading technique and poorly maintained vehicles. Additional risks related to weather conditions are associated with using ATVs and snowmobiles and include hypothermia, frostbite and snow blindness.

General Rules

Only designated and adequately trained drivers are permitted to drive company vehicles. Employees must notify the company immediately if their legal driving status changes. Under no circumstances is a worker to ride on any piece of equipment unless properly occupying a place or seat designated for that purpose. This is especially important around forklifts, aerial devices, single all-terrain vehicles, hoists and cranes.

When operating trucks and cars:



- Obey all rules of the road and ALWAYS respect the posted speed limit.
- Adjust speed to road and weather conditions.
- Always wear a seatbelt.
- Do not operate a vehicle while impaired in any manner.
- Do not operate a vehicle if there is open alcohol in the passenger compartment.
- Avoid driving when fatigued.
- When carrying a load, ensure that the vehicle is not overloaded, that the load is properly balanced and is properly secured.
- Ensure that trailers are properly hooked-up and that wiring is functioning properly.
- Do not travel in the back of a pick-up truck.
- Equip vehicles with a first aid kit, fire extinguisher, tool kit and spare parts.
- Use a hands free headset if a cell phone must be used while operating a vehicle.

When operating an ATV or Snowmobile:

- Wear an appropriate, correctly-sized helmet.
- Dress appropriately for the weather and carry extra clothing. Clothing should contain materials that retain heat, release moisture and resist both water and wind.
- Adjust speed to surface and weather conditions.
- Do not drive while impaired in any manner.
- Avoid driving while fatigued.

Travelling On Ice Roads

Be aware of ice road conditions. Never skidoo on ice if there is a chance that ice conditions are inadequate. If you do break through the ice:

- Don't panic.
- Kick vigorously into a horizontal position and swim to the nearest ice edge.
- Place hands/arms on unbroken ice while kicking hard to propel your body onto the ice, like a seal.
- Once clear, stay flat and roll away to stronger ice.
- Stand, keep moving and find shelter quickly.

Avoid driving at night. If travel at night is unavoidable:

- Never ride alone.
- Be aware that forward visibility is reduced by darkness and it is much more difficult to spot and identify potential hazards even when headlights are on.
- Dress properly, even when only going a short distance because becoming disoriented or lost is much more likely at night.
- Travel with reduced speed and increased caution.

MAINTENANCE AND INSPECTIONS

Poorly maintained vehicles can lead to breakdowns or accidents. The designated driver in conjunction with project management will ensure that all vehicles are properly maintained.

Designated drivers or project managers should:

- Perform a daily informal inspection of the vehicle before leaving. Things to consider include: tire condition, fuel levels and location of spare tire and tools.
- Perform weekly vehicle inspections and record findings in a Vehicle Inspection Log Book that is kept with the vehicle.
- Ensure that vehicles are properly maintained and regularly serviced by a qualified mechanic. Records of servicing should be kept.



SIGNAL PERSONS

A competent signal person must assist all operators of any equipment, whenever a vehicle, machine or its load may endanger anyone ([WSCC Regulation 10.129.4](#)). The operator must operate as directed by the signaler. All signal persons must receive proper training and must wear the appropriate protective clothing as required by the manager.

TRAFFIC CONTROL

Written Standard

- All traffic control procedures are to be in accordance with WSCC's Mine Act & Regulations.
- A traffic plan is to be set by a supervisor to NZC's manager title "Traffic Control Plan" with the indication of the location being applied.

- The Traffic Control Plan is to be implemented in the field by trained workers who must receive training to perform this work.
- All sub-contractors must comply with WSCC's Act & Regulations for Traffic Control, and NZC's Policies, whichever is more stringent.
- Personal Protective Equipment required includes:
 - Hard Hat: CSA Class E.
 - Safety Boots, CSA-certified Grade 1 (green triangular CSA patch outside).
 - Garment, usually a vest covering upper body and meeting these requirements:
 - Fluorescent Blaze or international orange in colour.
 - Two vertical yellow stripes 5cm wide on front, covering at least 500cm².
 - Two diagonal yellow stripes 5cm wide on back, in an X pattern, covering 570 cm².
 - Stripes retro-reflective and fluorescent.
 - Vests to have adjustable front and side and front tear-away feature on vests made of nylon.

FIGURE 35: TRAFFIC SIGNALLING



** Nighttime work requires that you wear additional reflective silver stripes encircling each arm and leg, or equivalent side visibility-enhancing stripes with a minimum area of 50 cm² per side.

- Traffic Control Procedure shall be communicated to all personnel, suppliers, and sub-contractors.
- Supervisors/ team leaders to inform sub-contractors of any workers that are trained in Traffic Control.
- Traffic Control Procedure to be included in NZC's Orientation for workers likely to be involved in jobs where traffic control is required.
- Keep records of communications.
- Traffic Control training to be provided by qualified personnel.
- Records of training will be kept.
- Supervisors are to be trained in their responsibilities.
- Supervisors/ team leader to inspect traffic control daily.
- Site inspected at the beginning/end of each shift, modifications, and repairs to be made as required.
- Follow up on correction of any violations, and document results.

4.9 OXY-FUEL CUTTING

All personnel involved in the use of compressed gases for welding shall be familiar with their characteristics and the necessary safety precautions. The supervisor shall discuss the following general characteristics in crew safety meetings.

SET-UP PROCEDURE:

- STEP 1:** Locate cylinders away from sources of excessive heat or physical damage. They should be secured upright in a cylinder truck or against a firm support.
- STEP 2:** Place a fire extinguisher close by in case of an emergency.
- STEP 3:** Slightly open ("crack") and then close the cylinder valves immediately to blow out dust and foreign matter that could restrict the gas flow or damage the regulator seats. Stand to one side of the cylinder valve outlet when doing this.

- STEP 4:** Attach the oxygen and fuel gas regulators to their respective cylinders. Screw the nuts tightly with the proper wrench.
Never force poorly fitting connections.
- STEP 5:** Make sure the pressure adjusting knobs or screws on the regulators are released.
- STEP 6:** Connect the green hose to the oxygen regulator and the red hose to the fuel gas regulator.
- STEP 7:** Connect the hoses to the torch – green hose to the oxygen inlet and the red hose to the fuel gas inlet.
- STEP 8:** Connect mixer and welding tip (or tip assembly) to torch handle.
- STEP 9:** Open the oxygen cylinder valve slowly and completely turn.
- STEP 10:** Open the fuel gas cylinder not more than one full turn.
- STEP 11:** Depress the oxygen torch handle and turn the pressure adjusting screw on the oxygen regulator to the desired pressure.
- STEP 12:** Continue oxygen purge for approximately three seconds for each hundred feet of hose. Close oxygen torch valve.
- STEP 13:** Open the fuel gas torch valve, turn the pressure adjusting screw on fuel gas regulator to the desired pressure and continue purging for ten seconds for each hundred feet of hose. Close the fuel torch valve.
- STEP 14:** To light the torch, open the fuel gas torch valve ½ turn and immediately light the tip with a spark lighter.
DO NOT USE MATCHES. Open the fuel gas torch valve further until the flame is free of soot.
- STEP 15:** Open the torch oxygen valve and adjust until a neutral flame results.
- STEP 16:** When cutting, wear snug fitting goggles with properly coloured and designated lenses. Shade 3 to 5.
- STEP 17:** Long sleeved shirts and pants must be worn while cutting, no shorts or T-shirts.

DISMANTLING PROCEDURE:

- STEP 1:** Close the torch oxygen valve.
- STEP 2:** Close the torch fuel gas valve.
- STEP 3:** Close the fuel gas cylinder valve.
- STEP 4:** Close the oxygen cylinder valve.
- STEP 5:** Open the torch fuel gas valve and bleed the fuel gas line. Release the fuel gas regulator knob.
- STEP 6:** Close the torch fuel gas valve.
- STEP 7:** Open the torch oxygen valve and bleed the oxygen line. Release the oxygen regulator knob.
- STEP 8:** Close the torch oxygen valve.

Regulators and torches can now be disconnected or, if the shutdown is temporary, the torch can be hung in a safe place.

4.10 ELECTRICAL ARC WELDING

All personnel involved in the use of electric arc process equipment shall be familiar with its characteristics and necessary safety precautions. The supervisor shall discuss the following general safety precautions in crew safety meetings.

- All equipment used in the process must be CSA approved.

- For safety and convenience, electrical supply lines to welding machines should be controlled from individual cut-off switches.
- Keep equipment and accessories safe from damage and in perfect running order.
- Set up welding operations in a dry location, free from puddles of water or wet ground.
- Cables should not have repairs made closer than 3 metres (10 feet) from the electrode holder.
- Cables should be placed so that tripping hazards are not created.
- Fire extinguisher shall be close at hand in case of fire.
- Loose connections at the machine, in the electrode holder or at the ground clamp will cause loss of power, make for poor welds, and might even cause loss of power, make for poor welds, and might even cause arcing sufficient to set off a fire.
- Electrodes shall be removed from the holder when the equipment is left unattended.
- The power supply to welding machines shall be shut off when equipment must be moved.
- Overloading welding machine or forcing cables to carry currents beyond the rated capacity causes overheating and reduces service life.
- The welder shall conduct DAILY checks of equipment for loose or corroded connections, cable damage, dirty or defective jaws of electrode holders and ground clamps.
- The total radiant energy (rays) produced by MIG welding can be as much as twice that from coated electrodes at equivalent welding parameters.
- Ultra violet rays can cause skin burning, tanning and “arc eyes”. Skin exposed for only 10 seconds will develop a “burn”. Dermatitis is not unusual when skin is repeatedly exposed to ultra violet rays.
- Long sleeved shirts and pants must be worn while welding, no shorts or T-shirts.
- Wear cuff less trousers to eliminate the danger of spatter and sparks being trapped.
- Flash goggles are recommended to be worn even under helmets and face shields.
- Keep work areas uncluttered and organized.
- When working on equipment, make sure all batteries are disconnected.
- The supervisor shall (in order of preference):
- Eliminate the accumulation of fumes.
- Provide adequate ventilation.
- Provide adequate respirators.
- Other than routine adjustment, leave repairs of electrical equipment to experienced electricians.
- Gasoline driven equipment must be operated only where the engine fumes can be vented outdoors. Carbon monoxide is potentially fatal.
- Never switch the polarity with an electric welding in operation. Idle the machine or switch it off for the change.
- Make sure electrical equipment is grounded.
- Be sure the branch circuit, main disconnect switch or primary input circuit fuses are removed before attempting any inspection or work on the inside of a welding machine.
- Placing the ON-OFF Power switch on the welding machine in the OFF position does not remove voltage from the power terminals inside the machine. **

Electric Arc Welding Process – Restrictions

- No welding shall be done in any areas where there may be flammable materials, explosive gasses or vapours, without authorization from supervisor.
- No welding is to be done in any tank, pipeline, compartment or container, which has contained flammable material until it has been purged, cleaned, and proved to be free of explosive vapours.
- Do not allow welding current to pass through the following:
 - Crane cables or slings
 - Oxygen, acetylene or other compressed gas cylinders.
 - Tanks or storage containers used for flammable liquids.
 - Pipes carrying compressed air, steam, gases or flammable liquids.

- Conduits, chains, metal handrails or ladders.
- Only qualified welders shall weld scaffold bracket clips, ear plates, and lifting lugs.

Electric Arc Welding Process – Operation

Welders shall observe the following safety precautions:

- Have a solid footing and remember that welding shield diminishes peripheral vision.
- Store electrode holders where they cannot contact people, fuels or compressed gas cylinders.
- Remove all electrodes from holders and turn the machine off when welding is stopped for any period of time, such as breaks, etc.
- Burn electrodes to within 1-1/2" – 2" (38-50mm) in length. Burning them shorter damages the electrode holder.
- Keep electrodes and holder dry. If exposed to water or steam, dry thoroughly prior to use.
- Place electrode stubs in a container to prevent slips and falls.

4.11 KITCHEN

There are many hazards associated with working in the kitchen. Improper use of equipment can result in cuts, scrapes, amputation and serious burns. Improper handling and storing of food can result in harmful bacteria being transferred to the consumer which can cause serious illness.

GENERAL KITCHEN RULES

- Always wash hands upon entering the kitchen or handling food. Do not use the kitchen sink to wash your hands.
- Always wash hands after using the washroom.
- Always wear an apron while in the kitchen and when handling food in the dining area. Aprons should be cleaned at least once daily and more frequently if contamination or excessive soiling occurs. Aprons should not be worn outside of the kitchen and dining areas.
- Sterile gloves should be used when handling meat and meat products.
- Long hair should be tied back or contained in a net.
- Jewelry on the hands and wrists should not be worn when handling food or using kitchen appliances.
- Keep hands away from face, hair, pockets and other sources of contamination while in the kitchen. Hands should be washed immediately if contamination occurs.
- No smoking in the kitchen or dining area. Always wash hands before returning to the kitchen after a smoke break.
- Always use soapy water with bleach to clean kitchen area. Use separate towels for washing kitchen and wiping tables.
- Cutting boards should be cleaned immediately after any contact with meat or meat products.
- All vegetables and fruit should be cleaned thoroughly before use.
- Kitchen appliances should only be used by trained kitchen staff. Do not use, adjust or clean appliances or equipment that you have not been trained to use.
- Knives should always be washed separately and put away immediately. Knives should never be placed into sinks
- Alert co-workers when handling hot food or equipment.

4.12 OFFICE SAFETY

The office environment has many hazards for the unwary and is as vulnerable to accidents as are workshops, or industrial job site areas. Office staff should:

- Maintain good housekeeping to promote safety. Keep your desk tidy.
- Avoid cuts to the tongue when sealing envelopes by using moisteners.
- Pass scissors handle first, with blades closed.
- Use a knife or blade with a handle for cutting and pasting; never use a double edged or unprotected razor blade.
- Ensure all electrical equipment should be grounded.
- Discard worn or frayed electrical cables.
- Keep passageways and walkways clear to provide access and egress in case of emergency.
- Never leave a desk or file cabinet with drawer open.
- Eliminate cables stretched across passageways or walkways that are tripping hazards.
- Never stand on swivel chairs or chairs fitted with castors, the chair may roll or tip when your weight is applied.
- Store heavy files in the bottom of filing cabinets.
- Not participate in practical jokes and horseplay as they are dangerous and forbidden.
- Keep fire/emergency doors closed when not in use.
- Not block fire escape routes or passageways, etc.
- Know your escape routes from place of work.
- Know the nearest location of fire extinguishers and how to operate them efficiently.
- Not use stairs in event of emergency.

APPENDIX FORMS

The following operational health and safety documentation is attached. Additional relevant documentation is available to workers as requested.

AIRCRAFT SAFETY (PDAC E3 PLUS 16.0)

CONFINED SPACE (CZN.FO.2013.04)

INCIDENT INVESTIGATION (CZN.FO.2013.08)

MEDICAL QUESTIONNAIRE (CZN.FO.2013.10)

RETURN-TO-WORK ARRANGEMENTS (CZN.STN.2013.06)

WSSC CONTRACTOR CLEARANCE REQUEST

WSSC EMPLOYER'S REPORT OF FATALITY

WSSC EMPLOYER'S REPORT OF INJURY

WSSC WORKER'S REPORT OF INJURY

WSSC EMPLOYER'S INCIDENT REPORTING FLOWCHART

SAFE WORK PROCEDURE: SULPHIDE SHACK

SAFE WORK PROCEDURE: GENSET

SAFE WORK PROCEDURE: CORE SAW

SAFE WORK PROCEDURE: INCINERATOR

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16.0 Aircraft

Introduction

The mineral exploration industry commonly relies on aircraft to access remote exploration sites. Various types of fixed wing aircraft and helicopters are used depending on availability and what is most appropriate for the job. Mineral exploration often requires operating aircraft in a wide variety of remote and challenging conditions. Aircraft related accidents, particularly those involving helicopters, have accounted for more fatalities than any other type of accident in exploration. Some fatalities could have been prevented if safe operating procedures (SOPs) had been followed. Four ways to reduce the likelihood of aircraft related incidents and potential fatalities are (1) carefully select charter aircraft companies and pilots; (2) do not accept unsafe practices by pilots or pressure pilots towards such practices; (3) thoroughly train all employees at any project serviced by aircraft to work safely in and around aircraft; and (4) provide refresher training for those who use charter aircraft on casual basis.

16.1 Risks and Hazards

All Aircraft

- Crashes resulting in injury or death caused by pilot fatigue, bad weather, overloading, inadequate maintenance
- Drowning caused by inability to escape a submerged or overturned aircraft after a crash in water.
- Death, dismemberment, severe injury, impact injury caused by contact with rotor blades or a propeller. This is particularly hazardous when mooring a float plane or when entering or exiting a helicopter during a toe-in landing
- Stranding caused by an accident, bad weather, mechanical problems, communication breakdown
- Pilot fatigue caused by difficult working conditions, stressful sling work, pressure by the company or contractor to complete a job
- Damage to property, aircraft caused by careless handling of freight, prop wash
- Hearing loss caused by lack of hearing protection
- Burns caused by contact with cowling around engines, areas near exhaust discharge, pitot tubes
- Accidental fires caused by prop wash, downdraft from rotor blades, fuel spills

Helicopters have additional risks and hazards

- Being struck by rotor blades or tail rotor, caused by unsafe movement through hummocky ground, wind causing blades to dip, toe-in landings
- Risks associated with slinging – see section 16.12 Slinging
- Injury or damage caused by people or equipment contacting main or tail rotor while loading

- Damage to main or tail rotor blades caused by coming into contact with trees or shrubs in tight landing spaces, which may result in potential stranding
- Falling out caused by flying with doors removed during some surveys

16.2 Responsibilities (Due Diligence) Regarding Aircraft

Implementing training and safe operating procedures (SOPs) are important ways to reduce potential incidents, which are often fatal. As presented in section 1.2 Due Diligence, companies should be able to demonstrate due diligence with respect to safety. For example, in Canada, Transport Canada regulations together with provincial and territorial Occupational Health and Safety legislation require companies to provide employees who fly and work around aircraft with training in safe work procedures regarding aircraft. The following are some requirements that demonstrate due diligence with respect to aircraft safety.

Exploration Companies

- Develop written safe operating procedures (SOPs), site specific SOPs (as needed), and SOPs for special aircraft operations (e.g., slinging, drill moves, hover manoeuvres, special surveys). SOPs should address flying to and from work sites and traverses etc. Some terrain requires specific safe operating procedures (mountains, glaciers, Arctic islands etc.).
- Develop a written emergency response plan (ERP) with procedures for overdue or missing aircraft.
- Hire (or train) supervisors who are competent, especially when slinging and drill move operations are required.
- Provide training and education for employees who fly or work around aircraft (e.g., traversing and slinging operations). Consider formal designation and training for those capable of supervising aircraft slinging operations to establish “load marshalls”.
- See that piloting, inspections and maintenance of chartered aircraft are carried out by competent personnel.
- Provide required PPE.
- Monitor the use of aircraft, behaviour around aircraft and implement consequences when SOPs etc., are not followed.
- Documentation: Keep records of training, accidents/incidents and corrective actions, mitigation of hazards, safety inductions and meetings, inspections, maintenance, infractions etc., that apply to aircraft.
- Carry adequate insurance.
- Sometimes only military aircraft are available for charter in less developed countries. Exploration personnel should be aware that normally military aircraft do not have or require airworthiness certificates. Flying in an aircraft with no airworthiness certificate may invalidate some insurance, such as life insurance, medical coverage etc. Military pilots may have different safety standards than civilian pilots.

Project Manager or Supervisor

- Implement company SOPs regarding aircraft. Develop site specific procedures and train employees in SOPs, as required.

- Make sure all employees are familiar with the project ERP procedures and are trained to respond correctly if an aircraft is late, missing or crashes.
- Repeat training periodically – whenever there is a change of pilot and/or engineer, change of aircraft, when new employees start work, and any time there is a slip up or reason for refresher training.
- Be sure pilots comply with jurisdictional transportation regulations. Do not request pilots to exceed the allowable duty hours and flight hours.
- Make sure pilots provide written flight plan records for all flights from the project and that they check-in on schedule.

Employees

- Follow company SOPs and training regarding aircraft.
- Follow training and instructions given by the pilot.
- Be familiar with and keep away from the danger zones around aircraft.
- Use PPE and safety equipment as directed.
- Report hazards or dangers to the pilot while in flight or to the supervisor or pilot while on the ground.
- Never engage in horseplay in or around aircraft.
- Be aware of their right to refuse to fly if they feel the situation is unsafe or they need more training to do a job safely (e.g., hover manoeuvres).

16.3 Aircraft Charters

Accidents and incidents involving aircraft (helicopter and fixed wing) are the principal cause of fatalities in the mineral exploration industry. Given that about 75% of accidents are caused by pilot error and 20% by equipment malfunction, it is imperative to use the safest pilots and aircraft possible. All companies registered in Canada that operate aircraft are required to have a Safety Management System (SMS) in place. No matter where in the world an aircraft is chartered, the presence or lack of a SMS will be an indication of a company's regard for safety.

Guidelines for Chartering Aircraft and Hiring Pilots

- Use only registered charter airline companies with good safety records that are in compliance with jurisdictional regulations – preferably one that has been audited. Request to review the company SMS documents and safety records and try to review audit information.
- There are consultants throughout the world that specialize in safety performance audits of charter aircraft companies. When planning an exploration program with extensive air support, the cost of performing an audit is only a small portion of the total expense.
- Obtain references for air charter companies and pilots from other companies that have used them. Preference should be given to pilots who have flown satisfactorily for the company before and whose competence can be effectively assessed.
- Discuss the charter company and aircraft selection process with someone who is familiar with the charter company under consideration and who has experience with the type of aircraft and terrain.

- Charter aircraft that are appropriate for project requirements e.g., ferrying employees to and from the site and/or traverse routes, capability to cover the required area, transporting equipment, flying required surveys or slinging required loads (e.g., equipment or drills). Make sure the aircraft landing requirements are fully discussed and understood.
- Specify the requirements for complete survival kits, training and emergency procedures when requesting proposals for aircraft charters.
- Make sure the aircraft landing requirements are fully discussed and understood.
- Hire experienced pilots. The Prospectors & Developers Association of Canada (PDAC) suggests that an exploration company stipulate that a pilot have a minimum of 1600 hours flying in the same type of aircraft. As an additional requirement for helicopter pilots, stipulate that a pilot has in excess of 800 hours experience in similar terrain and 300 hours of experience using unprepared landing sites. Also, the pilot should have flown a minimum of 300 hours as pilot in command during the last 12 months, and also have recent training and experience in slinging the particular type of work that will be required at the site. Some major mining companies require even more experience than outlined here.
- When helicopter slinging is required:
 - Helicopter: Tender documents and/or the helicopter contract should specify a type of helicopter capable of moving the drill components or any other required sling loads on site. Therefore, it is necessary to identify the drill equipment and accurate weights of component parts in the tender document. Helicopter specifications can be checked for lifting capacity, range, fuel capacity and other attributes to determine the best machine for a specific purpose but it is always advisable to discuss these requirements with experts.
 - Drill sites: Drill moves using helicopters require special pilot expertise such as long-lining ability and knowledge of how drillers work. Tender documents should specify that the pilot has recent experience and certification regarding drill moves and with the same type of machine. Specify a licensed aircraft maintenance engineer with sling expertise, as this person is responsible for the good condition of the sling equipment.
- It is recommended that a helicopter aircraft maintenance engineer be present at all projects where a contract helicopter is based. Discuss pilot and engineer rotations before the project starts.

16.4 Safe Operating Guidelines for All Aircraft

Follow strict safety rules when working around all aircraft. Propellers and rotor blades are invisible when engines are running; it is easy to become distracted and walk into them.

1. At the start up of the season or project, include an aircraft safety induction as part of the general safety induction meeting. The pilot should provide a full briefing at the aircraft for all personnel working on a site with aircraft support. It is advisable to repeat aircraft safety briefings at least monthly, but they must be repeated whenever a new pilot begins work, new personnel arrive on site, a new aircraft is used, or whenever an incident occurs involving aircraft. Employees and passengers should pay attention to all safety briefings.
- Hold full safety briefings before all flights for passengers who regularly fly (e.g., air support for traversing) until they are fully familiar with procedures. Less extensive briefings can be held once workers are well trained. Hold periodic refresher training.

- Brief passengers before all flights when there is a change or potential change in regular routine or there are unusual situations (e.g., hover manoeuvres).
 - Hold full pre-flight briefing any time there are visitors or persons who do not regularly fly on the aircraft.
 - All critical safety instructions and briefings should be in the local language, where relevant.
2. In many jurisdictions there are limits to the number of hours a pilot may fly in a given time period. Know these limits and do not request a pilot to exceed them. These regulations are intended to combat pilot fatigue, which is an important factor in many aircraft incidents and accidents. Transport Canada regulations permit 8 flight hours and 14 hours maximum duty time in a 24 hour period.

<http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/Part7/Standards/720.htm>

As a guideline, the International Airborne Geophysics Safety Association recommends the following hours, which are available on the following website:

http://www.iagsa.ca/Contract_Annex990325.pdf

Maximum flight hours

40 hours in any 7 consecutive day period

70 hours in any 14 consecutive day period

120 hours in any 30 consecutive day period

1200 hours in any calendar year

Hours should be reduced if slinging or low level surveys are performed.

3. Plan flights schedules to comply with certifications of the pilot and aircraft. If using VFR (Visual Flight Rules) aircraft, always plan to have flights completed in daylight with a safety margin. This usually means planning flights during daylight hours that begin no earlier than 45 minutes after sunrise and are completed 45 minutes before sunset.
4. Develop a written emergency response plan (ERP) with procedures that address potential aircraft emergencies. Train all passengers and employees to know *what* to do and *in what order* for potential aircraft emergencies. Hold a drill to test the plans. Passengers should be fully familiar with relevant parts of section 16.15 Emergency Procedures.
5. Pilots should file a written record of the passengers on board, the route and destination for every flight.
6. Aircraft are required to carry safety and survival equipment for each passenger. All passengers should know the location and nature of this equipment; the location may differ between aircraft – even in the same type of aircraft. In addition, each passenger should carry basic personal survival items suited to local conditions distributed in their pockets.
7. All passengers must be transported in anchored seats with seat belts fastened. Wear hearing protection (ear muffs) whenever possible. Carry and use disposable earplugs for additional protection.
8. The pilot or co-pilot is required to supervise the embarking and disembarking of passengers. This is usually done when the engines are shut down.
9. When boarding or disembarking, never walk in the direction of the propellers of fixed wing aircraft or in the direction of the tail rotor of a helicopter.

10. Stand well back from all aircraft during landing or docking procedures. Never touch or stand within the arc of a stationary propeller. The engine's ignition circuits may be live and spontaneous ignition in piston engines can occur.
11. Never overload an aircraft. Follow safe loading procedures. Plan for the increased weight of samples. Make an extra trip if necessary. (See section 16.8 Safe Loading Guidelines.)
12. Notify the pilot of any dangerous goods cargo. Plan ahead as it may be difficult to ship some supplies to remote sites, depending on available air carriers. See section 16.9 Transportation of Dangerous Goods.
13. All employees are required to maintain vigilant, safe behaviour and refrain from all types of horseplay in and around aircraft at all times.
14. No smoking within 30 metres of aircraft or fuel storage areas.
15. In the event of a crash, *stay in the vicinity of the aircraft*. In the event of a hard landing, do not leave a helicopter until the rotor blades stop completely or the pilot gives permission. Know where the exit is relative to your seat (situational awareness) so you can find the exit even if you are upside down, under water or the cabin is dark and smoky.
16. Always wear clothing appropriate for the climate and weather when you fly. Keep essential survival items in your pockets, if permitted. You may not be able to retrieve heavy clothing and packs from the cargo compartment in an emergency. In winter in the Arctic, dress in layers, wear boots and carry a parka, mitts and hat in the passenger compartment. In summer, carry a warm jacket and bug repellent.
17. When ferrying crews to a destination, distribute the food and equipment, including survival kits, as equally as possible between flights. Then, if something prevents the completion of all flights, the risk is reduced for any group that may be stranded without food, water and shelter.

16.5 Pilot Fatigue

Fatigue is cumulative and affects pilots in insidious ways; their attitude toward flying changes so that personal safety standards decline and they take risks they would not normally take. Fatigue and tiredness are not identical. A person may feel *tired* after a long day of work, but after a number of long hard work days one may feel the cumulative effect of the work as *fatigue*. Piloting any aircraft is stressful work and may result in fatigue. Piloting helicopters is usually considered more stressful than piloting fixed wing aircraft – and slinging operations are rated as twice as stressful as normal helicopter flying.

Symptoms of pilot fatigue are difficult to pinpoint but they may include:

- Decreased mental alertness
- Emotional responses to minor irritants that become unpredictable
- Tuning out visual and auditory cues that would normally serve as warning signals to the pilot
- Pilots may exhibit distracted attention, slow reaction time or missed cues, grouching and irritability, atypical behaviour and/or isolation.
- Fatigue often leads to mistakes, which in turn leads to incidents, sometimes with tragic consequences.

The following contribute to fatigue:

- Long working hours without enough sleep
- Pushing the limits – of the aircraft, load capacity, the weather and available daylight
- Slings difficult loads under marginal conditions – even when not actually pushing the limits
- While “fatigue” is most frequently an issue raised with reference to pilots, it is not limited to pilots. Field employees who undergo long stretches of work without a break and/or who endure stressful project situations may develop fatigue and be more liable to unsafe actions around aircraft.

16.6 Float Planes

Due to their design, additional safe operating guidelines apply to float planes.

- Pay close attention to the pilot's safety briefing, especially regarding safe boarding and disembarking routines.

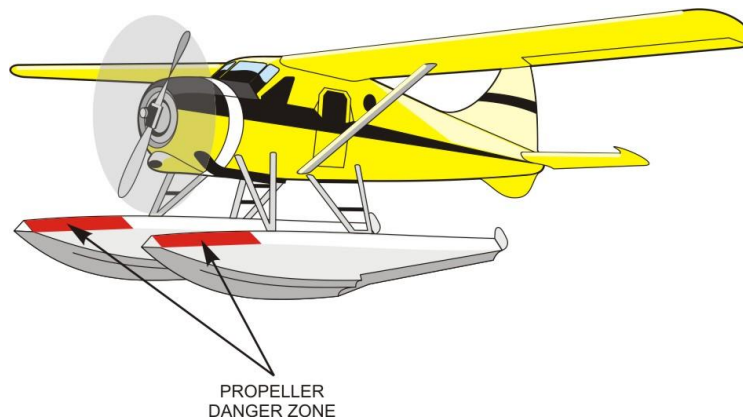


Figure 16.1: Float Plane propeller danger zone

- Danger zones: The propeller(s) is invisible and extends across the front of the floats. Watch out for the propeller overhang at a dock at all times.
- Be able to find and open the exits (situational awareness). In the event of an accident, float planes tend to come to rest upside down in water. See section 16.15 Emergency Procedures.
- Float planes are required to carry one life jacket for every person on board. Know where your life jacket is located, how to retrieve it, and how and when to put it on.
- The pilot should brief at least one passenger on the mooring procedures no matter what arrangements have been made at the destination. The passenger should be familiar with float planes, if possible. Do not assist in tying up a floatplane unless you have been trained to do so.

- Always follow the pilot's instructions when mooring a float plane. Always use a strut for the initial tie-up. Wait until the engine is fully stopped before securing the front of a float, as the engine may backfire causing the propeller to spin.
- Remember that the cowling around the engines and the struts near the exhaust areas will remain hot after the engine stops.
- Never touch the rudder, elevators, ailerons or connecting wires on the aircraft.
- Avoid surfaces coarser than sand when beaching and tying up a float plane on shorelines with no dock.
- Before loading, make sure the dock is firmly secured to the shore and the float plane is firmly secured to the dock.
- Remote landings:
 - Before landing, the pilot should verify that the float plane will be able to take off again, as take-off requirements change with load, elevation, wind conditions etc. While this is the pilot's responsibility, passengers should be aware of these constraints and not encourage a pilot to take chances.
 - The pilot should overfly the landing area and the takeoff area to check for floating obstacles, submerged or semi-submerged logs or rocks, wind direction and strength, trees, structures such as buildings, wires that may connect islands and the mainland, and other traffic on the water.
 - Glassy water landings: When possible, people on shore should make waves with a boat to disturb the water surface, which will help increase the pilot's depth perception and ability to judge altitude when landing.
 - In snowy conditions or on frozen lakes, use evergreen trees as markers to line runways and provide the pilot with a horizon reference in flat light or near white out conditions.
 - On ice: Check for other traffic, snow and ice conditions, wind direction and strength, cracks, obstacles, pressure ridges, wildlife and trees. Prevent skis from freezing in by placing brush under skis when the plane is parked.

16.7 Helicopters

Helicopters present a number of unique hazards by nature of their design and use. They are more susceptible to mechanical failure than fixed wing aircraft. Although they are particularly useful, never take safety for granted at any time, especially when accessing rugged terrain and/or flying in poor weather conditions where visibility is limited.

In addition to those listed in section 16.4 Safe Operating Guidelines for All Aircraft, the following guidelines apply to helicopters.

16.7.1 Safe Operating Guidelines for Helicopters

1. Avoid using piston engine helicopters.
2. Passenger safety briefings should stress the additional hazards associated with helicopters.

3. Never approach or exit a helicopter without the pilot's direct permission or signal. Pilots frequently do stability testing and shift the helicopter slightly before final landing. Establish a protocol with the pilot to signal that it is safe to approach or exit a helicopter. Also, establish a signal protocol that indicates it is safe for the pilot to lift off after all passengers have disembarked, unloaded gear and are well clear. This is particularly important when passengers disembark while the machine is under power.
4. Approach a helicopter by moving toward the *front* of it and in full view of the pilot. Try to keep eye contact with the pilot. Take care not to walk into the radio antenna or pitot tubes. Exit by moving away at the *front* of the helicopter. You may have to approach or exit to the side if it lands facing high ground or if it has a low blade clearance at the front (e.g., Sikorsky S-76). Never enter or exit toward the rear of a helicopter, as the tail rotor is invisible when the machine is running. See also # 6 and 7 below.



Figure 16.2 Helicopter

5. Always approach or exit in a *crouching* position to give your head more clearance from the rotor blades. Hold on to your hat or hard hat if it is not secured with a chinstrap. Do not reach up for your hat or chase it if it blows away.
6. *Never walk in the direction of the tail rotor.* If you walk into the tail rotor it will kill you! Inform the pilot before exiting if it is necessary to remove gear from the cargo compartment. Do this carefully and make sure to close the cargo compartment door correctly when finished. Then, return to the *front* in full view of the pilot and move away at the *FRONT* of the helicopter. Never go under the tail boom to get from one side of the helicopter to the other. Walk only around the front of the helicopter.
7. Always approach and exit using the *downhill* side if the helicopter is on a slope. The rotor blades will be much closer to the ground on the uphill side and they can hit your head. Be alert to this risk when moving through uneven or hummocky ground within the range of the main rotor blade. Passengers in rear seats should all exit from the same door on the downhill side of the helicopter. A front passenger who must exit on the uphill side should first retrieve gear stowed in the cargo compartment while staying close to the helicopter, and then move around the front and away from the machine on the downhill side.

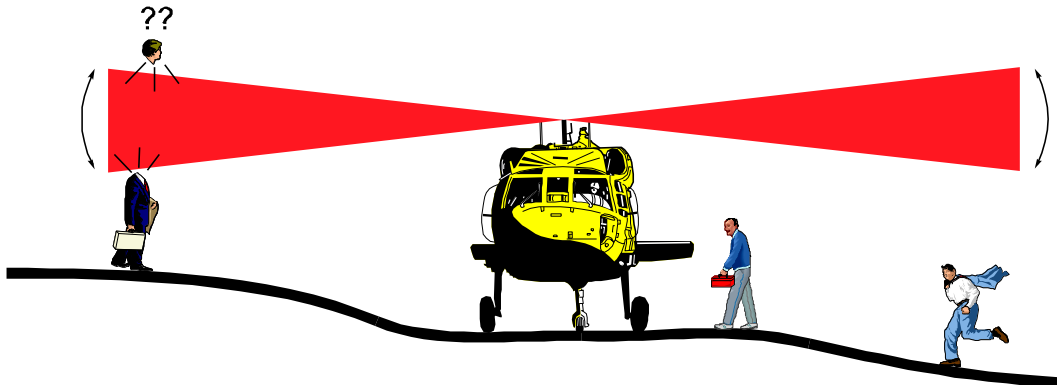


Figure 16.3: Approaching a helicopter

8. Do not approach or exit when the rotor blades are moving slowly. Blades will dip as the motor slows, and they can also dip unpredictably when it is windy.



Figure 16.4: Helicopter blades can dip down in wind

9. Establish a signal protocol between the pilot and all passengers to use when exiting and unloading gear. When exiting a helicopter that will take off immediately, move at least 10 metres away with your gear and crouch down in a safe place. Make eye contact with the pilot and signal that you are secure. Remain there during liftoff. This is very important when passengers are disembarking while the helicopter is under power.
10. Do not approach a helicopter when visibility is reduced with blowing sand, dust or snow from the downdraft of the rotors. Wait until visibility is clear or until the helicopter has shut down.
11. Do not distract the pilot or upset the balance of the machine with sudden or unpredictable movements during takeoff, landing or other manoeuvres. Nevertheless, if you notice a hazard while flying, be sure to point it out to the pilot. Do not assume the pilot has seen it.
12. Carry all long items horizontally (e.g., poles, oars, tools) when loading and unloading. Two people should carry long items – one at each end – to prevent contact with the rotors. Never carry them vertically or over your shoulder as they may hit the main rotor blades. Do not toss items from person to person.

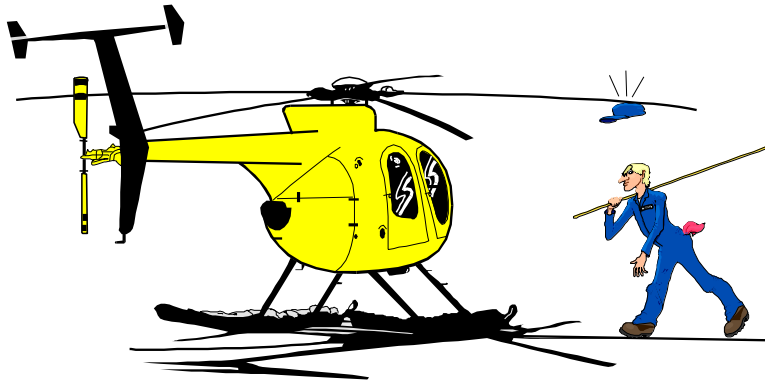


Figure 16.5: Secure loose items when approaching a helicopter

13. Stow small articles: Place hats, vests, sample bags, maps and clipboards etc., into a pack before boarding so they cannot be blown or sucked into the rotors or engine. Never chase something that blows away – you may be killed.
14. Never throw anything out of a helicopter. It may contact the rotor blades or be sucked into the jet engines.
15. Passengers should not ride in a helicopter during slinging procedures.

Note: Stay alert and constantly remind yourself to keep your distance from the rotor blades.

16.7.2 Additional Safety Guidelines for Helicopters

- *Do not rush* while working around aircraft. The tendency to hurry during loading and unloading procedures greatly increases the chances of injury. This is especially true when the machine is running and rotors are turning.
- Always plan who will do which job when loading and unloading a helicopter. Who will communicate with the pilot? Who will hold the door? Who will carry which items? How will the items be carried? This helps prevent confusion and accidents, as it is very noisy and windy around a helicopter with its rotors turning.
- When boarding or exiting a helicopter under power, keep a good grip on the door handle or door frame until both feet are safely inside the helicopter or on the ground.
- When exiting, refasten seat belts so they don't flap around inside the bubble or hang out the door. Close the door carefully.
- Do not touch a helicopter or the load before it has completely landed, as it is usually charged with static electricity.
- Stow field gear, samples and packs in the cargo compartment. Plan for the increased load at the end of the day due to the weight of samples.
- Close doors and cargo compartments carefully and completely. If the helicopter is unfamiliar, ask the pilot to demonstrate how to open and close the doors with minimum effort. Practice when the helicopter is shut down.
- Securely stow all items within the bubble. Unsecured, small heavy items can cause a lot of damage during turbulence or a hard landing. They may slide and jam the controls.

Never place items against the bubble as they may damage the surface or obstruct the pilot's view.

- Extra caution is required during some surveys such as when a helicopter door is removed. When working on such a survey, do not unfasten your seat belt until the pilot gives permission.
- When traversing or working off site, use hand-held FM radios for communication between the pilot and other parties on traverse. Supply the pilot with a frequency so field parties can communicate with the pilot from the ground. At least one FM radio per group working in any one location should be provided. Compact satellite phones capable of communicating with the project site can be used if the project site has the capability of contacting the pilot by radio.
- Carry a fluorescent orange helicopter cloth and signalling mirror to attract the pilot's attention in case radio communication fails. The cloth is useful to indicate wind direction to the pilot, but then pack it away securely to prevent it being sucked into the rotors.
- Protect your eyes from dust produced by the downdraft during arrival or departure. Wear safety glasses or goggles.

DON'T SMOKE IN OR AROUND THE HELICOPTER

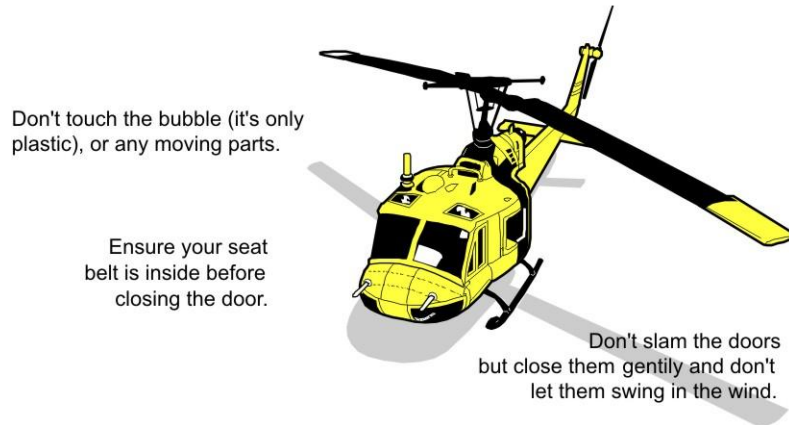


Figure 16.6: Helicopter safety

General safety around helicopter landing sites

- Stand back at least 15 m from the landing pad during arrival or departure, preferably upwind and in view of the pilot. Remember – a helicopter can move in any direction including backwards.
- Weigh down or remove all lightweight materials, especially plywood, foam mattresses and tarpaulins that might be blown around by helicopter downdraft. A heavily loaded helicopter has a powerful downdraft that can send sheets of plywood, styrofoam or plastic sailing into the air.
- Locate all fires at least 100 m from a helipad so turbulence created by flying activity will not blow embers about and create a brush fire.
- Designate any required parking area for vehicles or ATVs etc., and set it well back from the landing site. Remove light weight material (e.g., empty cans, rubbish) from the back

of pickup trucks to prevent objects being blown about by the downdraft from helicopter blades.

- In some forested areas, few landing sites are available and it is imperative that a ground party carries an axe or saw to create or improve landing sites. Fly the traverse route prior to drop off to check for potential landing sites, as well as rivers that cannot be crossed, predatory wildlife and hazardous terrain. Communicate and plan with the pilot regarding when and where you expect to end the traverse so that a suitable pick up point is located. Mark it on the maps (yours and the pilot's).



KEEP THE LANDING AREA CLEAN

The helicopter downdraft will lift and move an amazing variety of things.
Never throw any object in the vicinity of the helicopter.

Figure 16.7: Helicopter landing sites

16.7.3 Guidelines for Hover and Toe-in Manoeuvres

The following guidelines are adapted with permission from “Toe-in Pick-up Guidelines” in the *Canadian Mineral Exploration Health & Safety Annual Report 2008* issued jointly by AME BC (Association for Mineral Exploration British Columbia) and PDAC.

Hover Manoeuvre: Any passenger entry or exit from a helicopter that is required to be under power in order to maintain a stable altitude

Toe-in Manoeuvre: A passenger entry or exit when any skid is in partial contact with the ground

Exploration employees and helicopter pilots should strive to avoid hover and toe-in manoeuvres whenever possible. Field crews should always look for flat landing spots throughout the entire field season so the pilot can make a conventional, full skid landing. They are much riskier than regular landings, as it is critical for the pilot to maintain stability of the helicopter at all times. A hover or toe-in manoeuvre accident has a higher potential to become a fatal accident. The noise of the helicopter under high power is stressful for both the pilot and passengers. Passengers must remain calm and never rush or move rapidly when they embark or disembark from a helicopter under power.

- Factors that contribute to the safety of helicopter toe-in manoeuvres include: the type of helicopter, terrain, altitude, wind direction, the number of passengers and the loads to be removed or placed on board.
- Hover manoeuvres including toe-in pick ups and landings must only be done with experienced field crews who have developed a solid working relationship with a pilot experienced in making these manoeuvres.

- Hover manoeuvres including toe-in pick ups and landings should be discussed during the safety induction at the beginning of the season. If a pilot does not mention these manoeuvres at the safety induction or when the pilot starts work, the field crew should ask if they are part of the pilot's repertoire. Field crews should not assume a pilot will make toe-in landings and pick ups whenever they find it more convenient than searching for or preparing a good flat landing site.
- Entry and exit procedures for hover and toe-in manoeuvres should be practiced on the ground with the engine off before they are performed in the field.
- If a hover manoeuvre or a toe-in landing or pick up is anticipated during the day, the pilot and field crew should review and discuss the procedures prior to embarking on the flight and/or again prior to disembarking from the helicopter. The pilot should hold a drill before every trip when there is potential for a hover manoeuvre and especially for a toe-in manoeuvre.
- Establish the order of disembarkation or embarkation and sit in the helicopter accordingly. This order is usually determined by the weight of each passenger.
- As the pilot must keep both hands on the controls, he often indicates by radio contact or by eye contact and a nod that he is ready to have passengers board. Establish this procedure with the pilot beforehand.

Hover and Toe-in Landings (exits)

- Passengers should not participate in any hover exit when the skids are more than 0.6 metres off the ground.
- When disembarking, be especially careful not to make any unexpected movements that suddenly transfer weight onto or off a skid during the manoeuvre. All movements and weight transfers must be slow, smooth, efficient and controlled.
- After stepping carefully and smoothly off a skid, crouch at a predetermined distance while the helicopter takes off.
- When it is necessary to retrieve cargo from a compartment on the pilot's side of the helicopter, *never* duck under the tail boom. Only cross carefully in front of the pilot so you are always in view. Avoid this move if at all possible.
- *Never* walk upslope after disembarking from a helicopter in a hover or toe-in landing.

Toe-in Pick Ups

- A toe-in pick up location must be approved by the pilot – preferably by radio. If you are not in radio contact and the pilot does not land, it is because the pilot does not like your choice of pick up point. The pilot will go and find a good landing spot and you will have to walk to it.
- Before being picked up by the helicopter, all passengers should assemble with all gear in a location where it will be safe to board the helicopter. This position must be at a level no farther uphill than the level where the helicopter door will be so each person can walk carefully to the helicopter on a level or upslope path. Everyone must avoid the possibility of contact with the helicopter rotors.
- Each person must be able to make eye contact with the pilot. "*See the pilot see you*". Usually this will be 90° to the length of the machine on the side opposite the pilot.
- The crew must assume a crouched position with hat removed and all gear arranged ready to board. When the pilot signals (usually a nod), one person at a time will move slowly and deliberately to board the helicopter. The order that people board the helicopter

should be determined through discussion with the pilot *prior* to the manoeuvre, which probably means prior to being originally dropped off.

- When loading packs etc., carry items at or below waist level to avoid contact with rotors.
- The pilot can direct a passenger on board to assist by arranging seat belts and lifting or stowing packs in the cabin. The pilot should indicate where to sit to best keep the balance of the helicopter.
- Before boarding, hand in gear to a passenger already on board. Each person must slowly and smoothly step onto the skid and climb into the helicopter without creating a sudden weight shift. All movements and weight transfers must be slow, smooth, efficient and controlled.
- When it is necessary to stow cargo in a compartment on the pilot's side, NEVER duck under the tail boom. Only cross carefully in front of the pilot so you are always in view. Avoid this move whenever possible.
- Make sure all cargo is safely stowed and restrained before take off.

Because the safety of the operation is paramount:

1. The pilot makes all decisions regarding the helicopter and its capabilities – no exceptions.
2. Every passenger has the right to refuse to participate in a hover or toe-in manoeuvre if they do not feel competent to handle the situation.

16.8 Safe Loading Guidelines for All Aircraft

Know the load capabilities of the aircraft. Not only will this depend on the type of aircraft, it will vary with location, elevation and time of year – due to weather, temperature, humidity, the amount of fuel on board, as well as the weight of the passengers and samples (wet or dry).

Follow these guidelines:

- The pilot must load all aircraft personally or closely supervise the operation.
- He or she must know the weight and size of the cargo to correctly balance the aircraft.
- Loads must be secured so the centre of gravity does not shift during flight and endanger the aircraft.
- Plan for the increased weight of samples at the end of the day.
- Never urge a pilot to overload the aircraft. Make another trip.
- Notify the pilot of any dangerous goods to be transported in the aircraft. Verify how bear or pepper spray, firearms and flares, explosives and detonators etc., may be transported before any flight (see section 16.9 below).
 - It is recommended that bear spray be placed in hermetically sealed containers. Ammunition cases that seal tightly work well.
 - Transport aerosol bug spray in the cargo compartment.
 - Firearms must be transported unloaded and with the safety on.
 - Explosives and detonators must be transported separately.
- Make sure any loading ramp is firmly secured before use.

- When loading, take care not to bump or damage the fuselage, floats or rotor blades.
- When loading and unloading fuel drums from fixed wing aircraft, roll them on secured planks with ropes wrapped around the drums for control.
- Use care when loading sharp tools or equipment such as shovels in the helicopter cargo compartment. Often only a thin wall separates the fuel tank and the cargo compartment.

16.9 Transportation of Dangerous Goods

The pilot must be notified in advance about all hazardous cargo. The pilot is in charge of loading or directly supervising the transportation of all hazardous or dangerous goods cargo. When the pilot does not perform this duty, the person in charge is required to have adequate training in loading, securing, inspecting for damage and proper segregation of the load. Many apparently harmless items that are routinely carried by ground transportation can become extremely hazardous when carried by air. Some items can cause immediate life-threatening situations (e.g., fire or leaked toxic gases); other items can damage an aircraft's structure over a very short period of time (e.g., spilled acid or other corrosive material that causes rapid corrosion leading to a structural failure in flight).

- Dangerous goods restrictions vary between passenger, cargo and chartered aircraft; they are imposed by relevant national regulatory authorities.
- Dangerous goods may only be packaged for and shipped by air transport by individuals who have received formal training and hold current dangerous goods certifications.
- A dangerous goods declaration is required to accompany all hazardous cargo. Pilots are required to reject any hazardous cargo that does not agree with the TDG declaration. Generally, the training given to pilots does not allow them to package dangerous goods or prepare relevant documentation.
- Examples of some common items typically used in exploration that are classified as dangerous goods include but are not limited to: lead acid batteries, acids, flares, ammunition, explosives, detonators, aerosol containers (bear spray), solvents. Regulations governing the transportation of dangerous goods by air are found at the following website: <http://www.tc.gc.ca/eng/tdg/clear-part12-466.htm>. A detailed list of dangerous goods is included as schedule 1 of the Consolidated Transportation of Dangerous Goods Regulations including Amendment SOR/2008-34.
- Transport dangerous goods according to safe methods e.g., bear spray in sealed containers – never inside the aircraft cabin. See section 16.9 Safe Loading Guidelines.
- *TP 11504 – The Marks of Safety* shows the symbols and placards of classes of hazardous goods on the following Transport Canada website: <http://www.tc.gc.ca/media/documents/tdg-eng/tp11504e.pdf>
- Access to a variety of links regarding dangerous goods is available on the following Transport Canada website: <http://www.tc.gc.ca/tdg/training/menu.htm>

When placing a dangerous goods order from a supplier, have the supplier:

1. Deliver the goods directly to the field location
2. Make sure the supplier (shipper) ships the order as dangerous goods with the shipper's declaration form fully completed and attached to the dangerous goods. The consignee should be qualified to receive the shipment.

3. An alternative solution would be to use a dangerous goods shipper for regulated items.

16.10 Training

Due to the potential for fatalities and serious injuries resulting from aircraft accidents, it is imperative that everyone who uses or works around aircraft is thoroughly trained in SOPs. Everyone must be aware of their responsibilities that contribute to safe operations regarding aircraft. This is best accomplished through well planned and comprehensive site safety inductions and thorough safety briefings before flights and special operations.

16.10.1 Aircraft Safety Induction Meetings

A thorough aircraft safety induction should be part of the general site safety induction at the start up of the field season for all sites that use aircraft. Everyone (all employees and contractor's employees) should be required to attend. The appropriate topics should be thoroughly covered by the project manager and pilot with regard to landing sites, fuel storage and handling, remote airstrips or water/ice landings etc.

- SOPs
- Conduct around aircraft, landing sites and remote airstrips
- Fire prevention around aircraft and fuel storage areas
- Housekeeping around the landing area
- Communication equipment, channels and schedules and emergency communication procedures: Train employees how to place a call on the aircraft radio, if necessary.
- Responsibilities regarding trip plans, drop off and pick up points, check-in schedules for tracking aircraft and employee locations
- The ERP procedures regarding aircraft should cover:
 - An overdue radio call
 - An aircraft alert situation when an aircraft cannot be contacted after a specified length of time
 - An aircraft distress situation when an aircraft is overdue and cannot be contacted after a specified length of time
 - A declared aircraft emergency and other potential emergencies that might occur at the work site
- Safety at the aircraft:
 - Danger zones around aircraft: fixed wing, float or ski plane, helicopter, as required
 - Operations of features – doors, cargo storage, temporary tie up
 - Location and operation of emergency equipment – fire extinguisher, raft, life jackets, first aid kit; how to remove the ELT (Emergency Locator Transmitter) set up and activation; open and inspect the aircraft survival kit
- Capabilities of the aircraft and pilot – loads, possibility of hover manoeuvres
- Requirements for remote fixed wing aircraft landings

- How to create a safe temporary helicopter landing site for pick up, including the required dimensions for the helicopter in use.
- Personal emergency kit requirements for employees using aircraft

16.10.2 Regular Pre-Flight Safety Briefings

Passengers should receive a safety briefing from the pilot before each flight. Repeat briefings when new passengers board flights with more than one stop. At the start of the season, briefings should be longer and more thorough than later when field crews are familiar with routines and procedures. However, problems sometimes arise when field crews and/or pilots become complacent and forget that each flight is unique and circumstances change each day and throughout the day. Passengers may begin to take safety for granted and not be fully attentive to all SOPs. Experienced people have walked into rotor blades and propellers.

Safety briefings are essential for passengers who fly intermittently. Conduct refresher training, as required.

Pre-flight safety briefings should include the following topics:

- Aircraft description: Capabilities of the aircraft, the capacity, cargo compartments, location of safety equipment
- Entry and exit
 - Hazards of main rotor and tail rotor for helicopters *or*
 - Hazards of propellers for fixed wing aircraft
 - Make eye contact with the pilot before boarding
 - Crouch when approaching a helicopter and hold onto your hat
 - Hazards of sloping ground, obstacles such as stumps or hummocks
 - Understand the pilot's field of view and always remain within it unless the pilot knows your actions e.g., loading, unloading cargo
 - Floats – safe area to step on or over
- Beware of antennas, pitot tubes and cargo baskets for helicopters
- Doors: Know the correct way to open, close and latch them securely
- Cargo and baggage
 - Dangerous goods requirements including for bear spray, bug spray and firearms
 - Safe loading methods and plan for the weight of samples on return
 - Electronic devices shut off
 - Opening and closing cargo doors, cargo compartment secured
 - Cabin baggage secured
- Seat belts and/or shoulder harnesses: Know how to adjust them, release them quickly and when to do so in an emergency.
- Communications

- Appropriate radio and channels to use for communication, check that radios function before the aircraft departs
- Use of headsets for communication – wear them when the pilot wears them
- Correct hand signals
- How to aid a helicopter landing with hand signals and your body position
- Emergency Procedures
 - Pilot will direct when to leave aircraft
 - Passengers – situational awareness – know the location of exits relative to your seat and how to exit
 - Emergency brace positions, ditching procedures
 - Life raft and life jacket location – how and when to operate and inflate them
 - ELT location, manual set up, antenna placement and activation
 - Briefing card with features of the aircraft – location, importance
- No smoking rules – not permitted with 30 metres of aircraft or fuel storage area

16.10.3 Safety Briefings for Special Operations

Special operations: hover manoeuvres, slinging loads (drills, setting up camp etc.,) require special briefings.

- **Hover manoeuvres briefing**

Hover manoeuvres should be avoided whenever possible. Refer to section 16.7.3 for details. When a hover manoeuvre is unavoidable, the briefing and drill should cover the following points.

- Pilot's line of sight for the particular helicopter
- Seat belts – fasten before exit
- Headsets – listen for instructions
- Weight transfer – seating order – everything planned and executed carefully. Last one out is first one in; shuffle across the seats to exit; make a slow careful exit but hang on tightly
- Mustering (gathering) point for pick up – define what makes a good location
- Pilot signals and instructions

- **Slinging briefing**

- All aspects of helicopter safety including the pilot's line of sight and blind spots for the particular helicopter
- Site selection: size requirements, terrain characteristics
- Approach and departure requirements: angle of approach, clearance from trees, power lines, cliffs and other hazards
- Site organization
 - Pick up and lay down areas, load organization

- Personnel on site – only people with a work-related reason may be at slinging locations
- Restrict vehicles from slinging locations during operations
- Housekeeping – no loose objects such as plywood, tarps, clothing, rubbish
- Special equipment for slinging
 - Job allocation – who does what job
 - Long line – type, function
 - Carousel – type, function
 - Hook(s) – release function
 - Special equipment – e.g., for lifting drill rods
- Slinging procedures
 - Hook up procedures
 - Loading procedures
 - Unloading procedures
 - Special conditions
 - Pilot's instructions
- Ground crew safety
 - Radio communication
 - Hand signals
 - Safe positions – always in sight of pilot, never stand under the load, never turn your back on a load
 - Special cases – a long tall load (e.g., drill mast) can fall lengthwise trapping someone who is off to the side
 - Always have an escape route available
 - Never ride on a sling or skid
- Emergency Procedures
 - Where to go in the event of a helicopter emergency – in flight, in hover
 - How to handle load emergencies – groundman injuries, load problems

16.11 Responsibilities Regarding Aircraft

Exploration companies, contractors and all employees should have a clear understanding of their responsibilities to reduce risks and hazards and help eliminate aircraft incidents and fatalities. When companies use the Internal Responsibility System (IRS) approach, everyone follows SOPs, helps identify risks and hazards and contributes to safe aircraft operations. Refer to section 1.2 Internal Responsibility System.

16.11.1 Pilots

The pilot is in charge of all aspects of the aircraft. It is his or her duty to safely load the aircraft, brief passengers and conduct a safe flight. The pilot should receive a copy of Section 16. Aircraft and discuss the contents with the project manager and with employees during the aircraft safety induction meeting.

Responsibilities of the pilot include but are not limited to the following:

- Comply with all flight regulations of the country, province, territory or state (authorities having jurisdiction) and company requirements.
- Do not exceed the allowable duty hours and flight hours for the jurisdiction and/or the exploration company policy.
<http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/Part7/Standards/720.htm>
- Identify and designate (with the project/camp manager) a safe landing strip, dock, helicopter landing site, and safe slinging pick up and drop off locations, as required. Inspect them daily when in use and keep them free of debris and obstacles.
- File flight plans and make sure the person in charge has a written record of passengers and monitors all flights.
- Perform all necessary pre-flight checks on the aircraft.
- Develop an appropriate check-in and tracking system for aircraft with the project or camp manager. It is appropriate for the pilot to report the aircraft position every 30 minutes when flying.
- Brief the passengers on all in-flight safety procedures, equipment and flight conditions, especially for project visitors and employees who fly infrequently. Hold refresher training as required.
- Make sure all passengers know how to access and use all safety and survival equipment.
- Grant permission for passengers to approach or exit the aircraft. Remind passengers of the safe routes, as necessary.
- Inform passengers of any unusual conditions at the time of takeoff, during the flight or when landing.
- Follow safe operating procedures regarding fuel:
 - Use the correct fuel and make sure it has not passed the expiry date.
 - Maintain safe fuel delivery systems including filtering and water contamination test equipment. Test fuel for the presence of water and reject any fuel where water is present. Check the fuel lines for water each morning.
 - Do not operate fuelling equipment during an electrical storm or high winds.
 - Make sure empty fuel drums are removed and stored away from the landing site.
 - Be familiar with the information regarding safe fuel handling in remote locations on the following website:
<http://www.tc.gc.ca/civilaviation/publications/tp2228/fueldrum.htm>
- Supervise all aspects of loading the aircraft including the placement and securing any permissible external loads. Make sure freight or hand luggage does not block the aisle between crew, passengers and any exit.

- Approve loading of all dangerous or hazardous cargo. The pilot should have training in handling hazardous materials.
- Never indulge in or permit any “horseplay” at any time, for any reason around aircraft.
- Plan with passengers and clearly mark the location of drop off and pick up points on the pilot’s copy of the map.
- Brief passengers and make sure passengers are thoroughly trained and capable when hover or toe-in exits may occur.

16.11.2 Project Manager or Supervisor

Responsibilities of the project manager for sites serviced by aircraft include but are not limited to:

- Select the correct aircraft for the job and site requirements in consultation with the charter company and/or pilot (see section 16.3). This will reduce the temptation to overload the aircraft. For example, just because an aircraft has four seats, it is not necessarily able to carry four people. Take into account elevation, temperature, fuel, survival gear, weight of samples, as well as the weight of passengers and their gear.
- Make sure all employees receive training at the aircraft induction safety meeting regarding SOPs around aircraft. New employees should receive routine training in aircraft SOPs when they start work. Make sure project visitors receive full aircraft safety briefings.
- Make sure that passengers are (1) aware of their right to refuse to fly if they feel unsafe; and (2) understand their obligation to report what they feel are unsafe aircraft and/or flying practices.
- Develop a written emergency response plan with procedures to address potential aircraft emergencies. Make sure the plan is posted and accessible to employees and that they are trained to implement it, as needed. Test the ERP to make sure it works – hold a practice drill.
- Make sure emergency survival caches are available beyond an arbitrary distance (depends on location, terrain, number in party). The survival kit should be contained in a highly visible, waterproof, sealed bag that can float.
- Set up and maintain safe landing sites in consultation with the pilot.
 - Keep the landing area clear of loose debris.
 - Place an air sock or wind indicator at the landing site. Place secure flagging streamers on radio antennas so they are clearly visible from the air.
 - Regularly inspect aircraft landing strips and make sure no workers or equipment are present when aircraft are expected.
- Oversee fuel storage.
 - The fuel storage area should conform to all regulations of the AHJs (authorities having jurisdiction). Locate the storage area at least 100 metres from living quarters, lakes, rivers and major streams. Store fuel well above high tide and any possible flood levels. It is advisable to have a secondary containment system that is rated for aviation and diesel fuel. Check the specification sheet for rating information.

- Equip the fuel storage area with fire extinguishers, appropriate spill kits and posted with no smoking signs. At least one 20-lb BC extinguisher should be present.
- Make sure that adequate supplies of the correct fuel are available and they have not passed the expiry date.
- Keep an accurate account of the correct fuel in caches in consultation with the pilot or aircraft maintenance engineer.
- Store fuel drums on their side with the bungs in a horizontal position to prevent water contamination. Store aviation fuel separately from all other fuels. Mark the fuel drums with the company ownership when required.
- Refer to section 18.4.3 Fuel and Fuel Handling
- Discuss the pilot's flight plan and maintain a log and/or map of the specific remote locations where employees are working in the event communications are lost and rescue is required.
- Remote project environments can be stressful places to work in. Form a stress free working relationship with the pilot and do all that you can to promote well being at a project or camp. Don't come across as telling the pilot how to do their job, but take action if there are any signs that the pilot is under undue stress. Discuss concerns with both the pilot and his or her supervisor, if necessary (see section 16.5 Pilot Fatigue).

16.11.3 Passengers

Passengers need to be aware of their responsibilities so they do not jeopardize the safety of a flight.

Responsibilities of the passengers include but are not limited to the following:

- Obey the pilot at all times and follow the project SOPs regarding aircraft.
- Pay attention to *all* safety briefings. Have situational awareness – know the location of all exits relative to your seat and how to open each one. Be familiar with relevant information in section 16.5 Emergency Procedures.
- Never pressure a pilot to (1) fly beyond allowable flight and duty time limits, (2) fly beyond his or her license limitations, (3) overload the aircraft, (4) fly in bad weather or in unsafe conditions, or (5) use an unsuitable landing strip or water port. Remember that the pilot is in charge of the flight at all times.
- Employees may refuse to fly if they feel the aircraft is unsafe, or if the pilot has flown or may fly in an unsafe manner. Inform a supervisor if any pilot engages in questionable behaviour.
- Employees may refuse to participate in a toe-in manoeuvre if they feel they need more training.
- Wear a seat belt at all times. Wear hearing protection. Wear the headset whenever the pilot is wearing one as it is the only means of communicating with you.
- Know the location and how to access and use the survival and safety equipment on board the aircraft.
- Inform the pilot if you are transporting dangerous goods (e.g., guns, ammunition, bear spray). These items must be correctly packaged and stowed. See section 16.9 Transportation of Dangerous Goods.

- Stow all hand luggage according to the pilot's instructions.
- *Never* indulge in "horseplay" in or near any aircraft. No one may ride on the skids or on the sling underneath the helicopter. Lifting people by helicopter line or sling may only be done by special emergency crews in the process of a rescue.
- Passengers should wear clothing suitable for the worst weather conditions they may encounter in case of delay, accident or stranding. Carry a suitable personal emergency/survival kit. Do not leave an aircraft without your pack – whether on traverse or at a work site – as something may prevent the aircraft from returning.
- Make sure you have a topographic map of the area and know where you and your co-workers are located when dropped off. Mark it on your map. Do not leave the aircraft unless you know your exact location.
- Discuss with the pilot how he prefers field crew to describe their locations by radio and by ground signalling. Ineffective communication costs valuable helicopter time, can contribute to pilot stress and can become a safety issue with respect to fuel consumption and helicopter range.
- If you suspect that you are off course, do not hesitate to communicate your concern to the pilot. Occasionally pilots get lost, especially in areas with few recognizable physical features and few roads. Indicate any hazard (e.g., birds, other aircraft) you observe to the pilot while in flight; don't assume the pilot has seen it.
- When a helicopter comes in to pick up passengers, someone may be designated to help to indicate wind direction. They should stand with their back to the wind and extend their arms straight out in front pointing in the direction the wind is blowing.
- The following websites provide general information regarding passenger safety on helicopters and float planes:

<http://www.tc.gc.ca/CivilAviation/systemSafety/brochures/tp4263.htm>

<http://www.tc.gc.ca/CivilAviation/systemSafety/brochures/tp12365.htm>

16.12 Slinging

Helicopters are often used to move supplies, fuel, project equipment and drills efficiently by slinging. Drill moves and airborne geophysics are special skill slinging operations and pilots who perform these jobs require special training. Slinging is hazardous work and accidents may occur even with experienced pilots. To minimize the hazards and dangers, employees and drill contractors need to develop, be trained in, and adhere to safe operating procedures (SOPs) for slinging.

16.12.1 Risks and Hazards

- Death, injury to pilot and/or ground personnel caused by helicopter crash
- Death or injury to people on the slinging route caused by loss of load or snagged sling gear
- Accidents resulting in injury or death caused by:
 - Pilot fatigue
 - Poor visibility (dust, blowing snow, flat light, rain)

- Improperly secured load
 - Load exceeding lifting capacity of the helicopter
- Stress caused by noise, rotor downwash
- Hearing loss caused by lack of hearing protection
- Eye injuries caused by blown dust, grit
- Hand injuries caused by crushing or pinching or impact by sling loads
- Electric shock from grounding effect
- Injuries caused by slips, trips and falls due to poor ground conditions, obstacles, poor housekeeping at sling locations

16.12.2 Causes of Slings Accidents

Employees should be aware of the potential hazards that cause accidents during slinging operations. Pilot fatigue is the root cause of many slinging accidents. 60% of slinging accidents occur during pick up. The following information is compiled with permission from the Transport Canada brochure *TP 3042 - Slinging with Safety*.

Source : *TP 3042 - Slinging with Safety*, Transport Canada in May 2000. Reproduced with the permission of the Minister of Public Works and Government Services Canada, 2008.

Some major hazards are:

- Snagged sling gear
- Obstacles in the operating area such as stumps, drill equipment
- Untidy housekeeping around the drill site and landing site. Debris or loose plywood sheets etc., may be blown violently into the air by the downdraft from the helicopter's rotors.
- Poor surface conditions at the operating site such as snow, soft spots, mud
- Incorrectly rigged load
- Overloading
- Wind conditions not known beforehand, or variable wind conditions
- Inappropriate choice of machine for the task
- Inadequate condition and maintenance of slinging equipment

Here is how accidents happen:

- Inadequate planning
- Inadequate briefings
- Getting pressured into a risky operation
- Accepting hazards
- Flying when fatigued
- Lack of training for the task

- Unsure of what is required
- Operating in marginal weather conditions
- Ignoring safe operating procedures (SOPs)
- Becoming distracted and not spotting a hazard
- Poor communication or poor understanding between workers on the ground and the pilot
- Lack of respect for established procedures
- Ground crew placing themselves in a dangerous position under the load or out of sight of the pilot

16.12.3 Safe Slingsing Guidelines

It is essential to carefully plan all slinging operations. Numerous factors contribute to safe slinging operations. These include (1) using the correct equipment, (2) careful planning and coordination of all manoeuvres between the pilot and ground crew, (3) accurate communication between pilot and ground crew, and (4) taking time to do the job safely and correctly. Hazards and risks can be reduced by following these guidelines.

1. Carry out a risk assessment to identify, assess and eliminate risks. Address the observations and conclusions of the risk assessment and mitigate the risks. Provide protection against risks that cannot be eliminated.
2. Make sure the helicopter has the lifting capacity to do the job.
3. Make sure the helicopter pick up and drop off locations are large enough for all required manoeuvres and are cleared of all debris and vegetation that might interfere with operations.
4. All personnel involved in slinging operations should be fully trained and experienced. All personnel (company employees, contract drillers) should follow safe slinging procedures. All personnel not directly involved with slinging operations must stay well away from the slinging locations and flight paths.
5. Consider having individuals authorized to manage and/or connect sling loads formally designated as "load marshalls". Once they have specific training, the person designated as load marshall shall inspect all loads prior to hooking up, and be the only person allowed to actually hook up, or designate the person that hooks up the load. The load marshall is the only person who communicates with the pilot.
6. All ground crew should wear PPE: hard hats secured with chin straps, hearing protection, goggles that strap on securely for eye protection, reflective clothing and boots with good soles – preferably with safety toes, as required. The load marshal should wear fluorescent gloves and fluorescent arm bands.
7. Hold briefings for each slinging job so everyone fully understands their responsibilities for the task at hand. Include clear instructions regarding potential emergency situations.
8. Plan for site specific emergency response procedures. Define a NO-GO zone where the pilot may drop a load or make an emergency landing. Everyone involved must know where to go and what to do if a load gets snagged, is dropped, or if the helicopter must make an emergency landing.
9. Use the correct type of slinging equipment for the job and be sure it is in good working condition.
10. Organize the loads taking into account the weight, shape and type of loads.

11. Plan flight paths so helicopters do not fly over built up areas, established project areas or where people are working.
12. Ground personnel should never place themselves beneath a suspended load under any circumstances.
13. Never put pressure on the pilot to complete slinging operations under poor weather conditions or if the pilot and/or drill crew are in a state of fatigue.

Note that exploration companies can often negotiate a training session outside the field season with a helicopter charter company at the air base. Charter companies are usually willing to oblige as their pilots also receive valuable training under controlled conditions. If planning ahead is possible, an exploration company may bring drill company employees as well to take part in the training. Individuals who have taken the training may be designated as “load marshalls”.

16.12.4 Planning for Safe Slinging Operations

Include the following factors when planning slinging operations.

Risk Assessment

Conduct a risk assessment to identify, assess, eliminate or mitigate the hazards associated with slinging operations. Here is a partial list:

- Physical hazards such as trees, power lines, cliffs, bodies of water, project living quarters
- Weather conditions
- Fatigue potential: how rested are the pilot and crew?
- Ground conditions at staging, pick up, drop off and emergency landing sites
- Loose material, debris, temporary unsecured structures at any of the above locations
- Load aspects
 - Weight of items for slinging – “real weight vs. driller’s weight”
 - Lifting capacity of aircraft
 - Potentially difficult loads to sling
 - Potential pinch points, crush or other danger points specific to the loads

Helicopter Performance

- The elevation, air temperature and humidity significantly affect helicopter performance. Helicopters operating in mountainous or hot environments have reduced lifting capabilities and must carry lighter loads than when operating at sea level and/or in cool weather.
- Above certain weights, helicopters may not be able to take off vertically. It may be necessary to clear an area ahead of the site for the helicopter to execute a low-level transition to forward flight.

Site

- The pilot and project manager should identify and designate the pick up and drop off slinging sites. Clear the operating area of all stumps, brush, unnecessary equipment and

loose materials that might catch on a moving sling load or be blown about by the rotor downdraft.

- Inspect the sling operation sites daily and remove all debris and obstacles to prevent flying debris caused by downdrafts from the helicopter.
- Define the NO-GO area for each operation for emergency manoeuvres.

Communication

It is usually safer to use radio communication between the pilot and groundman. It is highly recommended that radios always be available and used during slinging operations.

- It is advisable to use handheld FM radios fitted with headsets or speaker phones. These provide hearing protection, noise reduction and a boom microphone that enables workers to speak without averting their eyes from the task. Holster radios to protect them from entanglement and allow a worker's hands to be free.
- Check radios during the briefing to be sure they function.
- The pilot should receive radio communication and hand signals from only one person on the ground.
- Pre-determine the radio calls that are expected from the groundman to the pilot. Choose good clear instructions as the background helicopter noise makes directions difficult to understand by either person. For example, mutually select radio calls when lowering a load like: 10 metres, 5 metres, 2 metres, down. Use clock angles to direct lateral movement of a load: 12 o'clock (forward), 6 o'clock (reverse) etc. Use "clear" only when the groundman or designate has hooked up a load and is clear of the area and wishes to direct the pilot to lift the load.
- Agree upon and be thoroughly familiar with hand signals to use, if necessary. See section 16.14 Commonly Accepted and Known Hand Signals.

Slinging Equipment

The size, safe working load, length of slings, hooks, nets, shackles and "D" rings will vary with the capability of the helicopter and the type of load.

- Slinging equipment is not standardized. Consequently crews involved in slinging require specific training for the equipment in use. Just because an individual has some slinging experience and/or training, it cannot be assumed that they know and understand the correct procedures for specific sling gear in use at the site.
- When a new helicopter arrives at a project, insist that the pilot present and inspect all slinging gear for suitability and condition prior to commencing any slinging operations.
- Make sure the appropriate equipment is available to do the job efficiently (various slings, cable chokers, lifting pods, lanyards etc.). Every item must be in good working condition.
- Clearly identify all slinging equipment for aircraft use only (colour code, if necessary) and store it separately from general purpose slinging equipment. Lifting equipment should be clearly marked with a unique identification number or symbol that indicates the maximum lifting capacity of the item. Store the slinging equipment up off the ground when not in use. Suspend it from the attachment hooks when possible.
- Use a long line (>15 m) for slinging, as it is safer. Avoid the use of a short line (<15 m).
- Maintain a register of all slinging equipment to make sure all items are within the life or test date.

- Wire ropes used for all slings, lanyards and nets should have a designed breaking strength of not less than 6 times the maximum lifting capacity of the helicopter. All items in the load chain must have a breaking strain of at least 4 times the weight of the largest load to be carried.
- Inspect all slinging equipment before initial use and daily for defects and damage for the duration of the slinging work. The inspector must be a designated, competent person. Keep a record of inspections.
- Inspect wire rope slings for (1) fatigue failure – small cracks in the wire rope, (2) abrasive wear – worn shiny spots and (3) abusive wear – kinking or bird caging.
- Discard wire rope slings that show severe corrosion, more than 1/3 reduction in the diameter of the outer wire and excessive abusive or abrasive wear. Abusive wear causes serious structural damage to wire rope and will cause the sling to become unsafe long before other factors.
- Use steel wire rope slings and/or fibre net slings in preference to nylon webbing slings. Nylon webbing may chafe very rapidly in flight if it is poorly rigged. Rough loads may require wrapping to prevent chafing of nylon webbing if it is used. If so, verify the appropriate wrapping material to prevent it coming loose and being sucked into the engines or rotors.
- Test electrical and emergency mechanical cargo hook release mechanisms daily. Keep all winches, shackles, line slings and hoists under one maintenance testing program.
- Make sure the aircraft hook assembly and operating system adhere to the same planned maintenance requirements as other aircraft components.
- Always insert a swivel between the fixed hook assembly of the helicopter and the external load.
- A shackle or hard eye must form the direct connection between the cargo hook and sling. Soft eyes and rope attachments may bind on the cargo hook and prevent release under normal release conditions or, more dangerously, in case of emergency.
- The pilot should release the long line every time the helicopter lands, even if for a very short time. Something may interrupt the slinging plans and the pilot might take off and forget the line is still attached.
- If a cargo hook has been impacted in any way, it must be inspected prior to continuing or resuming slinging operations.

Loads

- Make sure the cargo weight does not exceed the lifting capacity of the helicopter.
- Take great care when attaching slings to make sure they will not become detached during flight.
- Make sure the entire cargo is held securely by the net so nothing comes loose during flight.
- Properly prepare unusually shaped items for slinging. Follow best procedures when slinging difficult loads such as plywood or boats, as they can “fly” and be very dangerous during slinging if not correctly handled.
- Weigh down light loads (e.g., plywood) with heavy gear to keep the sling from swaying backwards into the tail rotor.

- Before slinging bundles of long timbers such as 2x4s, nail each 2x4 to an adjacent one. Then, no individual 2x4 will slip out of the bundle if the load starts to spin during flight.
- It may be advisable to pad or wrap core boxes with cardboard, canvas or something similar, to prevent them from chafing the sling net. Stack and fasten core boxes together to minimize any load shifting and spillage during flight.
- There are often special hooks for slinging drill rods. Make sure the person hooking up the rods is trained and understands how the hooks operate.
- Centre the weight by placing heavy items in the centre of the cargo net first and lighter items on top. Make the loads as symmetrical as possible. After the net is secure, look for holes where items might slip out. Pad sharp objects, as they could sever the net while in flight.
- Don't place a tarpaulin inside a net to carry many small items. The tarpaulin could potentially slip out and get tangled in the rotors. Small loose items should be placed in boxes with lids and then boxes securely strapped together.
- Place all sling net loops on a lanyard hook, and then attach this lanyard hook to the helicopter hook. If you know the number of loops around the perimeter of the sling net, you can count the loops on the lanyard hook to confirm that they are all attached.
- Never attach cloth straps or ropes directly to a helicopter hook. Attach them to a lanyard hook. Then, attach the lanyard hook to the helicopter hook. If straps or ropes are attached directly to the helicopter hook, they may come off if the load rotates during flight.
- Make sure the lanyard hook-keeper is secured in the closed position before signalling the helicopter to lift.
- Never fly with an empty lanyard and/or long line as they may trail back into the tail rotor during certain manoeuvres. Remove the line and place it inside the helicopter for the return trip or weight it down. They can only be flown if they have at least 10 kg of fixed weight at the hood end of the line.
- When it is necessary to use a very long line attached to a sling (e.g., jungle, mountainous sites with very tall trees), always have a pile of rocks or logs available to use to weigh down the sling for the return trip. Under these circumstances, it may be impossible to detach the sling net or cables for the return trip.

Weather

- Be prepared to stop slinging operations if weather conditions are marginal. Check the wind direction frequently and be alert for changes. Stop slinging operations if electrical storms move into the area. Don't push your luck.
- Radio communication between the pilot and groundman is essential when slinging in snow conditions, as the helicopter can create blowing snow while it hovers. The pilot will have great difficulty seeing hand signals from the groundman. This may also occur when sand or dust obscures visibility.
- Flat light conditions make vertical referencing very difficult. To help the pilot distinguish the horizon, place visual cues or markers outside the pick up area. Use items like large rocks, large orange garbage bags filled with snow, spray paint large areas of snow or rocks. Whatever is used must not be affected by the rotor downwash.

Grounding Effect

- Electrostatic charges are built up by friction between the surfaces of the aircraft and airborne particles. Static shock can be particularly severe when the air is dry and dusty

and also when the aircraft flies through heavy rain, snow or ice crystals. It may be advisable to use a grounding hook to touch the load first. A person can be knocked to the ground or even become entangled in the cargo net from a charge of static electricity.

- The person hooking the cargo onto the helicopter load hook should wear lineman gloves for protection from static electric shock. Before attaching the load to the cargo hook, touch the load hook to the sling eye before touching the hook with your hand.
- If bad static conditions exist, have the pilot ground the load first, then pick it up to do final positioning.
- Do not stand in water when touching a cargo hook of a hovering helicopter.

16.12.5 Slinging Responsibilities

Responsibilities for safe slinging operations lie with the helicopter company to provide certified sling equipment in good working order, and with the pilot and the groundman/load marshal to carry out safe operations. Other ground workers at the sling location should follow the directions of the load marshal.

Pilot

It is very important for the pilot to be well rested. He or she must not exceed the legal number of flight duty hours. During slinging operations, it is imperative that the pilot feel complete confidence and control after taking into consideration all the external factors affecting the operation. Because slinging operations require such intense concentration by the pilot, everyone must *watch for signs of pilot fatigue*, which may include inattentiveness, slow reaction time or missed cues, grouchiness and/or atypical behaviour. See section 16.5 Pilot Fatigue.

The pilot's responsibilities include the following:

- With the project manager, designate and inspect the staging area, the sling pick up, drop off, and emergency drop locations.
- Make certain that everyone is thoroughly briefed for the required moves. See section 16.10.3 Safety Briefings for Special Operations.
- Establish signals for communication – radio and hand – and make sure everyone is familiar with them. See section 16.14 Commonly Accepted and Known Hand Signals.
- Check the release mechanism and sling gear serviceability. If present, the aircraft maintenance engineer may have this responsibility.
 - Check the cargo hook.
 - Check that the release mechanisms physically open – normal and emergency.
 - Inspect all slings, straps, nets etc. Nothing must be worn or frayed and all hooks must have a safety latch.
 - Inspect the position of the helicopter mirror.
- Follow proper slinging procedures.
- Clarify emergency procedures for everyone to follow in the event of an emergency – both during hook up and during flight.
- Coordinate the makeup of loads with the groundman. Be familiar with and estimate the flying characteristics of each load.

- In the case of a failed or dropped load, halt slinging operations until the root cause of the failure is determined and mitigated.

Groundman (Load Marshall)

A slinging site may use one or more people on the ground. The person in charge is designated as the groundman or load marshall. This person may or may not hook up the load to the helicopter. It is safest if a groundman stands off to one side and coordinates the hook up, which is done by a second trained person.

- The groundman must be fully trained for the job and have a complete understanding of the task to be performed. The groundman responsibilities include the following:
 - Manage activities on the ground and define the positions and responsibilities of the team.
 - Make sure the load is safe. Be familiar with the weight and specific attachment gear required for specific types of loads.
 - Communication: Only the groundman or one designated person may send signals to the pilot. The pilot and groundman must confirm the signals with each other. Use radio communication, whenever possible. Hand signals may be acceptable, depending on visibility conditions.
- It is essential to wear PPE (see # 6 in section 16.12.3). The groundman should also wear reflective arm bands and fluorescent gloves for greater visibility when signalling.
- Communicate the load weight to the pilot each time, as it may be very different from the previous load.
- Place loads so they are free of obstructions before lifting.
- Do not allow the cable to be placed across the skids when attaching the cable to a load.
- Verify that the lanyard hook-keeper is secured in the closed position before signalling the helicopter to lift.
- Never step directly in front of a sling load after hooking it onto the helicopter. Exit forward but to the side to avoid being struck by the load as the helicopter aligns for take-off. Stand or crouch in full view of the pilot. Then, keep well away from the flight paths while sling loads are transported.
- Never under any circumstances will a ground crew or driller place themselves beneath a suspended sling load or in the path that a forward moving helicopter is expected to take. Be aware of the area the load would cover if dropped and stay clear of that area.
- Never turn your back on an incoming load.
- Allow the load to settle before removing chokers and slings.
- Use a second groundman when slinging a drill rig and equipment or when slinging a complicated load. This person is required to be familiar with safe slinging procedures and should be equipped with a radio. Only one person, however, may give signals to the pilot.
- Know the emergency procedures for the job. Know where to go and what to do if a load gets snagged, is dropped, or if the helicopter must make an emergency landing. Designate and observe the NO-GO zone.
- If the ground crew sees any equipment that may be suspect in any way they must bring it to the attention of the pilot immediately.
- Take time to do the job safely and correctly.

Other ground crew workers

- Only workers who have a specific task related to slinging may be at the site. All others must remain well clear of the operations.
- Every worker at any slinging site must wear PPE including gloves to protect hands. Wear a head set with receiver to hear communications between the pilot and groundman. Do not communicate with the pilot unless designated to do so by the load master.
- Know the emergency procedures for your job – where to go, what to do if a load fails or is dropped, or the helicopter engine fails or makes an emergency landing.

16.12.6 Guidelines for Drill Slinging Operations

Be familiar with section 16.12.3 Safe Slinging Guidelines as well as the following guidelines.

- Prior to a field program involving drill slinging operations, make sure the tender document and/or helicopter contract specifies the type of helicopter capable of performing the required drill moves and other slinging procedures. Request specific pilot experience related to drill moves as part of the contract as well as for the aircraft maintenance engineer, who is responsible for maintaining slinging equipment. See section 16.3 Charter Aircraft)
- Only long line sling equipment should be used (minimum 15 metres – maximum 38 metres) unless the geographical and/or windy conditions require more than 38 metres to allow a safer and more stable hovering position for the helicopter. Using long lines will minimize the effect of downwash from the rotors and place the aircraft in cleaner air. Short line slinging (<15 metres) does not provide enough manoeuvrability and reaction time for the pilot or ground crew in the event of an emergency load release or engine failure.
- Inspect slinging equipment for damage before use. Use only steel cables as rope may break and whip into the rotor blades. Inspect cargo nets for rips and tears where the contents may come out while in flight.
- Pre-plan drill moves and/or any load preparation with all personnel involved in the operation. Designate a groundman (load marshal) to manage activities on the ground and define positioning and responsibilities for the personnel who are specifically designated to be present in the immediate area of the move sites (tear down and assembly sites). Only the designated groundman should be responsible for two-way radio and hand signal communications with the pilot, unless otherwise assigned.
 - All employees working at the slinging site must wear PPE (see # 6 in section 16.12.3).
 - Only employees directly working with slinging operations may be present at the sites. This is critically important for safety.
 - Where available, use a competent observer to monitor activities from a distance and who can act as a second load marshal in specific cases.
- The briefing plan prior to any sling load movement must include clear instructions regarding what to do for possible emergency situations. Define a NO-GO AREA on each drill site or storage area where the pilot may drop the load or make an emergency landing.
- During slinging, ground personnel will not place themselves beneath a suspended load under any circumstances.

- Designated positions should be within sight of the pilot at all times. *“If you can’t see the pilot’s eyes, he can’t see you”*. Note that different helicopters will have different pilot line-of-sight characteristics. The pilot should review these characteristics with the ground crew prior to all drill moves.
- Communication: It is best to use radio head sets to communicate with pilot. Chatter should be kept to critical conversation only. Keep communication equipment fully operational until the slinging operations are complete. Hand signals (marshalling signals) must be well known and may also be used by the designated load marshall. Remember that only one person sends the signals to the pilot. See section 16.14 Commonly Accepted and Known Hand Signals.
- Establish with the pilot that current weather conditions permit safe operations and under no circumstances should the pilot be badgered into completing the operations under poor weather conditions or if he and/or drill crews are in a state of fatigue.
- Organize the tear down and assembly sites and keep them free of clutter. Secure all materials to prevent flyaway material during slinging.
- The tower is the most challenging and dangerous part of a helicopter supported drill move. The ground crew and pilot should work together to achieve a smooth and safe tower move and re-attachment. The load marshall should try to position him/herself upwind of the approach direction, unless the pilot decides on a different approach for safety reasons.
- Whether positioning the tower vertically or horizontally, the tower should approach the drill at mount or eye level (unless there are different instructions from the pilot pre-move briefing) and not from a height directly overhead.
 1. Marshal the pilot to bring the load in a lateral position at eye level to allow easier positioning, less intimidation and a safer environment for the ground crew. The tower should be level with respect to the mount. Mark or weld hanging points on the tower for future moves once the best strapping points are identified (for balance and flight characteristics). Critical for safety: make sure any welds are properly completed.
 2. Load stabilization should only be conducted with the approval of the pilot and with the use of straps or rope with sufficient length to allow the ground crew sufficient distance to be protected from an emergency load release. Over use of straps or ropes can be counter productive as the ground crew may in effect work against each other. One or two experienced ground crew should be easily able to stabilize the tower. (The method of strapping used is of prime importance).
 3. Fit the drill with a guide (welded guides) to force the base of the tower into the correct alignment.
 4. Paint a white or orange line along the tower rest bar and the side of the tower in view of the pilot so he can better gauge proper alignment. This guide line should be cleaned and refreshed, if necessary, before each drill move.
- Pin or bolt all drill rig parts immediately after they are positioned.
- If difficulties or confusion develop that cannot be easily and quickly resolved, the pilot should land the helicopter and participate with the ground personnel to solve the problems or concerns.
- Debrief after every move to identify problems and highlight successful work procedures.

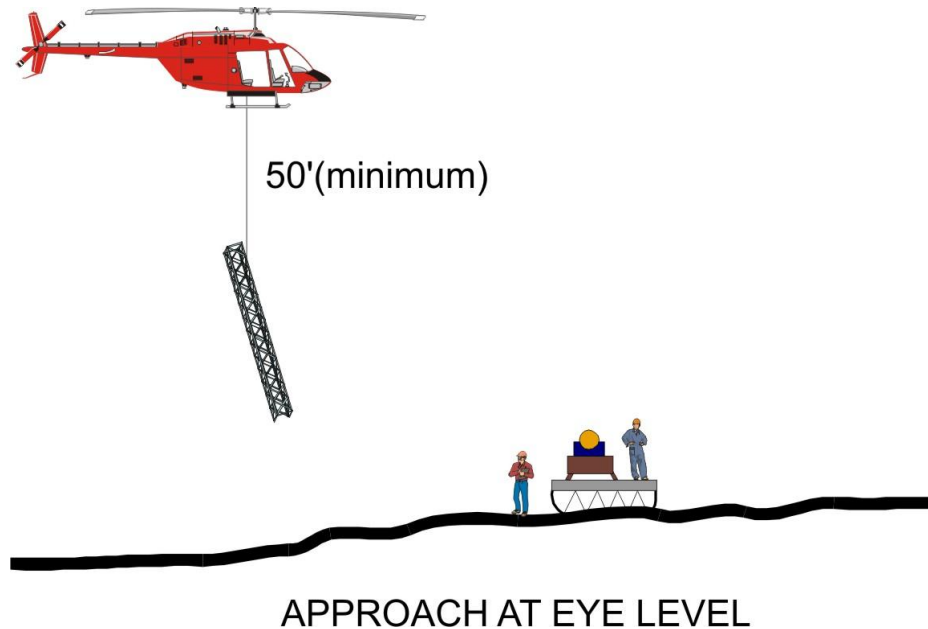


Figure 16.8: Drill slinging

16.13 Temporary Landing Sites

Safe operating procedures should be in place for landing fixed wing aircraft that land on lakes and rivers using floats, on unmaintained airstrips and ground such as beaches, eskers or gravel bars using tundra tires; and on frozen lakes and rivers using skis. SOPs should also be in place for helicopters, which may land in many conditions and terrain. Obtain environmental approvals and adhere to regulations of the AHJs when selecting and preparing landing sites. Landing requirements vary according to the type of aircraft.

16.13.1 Helicopter Landing Sites

The largest required helicopter determines the required dimensions of the landing site at a project or camp. Always discuss the exact requirements for landing sites with the helicopter contractor so they are fully understood by all parties. Good clearance in all directions is necessary for manoeuvring helicopters and slinging loads. Some terrain requires special construction to provide a safe landing spot. Where a helicopter downdraft creates blowing sand or dust, a raised helicopter landing pad may be a partial solution. Much of the following information is based on the Transport Canada Aviation Safety brochure *Safer Temporary Bush Helipads*.

Source: TP 4262 -*Safer Temporary Bush Helipads*, Transport Canada in April 1999.
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Selecting Temporary Sites

- The landing site surface should be on level, firm and stable ground under both wet and dry conditions. The site should be as level as possible with a slope not more than 3°.

- Understand the difference between the area required for the helicopter skids and the amount of area required for safe landing and takeoff.
- Plan the temporary landing site dimensions to safely accommodate the largest helicopter that will be used. A clearing, including the opening in the tree canopy, should measure *at least* 35 metres in diameter (more in areas of tall forests or jungle). The landing spot (helipad) should be at least 4 metres square. If the helipad is made of logs etc., they must extend sufficiently beyond the length of the skids and be placed at 90° to the skids for firm support.
- Take into account local prevailing winds and plan the flight access corridors in the direction of prevailing winds. If necessary, clear an access corridor. Consider a clearing beside a lake, river, road, or on a ridge top.
- Stay away from power lines, wires, cables or towers. Avoid obstacles such as cliffs and stands of tall trees that might cause dangerous downdrafts.
- The approach and landing paths should avoid passing over open water and over accommodations.
- Wildlife. Stay away from flight paths or feeding areas of flocking birds such as gulls. Flight paths are usually below 150 metres above ground level and birds are especially active at sunrise and sunset. This problem may occur near waste disposal sites, dumps, migratory waterfowl refuges and agricultural fields during harvest or plowing activities. Bears may also become a problem at landing sites near dumps.
- Choose an area that requires minimal site improvement – one relatively free of stumps, deadfalls, brush, rocks or other hazards.
- When possible, select a low dust area.

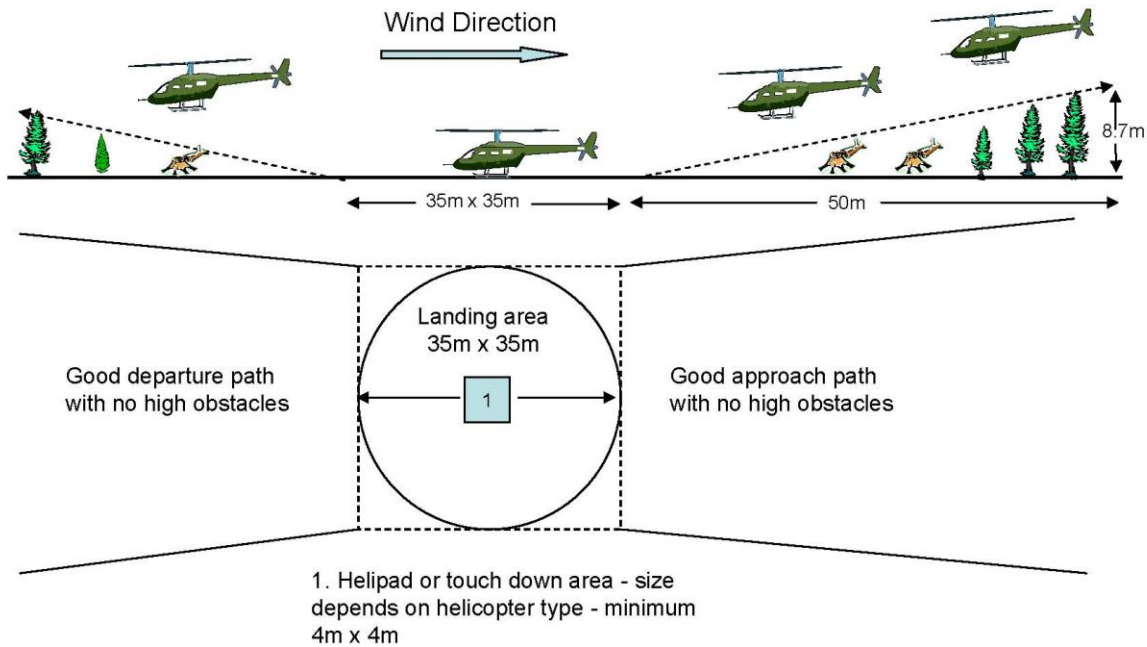


Figure 16.9: Elevation and plan views for suggested minimum dimensions of a temporary helicopter landing area

Improving a Temporary Site

- Cut down trees that may be a hazard on the approach and departure paths, especially if helicopters will be slinging external loads. Ideally, it is best to provide access with a 15° angle of approach. The angle of approach may not exceed 40°.
- Clear the manoeuvring area (e.g., within at least 15 metres of the landing spot). Remove all hazards such as stumps, brush, deadfalls, large rocks and loose debris. Remaining trees near the landing site must be firmly rooted, show no signs of decay or dead branches that may be blown down by the downdraft from the rotor blades.
- Clear the landing area to the ground surface within 8 metres of the helipad. Nothing must protrude that might contact the tail rotor.
- Provide a wind indicator such as flagging tape streamers or a windsock. Smoke flares may be used when necessary. Firmly secure all markers and flagging to prevent them from blowing into the rotors.
- In areas where dust or sand is a problem, use a binding agent (one permissible under local environmental regulations) in the immediate area of the landing spot.
- Make sure at least one 20-lb large multi-purpose (dry powder type) fire extinguisher is immediately available at the landing site.
- Provide a hazardous materials spill kit and a proper waste disposal container.

Temporary Bush Helipad Construction on Snow or Swampy Ground

- On deep snow or soft swampy ground, construct an evergreen bough mattress at least 15 cm thick and at least 3 m square for the helipad. Tramp the snow down with snowshoes first to make a base.

- Lay a minimum of 6 sturdy logs close together on the bough mattress (maximum of 50-60 cm intervals) and at right angles to the direction of helicopter approach. Ideally the logs should form a solid and continuous landing surface. They should be at least 3 metres long and 10 cm thick. Each helicopter skid must rest across several logs, not along one log.
- Make sure the pad is level to within 5°. Trim off all stubs and knots from the logs so the skids won't catch on them.

Long-Term/Heavy Duty Bush Helipad Construction on Snow or Swampy Ground

- Construct an evergreen bough mattress larger than for the short-term pad. It should measure at least 30 cm thick and 4 m x 5 m. Tramp the snow with snowshoes to make a base.
- On the bough mattress, lay 2 sturdy logs, each 4-5 m long, about 3 m apart. Lay these logs parallel to the helicopter direction of approach.
- Lay sturdy logs of equal thickness across the first two logs to form a solid and continuous landing surface to maximize the "ground effect". The logs should be 4-5 m long. Spike these cross-logs together with 30 cm spikes.
- Make sure the pad is level. Trim off all stubs and knots and make sure no spikes protrude.

Hillside Bush Helipad Construction

- Except for leveling considerations, the construction and dimensions should be the same as for level ground helipads.
- Build up the downhill side to make a level helipad. Often, a large log on the downhill side will suffice. On steep slopes, make sure the pad is securely braced so it will not slide or roll under the weight of a fully loaded helicopter.
- Lay the cross-logs on top of the built up braced logs in the same direction as the slope to form a continuous pad. Usually, the helicopter will approach on a course along the side of the hill and land with one side towards the slope and the skids supported by several of the cross-logs. Verify the best direction to place the logs with the helicopter pilot.
- Install a good, highly visible wind indicator. This is very important due to the variable winds that occur around hills and down slopes.

Temporary Rock Hilltop Helipad Construction

- Clear all loose debris from the rock surface and mark the landing spot with conspicuous paint.
- A 3-metre circle around a large letter **H** is best, but any marking easily seen from the air will suffice.
- A wind indicator is important because of hilltop winds.

Temporary Ice Helipad Construction

- Check carefully for cracks and soft spots on the river, lake or sea ice, especially when the ice is snow-covered.
- Away from a shoreline it is often difficult for pilots to determine their height for landing or hovering. Provide visual references ahead or to one side of the landing spot. Piles of

equipment or weighted conspicuous markers such as orange garbage bags filled with snow or streamers can be used.

- All personnel must stand well clear of the helipad during landings, hovers or departures. Blowing snow can obscure the pilot's visibility and the helicopter could drift across the landing site.

16.13.2 Landing Strips

Remote landing strips

- Pilots and project managers should verify that the landing strip is long enough to accommodate the aircraft and that the condition of the strip is suitable for use.
- Pilots should fly over a remote unattended landing strip to check for wind direction, wild animals, obstructions and the condition of the runway before committing to land.
- Designated employees on the ground should inspect infrequently used landing strips on foot or by vehicle for obstructions and wild animals before flight arrivals and departures.
- People working on the ground near landing strips should be aware that pilots usually make a pass before landing. Anyone present on a landing strip on foot or in a vehicle should leave it immediately when aircraft approach. Designate an area off to the side for parking vehicles.

Landing on ice

- Verify the ice is thick enough to handle the fully loaded aircraft. Measure the ice if necessary. Clear snow from the ice and make edges to define the runway.
- If landing on an ice road, set up the strip in an area where the ice road banks are no higher than 2 m to avoid interference problems with the wings when the aircraft turns around. Block off both ends of the runway with vehicles. Keep the vehicle at least 30 metres from the lead-in and another vehicle 500 metres away from the end of the strip to allow for a run-off zone. Do not point the vehicle head lights onto the strip as the white light will wash out the visibility of the strip.
- If permitted, night landings require flares to be set up every 60 metres on both sides of the runway. As a potential alternative to flares, place a roll of toilet paper into a can of diesel fuel. These burn longer and make a more visible light. Position the flares in advance and wait for the aircraft arrival. When the plane arrives, signal to confirm arrival at the correct location. Light the flares.
- Keep the runway secure until the plane has departed.
- For additional information, refer to *Best Practice for Building and Working Safely on Ice Covers in Alberta*. Website: http://employment.alberta.ca/documents/WHS/WHS-PUB_sh010.pdf



Figure 16.10: Try to verify the condition of a remote landing strip; this aircraft had to be towed to firmer ground before departure. © Bill Mitchell

16.14 Commonly Accepted and Known Hand Signals

The Transport Canada poster TP 9528 has signals that are generally accepted for marshalling movements and helicopter instructions from ground to pilot. The poster measures 28x43.5 cm and is available in English and French. It can be ordered from the following website:

<http://www.tc.gc.ca/civilaviation/systemsafety/posters/menu.htm>

HELICOPTERS

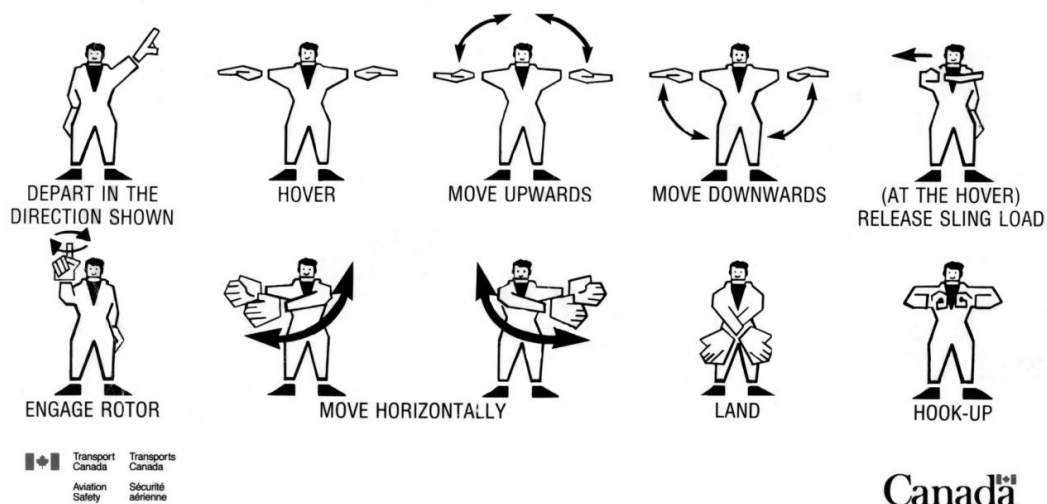


Figure 16.11: Marshalling Signals for helicopters

Source: **TP 9528-1-Marshalling Signals, Helicopters**, Transport Canada in June 2000.

<http://www.tc.gc.ca/civilaviation/systemSafety/posters/menu.htm>

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16.15 Emergency Procedures

16.15.1 Emergency Guidelines for All Aircraft

Each project should have a written emergency response plan (ERP) that includes emergency procedures in the event of an overdue and/or downed aircraft. Everyone should be familiar with the ERP and with aircraft emergency procedures and routines in the event a crisis develops. Although the pilot is responsible for the safety of the flight, each passenger is also responsible for their own safety. In an emergency situation, a pilot may not be able to provide additional instructions regarding an emergency landing or evacuation. Therefore, you need to know how to get out of the aircraft.

The emergency procedures for fixed wing aircraft and helicopters are compiled from information available on the following Transport Canada websites. In addition, passengers should be familiar with the passenger safety instruction cards in the aircraft.

Source: TP 12365 – Seaplanes: A passenger's guide. *Transport Canada in January*

2008. <http://www.tc.gc.ca/CivilAviation/systemSafety/brochures/tp12365.htm>

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Source: TP4263 – Helicopter Passenger. *Transport Canada in August 2004.*

<http://www.tc.gc.ca/CivilAviation/systemSafety/brochures/tp4263.htm>

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Preparation for an emergency

1. Pay attention to every safety briefing. Know the location of exits and all emergency equipment including the ELT on board the aircraft. Equipment location varies between aircraft and even between the same type of aircraft. Know the “brace position” for your type of seat belt. See the safety card for details. Ask questions if you do not learn all the information you should know in the briefing or on the card.
2. Read the instructions for the operation of the doors and emergency exits. Know the location of and how to use all exits. The method of opening an exit may differ from one aircraft to another and even within the same aircraft. If you have not done so in a general safety induction, ask the pilot if you can practice opening the exit(s) before the engine starts up.
3. Locate the exit in relation to your left or right knee. If the exit is on your right while upright then it will still be on your right in the event the aircraft comes to rest inverted. No matter how disorienting an accident, as long as your seat belt is fastened, your relationship to the exit(s) remains the same. Be familiar with your surroundings so you can find your way to an exit – even with your eyes closed.
4. If you are flying over water, know the location of your life preserver. Locate it! Know how to reach it, how to put it on and how to inflate it. Float planes are required to carry life preservers or PFDs (personal floatation device) for every occupant. Check with the pilot
5. to see if it should be worn in-flight. If so, wear it, but *never inflated it while in the aircraft*.

During an emergency

1. Follow any instructions issued by the pilot.
2. Do not distract the pilot.
3. Check that any loose gear in the cabin is secured.
4. Wear a helmet if provided.
5. Remove eye glasses and put them in your pocket. Loosen your collar.
6. Assume the brace position.
 - **Tighten your seat belt.**
 - **With shoulder straps:** tighten and sit upright, knees together, arms folded across your chest
 - **Without shoulder straps:** bend forward so your chest is on your lap, head on knees, arms folded under thighs

After an emergency on land

1. Wait for instructions to exit or until rotors stop turning if in a helicopter.
2. Assist others to evacuate well clear of the aircraft.
3. Remove the first aid kit and other emergency equipment after there is no threat of fire.
4. Administer first aid as required.
5. Remove ELT, read instructions and activate.
6. Set up camp to be as comfortable as possible.
7. Make the site as conspicuous as possible from the air.
8. Stay near the aircraft – don't wander away from the site.

After an emergency on water, follow instructions for underwater egress.

In water accidents, float planes tend to come to rest inverted. Helicopters may tip over after an emergency landing on water. The key to your survival is to retain your situational awareness and expeditiously exit the aircraft. It may be advisable to be trained in underwater egress if you frequently fly over water or on float planes. The following actions are recommended once the float plane momentum subsides.

1. Stay calm – Think about what you will do next. Wait for significant accident motion to stop.
2. Grab your life preserver/PFD – If time permits, put it on, but at least grab it. DO NOT INFLATE IT until after exiting. It is impossible to swim underwater with an inflated life preserver. You may get trapped.
3. Open the exit – If sitting next to an exit, find it and grab the exit handle in relation to your left or right knee as previously established. Open the exit. The exit may not open until the cabin is sufficiently flooded and the inside water pressure has equalized. DO NOT RELEASE YOUR SEAT BELT AND SHOULDER HARNESS until you are ready to exit. It is easy to become disoriented if you release your seat belt too early. You may float upwards making it more difficult to get to the exit.
4. Release your seat belt/harness – Once the exit is open and you know the exit path, keep hold on a fixed part of the float plane and release your seat belt with the other hand.

5. Exit – Proceed in the direction of the nearest exit. If this exit is blocked or jammed, immediately go to the nearest alternate exit. Always exit by placing one hand on a fixed part of the aircraft and not letting go before grabbing another fixed part (hand over hand). Pull yourself through the exit. Do not let go until you are out. Resist the urge to kick, as you may become entangled in loose wires or debris, or you might kick the person exiting right behind you. If you become stuck, back up to disengage; twist your body 90° and then exit.
6. Getting to the surface – Once you have exited a float plane, follow the bubbles to the surface. If you cannot do so, as a last resort inflate your life preserver. Exhale slowly as you rise.
7. Inflate your life preserver – Inflate it only when you are clear of the wreckage, since life preservers can easily get caught on wreckage, block an exit, or prevent another passenger from exiting.

16.15.2 Ground to Air Emergency Signals

Routine methods for signalling aircraft from the ground include the following:

- Brightly coloured helicopter cloth: Fluorescent orange or red nylon cloth squares at least 2x2 metres. They are highly visible and all field workers who routinely use aircraft should carry one. If you are being searched for, a pilot or searcher is more likely to detect movement even in his/her peripheral vision, so *run* and wave the cloth(s). Join several together as the larger the coloured area the easier it is to see. Stake them together to the ground during the day. Use them for shelter at night.
- Mirrors: Aimed correctly, the flash of the mirror can be seen for long distances. Any mirror will work, but a mirror is most accurate when it has small sighting hole to use to pinpoint the target. Don't flash a mirror at an aircraft that is very close or landing as it can momentarily blind the pilot. Brunton compass mirrors work well and even a piece of flattened tinfoil may work in an emergency.
- Smoke and Fire: In most daylight, smoke is more visible than fire, unless it is very windy. Keep green tree limbs, woody matter available to make lots of smoke when a search plane approaches. Build a fire for a signal on very dull days, at dusk or dawn or at night. The fire needs to be large to be visible, but don't allow it to start a brush or forest fire.
- Pyrotechnic signals: Good signals can produce enough smoke or light to be seen from a long distance. Smoke flares work only in daylight and are effective for aerial searches. Small flares that are fired from pen-like holders are not very effective. Those fired from pistols are brighter and reach a higher altitude. Use red flares to indicate distress and use white flares for illumination. Be very careful not to start a fire with them. See section 8. Survival.
- The following symbols may be used to communicate with aircraft during an emergency. It is good to know them even though they are not used frequently due to the increased use of satellite phones. Create as much colour contrast as possible between the symbol and the background. Symbols should be at least 2.5 metres long – larger is better – and spaced at least 3 metres apart. Symbols 1 to 5 are internationally accepted; symbols 6 to 9 are for use in Canada only.

Table 16.1 :Aircraft emergency assistance symbols

N°.	MESSAGE	CORE SYMBOL
1.	REQUIRE ASSISTANCE	V
2.	REQUIRE MEDICAL ASSISTANCE	X
3.	NO or NEGATIVE	N
4.	YES or AFFIRMATIVE	Y
5.	PROCEEDING IN THE DIRECTION	↑
6.	ALL IS WELL	LL
7.	REQUIRE FOOD AND WATER	F
8.	REQUIRE FUEL AND OIL	L
9.	NEED REPAIRS	W

Source: TP 14371 – SAR-4.0 Aircraft Emergency Assistance, *Transport Canada in December 2007*.

<http://www.tc.gc.ca/CivilAviation/publications/tp14371/SAR/4-0.htm#4-8-1>

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16.16 Resources

The Prospectors & Developers Association of Canada (PDAC) thanks the following for granting permission to include material from their publications.

Association for Mineral Exploration British Columbia (AME BC)

Transport Canada

Their permission does not imply that they endorse the PDAC Health and Safety Guidelines. The PDAC is solely responsible for the content of these Health and Safety Guidelines.

Books

Health and Safety Committee. (2006) *Safety Guidelines for Mineral Exploration in Western Canada*. Fourth edition. Association for Mineral Exploration British Columbia. The Guidelines are also available by following the links on the websites: <http://www.amebc.ca/documents/resources-and-publications/publications/current/safety%20guidelines-web.pdf>. Accessed February 12, 2010.

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Canadian Zinc Corp Confined Space Entry Permit

Permit date: / / Work shift: 1st ☐ 2nd ☐ 3rd ☐ Expires: / /

Time started: Time Permit Expires:

Permit space to be entered (name and location): Anticipated Entry: Anticipated Exit

Purpose of entry:

Names of trained, authorized individuals

- Hazard Evaluator: Signature:
- Safety Watch
- Fire Watch (If applicable)
- Authorized entrant(s):

Emergency Rescue

Required Emergency Equipment:

Location:

Pre-entry requirements

Requirements	Yes	No	N/A	Requirements	Yes	No	N/A
Lockout - tagout/de-energize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hot work permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pipes(s) broken or capped or blanked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fall arrest harness/lifeline/tripod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purge or flush or drain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Personal protective equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ventilation (natural or mechanical)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hardhat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Secure area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Safety glasses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-sparking tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Respirator, type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other PPE:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contractor employees involved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other PPE:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Space-monitoring results		Test 1	Test 2	Test 3	Test 4
Monitor at least every four hours	Permissible entry levels	Time: Initial:	Time: Initial:	Time: Initial:	Time: Initial:
Percent oxygen	19% to 23%				
Combustible gas	Less than 20% LEL				
Other toxic gas					
Other toxic gas					
Gas Tester Name	Instrument Used	Model / Type	Serial Number		

Canadian Zinc Corp Entry Permit – Page 2

Possible atmospheric hazards	Yes	No	N/A
Lack of oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Combustible gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Combustible vapors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Combustible dusts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Toxic gases/vapors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possible non-atmospheric hazards			
Noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical contact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature extreme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engulfment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entrapment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other non-atmospheric hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pre-entry checklist

Entry is not permitted until these items are completed.

OK	Needs action	
<input type="checkbox"/>	<input type="checkbox"/>	A complete hazard analysis of the confined space has been completed and recorded.
<input type="checkbox"/>	<input type="checkbox"/>	A minimum of two employees must be assigned to work involving permit space entry. One employee must remain outside the permit space at all times.
<input type="checkbox"/>	<input type="checkbox"/>	The surrounding area must be surveyed to show that it is free of hazards such as drifting vapors from tanks, piping, sewers, or vehicle exhaust.
<input type="checkbox"/>	<input type="checkbox"/>	Those responsible for operation of the gas monitor have been trained.
<input type="checkbox"/>	<input type="checkbox"/>	Gas monitor calibration tests and functional test (fresh air calibration) have been performed this shift on the gas monitor.
<input type="checkbox"/>	<input type="checkbox"/>	The atmosphere will be continuously monitored while the space is occupied, if required by entry procedure.

This permit has been terminated for the following reason:

☐ Work completed ☐ Canceled Time: Note:

Supervisor's signature Time: Date: / /

Return this completed permit to _____. Review, then file for one year.



CZN.FO.2013.08

Incident Reporting



Objective:

This document provides incident reporting guidelines at Canadian Zinc's projects.

Document Particulars

Mine Site Location:	Prairie Creek Mine, Northwest Territories
Version:	1.0
Completion Date:	December 3, 2013
Reviewed Date:	December 31, 2013
Approved Date:	December 31, 2013
Renew Date:	December 3, 2015
Prepared By:	Chris Reeves, General Manager
Reviewers:	Prairie Creek Occupational Health & Safety Committee
Approver:	Alan Taylor, Chief Operating Officer
File Location:	T:\Prairie Creek Mine\Operations\Operations Manual\2013 Operations Manual
HSEC Key Contact(s):	Chris Reeves, General Manager - chris.r@canadianzinc.com Ted Boychuk, Mine Site Manager - ted@canadianzinc.com
WSCC Key Contact:	Peter Bengt, Chief Inspector of Mines, Tel: (867) 669-4412
Brief Description:	This document contains incident reporting policy

Canadian Zinc wishes to thank the Northern Mine Safety Forum members for their advice and assistance in the progress of our HSEC policies for the benefit our employees, contractors, visitors and their families.

CANADIAN ZINC INCIDENT INVESTIGATION FORM

Please complete for all incidents and submit to the following:

- General Manager: chris.r@canadianzinc.com
- Prairie Creek Occupational Health & Safety Committee: safety@canadianzinc.com

Incident Date/ Time:		Reporting Date/ Time:	
Description of HSEC Incident:			
Details of Injury/Damage/Impact:			
Immediate actions taken by onsite management following the Incident:			
Employee, Contractor and/or Third Party Incident?		Click for Options	
Work category of person injured or involved		Click for Options	
Was a risk assessment conducted for this task?		Yes <input type="checkbox"/> No <input type="checkbox"/>	
Does a site standard or procedure exist to control this risk?		Yes <input type="checkbox"/> No <input type="checkbox"/>	
Severity Rating	ACTUAL : Click for Options	POTENTIAL : Click for Options	
Event Type	Select Incident Type		
Impact Type	Click for Options Click for Options (select only one impact type)		
The most causal FRCP or Major Incident Type :		Click for Options	
Was this a zero barrier incident Yes <input type="checkbox"/> No <input type="checkbox"/>		Was this a repeat incident ? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Was this incident a Refining/Process Failure? Yes <input type="checkbox"/> No <input type="checkbox"/>		Property damage Amount	Yes <input type="checkbox"/> No <input type="checkbox"/> Click for Options

CANADIAN ZINC INVESTIGATION:		
PEEPO CHART GUIDELINE		
Use PEEPO chart to determine what needs to be investigated for incident		
Item	Detail	Comment
PEOPLE		
Records	Personnel, medical, training and incident history records	
Roster	Time sheets, shift rosters and work cycles	
History	Previous 72 hour history of key personnel involved	
Psychology	Assessment of personality, safety attitude, motivation, conflict, stress, external influences i.e. social and domestic pressures	
Physiology	Assessment of physical and mental state prior to the incident including fatigue, substance abuse, physical stress, illness or impairment, environmental discomfort, age physical condition	
Ability	Assessment of training, experience and competence for the task	
Supervision	Levels and quality of supervision	
Alertness	Assessment of situational and hazard awareness	
Communication	Assessment of communication adequacy and effectiveness	
Teamwork	Assessment of teamwork, workload sharing and coordination of effort	

CANADIAN ZINC INVESTIGATION:		
PEEPO CHART GUIDELINE		
Use PEEPO chart to determine what needs to be investigated for incident		
Item	Detail	Comment
ENVIRONMENT		
Illumination	Too much or too little light that was a negative influence on vision	
Weather Wind/turbulence	Assessment of the weather - consider condensation, fog, frost, hail, ice, mist rain, sleet, snow, excessive wind/gusts	
Temperature/ humidity	Extremes of heat, cold, and humidity that may have a negative influence on human or equipment performance	
Contaminants	Consider if any contaminants were present, e.g. carbon dioxide, carbon monoxide, chemicals, dust, foreign objects, debris, fumes, gases, impurities, mists, smog, smoke, toxic materials, or vapours	
Noise	Was there excessive noise? Did it interfere with communication?	
Vibration	Assessment of vibration in the area	
Radiation	Radiant energy emitted in waves or particles that may have a negative influence on human or equipment performance. This includes assessment of any potential radiation sources e.g. ionising, laser, non-ionising, radio waves, sunlight, or ultraviolet	
Work surface/ space	Conditions of the work surfaces on which personnel and equipment operate that may have a negative influence on performance. This includes holes, inclines, rocky, rough, rutted, slippery, steep or uneven wave action	
Electricity	Assessment of any potential electrical energy sources that may have played a role in the incident	
Air pressure	Assessment of any sudden or gradual changes in air pressure that may have had a negative influence on human or equipment performance	
Wildlife	The actions or presence of animals that injure personnel, cause personnel to make errors, damage equipment, or cause equipment to malfunction	

CANADIAN ZINC INVESTIGATION:		
PEEPO CHART GUIDELINE		
Use PEEPO chart to determine what needs to be investigated for incident		
Item	Detail	Comment
EQUIPMENT		
Design	The design of the equipment should be adequate to meet the requirements and operational conditions under which they were being used	
Construction	The equipment should be constructed to specifications within the design standard	
Testing	The equipment should be tested to ensure that it meets the design standard and construction specifications	
Inspection	There should be an inspection procedure for monitoring the status of the equipment on: <ul style="list-style-type: none"> – initial delivery – periodically throughout its life – at critical times before, during and after operation 	
Maintenance	The equipment should be maintained to the manufacturer's specifications to maintain the original design performance safety and reliability standards	
Modification/ Management of Change	Equipment modification should be carried out under a "management of change" process to ensure performance; safety and reliability are not adversely affected. Modifications should also account for changes to: <ul style="list-style-type: none"> – maintenance procedures – inspection procedures – operating procedures – ergonomics – man-machine interface 	

CANADIAN ZINC INVESTIGATION:		
PEEPO CHART GUIDELINE		
Use PEEPO chart to determine what needs to be investigated for incident		
Item	Detail	Comment
PROCEDURES AND DOCUMENTS		
Utilisation	Documented procedures should be used for conducting the operation in a correct, safe and efficient manner	
Content	<p>The documented procedures should be adequate for the scope of the work to be conducted. The procedure should:</p> <ul style="list-style-type: none"> – cover all tasks – be technically correct – contain emergency provisions – contain work-around provisions – cover exemptions where the entire procedure does not apply 	
Criteria	The procedures should contain the necessary information in a user friendly language. The format should successfully link people and equipment to provide a risk minimised or risk eliminated operation	
Validated	The procedures should be reviewed, checked and tested by qualified people to ensure that the personnel that use the procedure can carry out the operation correctly safely, efficiently, and with minimal environmental impact	

CANADIAN ZINC INVESTIGATION:		
PEEPO CHART GUIDELINE		
Use PEEPO chart to determine what needs to be investigated for incident		
Item	Detail	Comment
ORGANISATION		
Organisational culture	<p>The organisation should have a systemic approach to safety. There should be evidence of management leadership and commitment to setting high standards of HSEC, quality and productivity performance. Measurable factors include:</p> <ul style="list-style-type: none"> – organisational structure – people management – provision and quality of tools and equipment – commercial and operational pressures – planning – maintenance of facilities and equipment – communication 	
Training programme	The organisation should have a structured training programme for the provision and consolidation of technical skills, safety awareness and safety knowledge. The effectiveness of training should be measurable	
Visible support	The organisation should demonstrate support for the work site operational staff including provision of adequate manning levels, suitable equipment and material and adequate facilities and services	
Operational feedback processes	The organisation should have a formal and effective operational feedback system for system monitoring and improvement	

CANADIAN ZINC INVESTIGATION:		
Checklist		
Record information gathered during investigation below		
Date and time of site inspection		
Describe particulars of site:		
Photographs taken YES / NO	If yes, by whom	
Witnesses - name and contact information of all witnesses or potential witnesses (Ensure statements/interviews are conducted independently for each person listed)		
Name	Department	Contact Number
1.		
2.		
3.		
4.		
5.		
Physical evidence - list all physical evidence collected		
1.		
2.		
3.		
4.		
5.		
Sketch a map of the incident area		

CANADIAN ZINC INVESTIGATION:			
Checklist			
Record information gathered during investigation below			
Environmental Conditions			
Temperature		Weather	
Wind		Too hot / cold	
Noise conditions		Lighting/Daylight	
Atmosphere (toxic fume, dust, etc)			
Housekeeping observations			
Equipment Conditions			
Damage			
Alterations			
Recent maintenance			
Evidence of misuse			
Abnormal stress			
Hazards marked			
Safety equipment present and used			
Equipment used is appropriate for the job			
Design issues			
PPE required			
Other observations			

CANADIAN ZINC INVESTIGATION:
Checklist
Record information gathered during investigation below
Procedures
What Procedures or Work Instructions apply
Who instructed the employee(s) on proper procedures, and when?
Was a risk assessment performed (Personal, Group, Formal)? YES / NO If yes, by whom and when and make a note of any documentation relating to this
Were appropriate tools available? YES / NO If no, why not?
Were appropriate tools used? YES / NO If no, why not?
Were safety devices working properly? YES / NO If no, why not?
Was lockout/s required? YES / NO If yes, were they used as necessary?
Have there been any incidents of a similar nature? YES / NO If yes, get details?

CANADIAN ZINC INVESTIGATION:	
Checklist	
Record information gathered during investigation below	
Organisation	
Was employee trained on equipment and procedures? YES / NO If yes, by who and when? (obtain training documents to confirm)	
Was training up to date and valid YES / NO	
Was there adequate supervision YES / NO	
Name of supervisor	
Were hazards properly identified to this employee? YES / NO If yes, by whom / when?	
Were unsafe conditions previously identified? YES / NO If yes, when?	
Were the unsafe conditions rectified? YES / NO If yes, by whom / when? - If no, why not?	
Were unsafe conditions previously identified? YES / NO If yes, when?	
Was regular maintenance carried out, if applicable? YES / NO If yes, by whom / when? (obtain maintenance records if needed)	
Were safety inspections carried out as required? YES / NO If yes, by whom / when?	
List applicable safety regulations	

CANADIAN ZINC INVESTIGATION:
Checklist
Record information gathered during investigation below
Additional sources
Relevant employee medical history/disabilities/accommodations/restrictions
Equipment manuals available
External training or certification involved
Applicable Material Safety Data Sheets
Any expert consultants needed to assist in fact-finding
Any additional information

CANADIAN ZINC INVESTIGATION:

Checklist

Record information gathered during investigation below

Timeline AND Five WHY'S

Complete timeline if required and perform five why analysis on facts of incident

Use information gathered from PEEPO and investigation to complete

INCIDENT CAUSATION ANALYSIS MYTHOLOGY (ICAM)

Complete ICAM Analysis if incident is Actual level 2, Potential level 3 or higher

ICAM Analysis

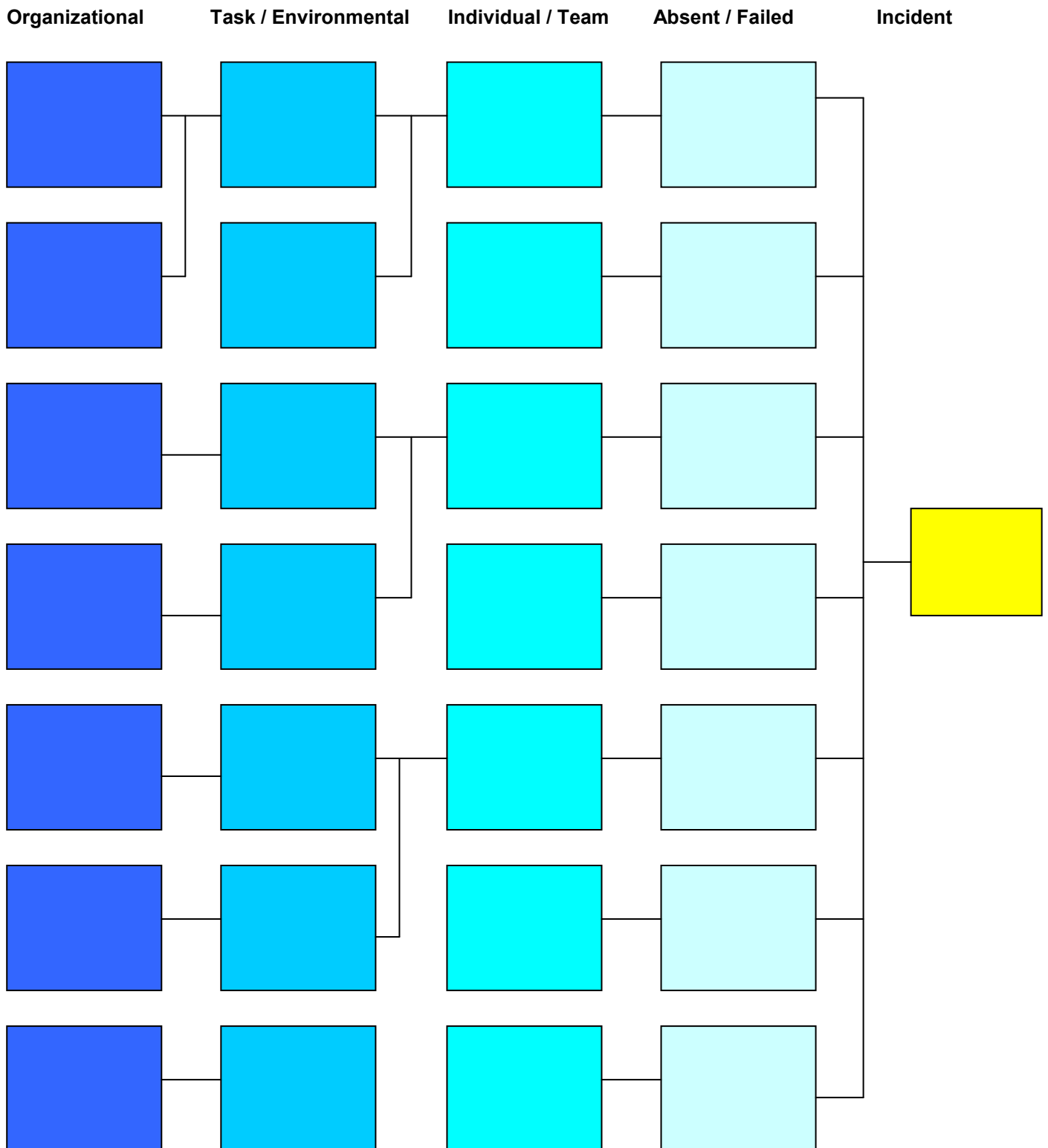
Absent or Failed Defences:	Description
Click for options	
Click for options	
Click for options	
Click for options	
Click for options	
Individual/Team Actions:	Description
Click for options	
Click for options	
Click for options	
Click for options	
Click for options	
Task/Environmental Conditions(Workplace) :	Description
Click for options	
Click for options	
Click for options	
Click for options	
Click for options	
Task/Environmental Conditions(Human) :	Description
Click for options	
Click for options	
Click for options	
Click for options	
Click for options	
Organisational Factors:	Description
Click for options	
Click for options	
Click for options	
Click for options	

PERMANENT CORRECTIVE ACTIONS TO BE TAKEN
(Actions should relate back to investigation findings)

Action	Hierarchy of Control Type	Responsible person job title	Due Date
	Click for options		
	Click for options		
	Click for options		
	Click for options		

ICAM ANALYSIS CHART *(edit as required)*

Enter information from analysis into boxes below. Click on box to enter text. Click on connector lines to move or delete. Delete empty boxes when complete





Prairie Creek Mine Confidential Medical Questionnaire

Please complete the following information to assist us in case of a medical emergency. This form will be kept in our medical file in the Occupational Health Centre and will be kept in the strictest confidence with the Occupational Health & Safety Department. Your cooperation is appreciated. If you are a visitor or a temporary employee, please indicate the expected date you will be leaving.

Print clearly and answer all questions in full.

Name:	Date of Birth:
Home Address:	
Home Phone:	Company:
Reason for visit or scope of work:	
Health Care #:	Health Care Province /Territory:
Emergency Contact:	Emergency Contact Relationship:
Emergency Contact Home Phone:	Emergency Contact Work Phone:
If <u>Temporary</u> or a <u>Visitor</u> what dates are you expected to start and leave? Day/Month/Year: to	
Dates and results of Tuberculosis (TB) Test:	Dates and results of Chest X-Ray:
Date of last Tetanus Toxoid Immunization (if known):	
Do you have any illnesses at this time?	
Are you taking any medications at this present time? Yes / No If yes, please list them, the required dosage and frequency:	
Do you have any chronic medical conditions and/or wear a medical alert? Eg. Diabetes, Asthma, Heart Disease, Respiratory Illness, Severe Allergies, etc. Yes / No If yes, please explain:	
Do you have any allergies to drugs, food, insects, other? Yes / No If yes, list them and give reaction e.g. rash, breathing, other?	
Do you use corrective lenses, contact lenses, or prosthesis? Yes / No If yes, list them?	
Are there any limitations that could inhibit your abilities to perform the tasks required as part of your engagement with Canadian Zinc Corporation? Yes / No If yes, list them?	

I hereby certify to the best of my knowledge the above information is correct and complete.

Signature: _____ Date: _____

If you are going to be onsite for more than 6 months contact the Safety Coordinator to make an appointment for your hearing test

RETURN TO WORK ARRANGEMENTS

(INCLUDES PROPOSED SUITABLE OR PRE-INJURY EMPLOYMENT)

Note: These return to work arrangements are not a new employment contract.

These arrangements will be reviewed over time to ensure that the duties and hours are consistent with your capacity for work and are helping to progress your return to work.

For information about developing return to work arrangements see page 3.

DETAILS

These return to work arrangements are for

Name of worker

Workers Compensation Authority claim number

Pre-injury work

Job title

Days/hours of work

Location

Name of employer

RETURN TO WORK ARRANGEMENTS

Duties or tasks to be undertaken

Describe the specific duties and tasks required. Include any physical and other requirements, e.g. lifting, sitting, rotation of tasks, etc.

Workplace supports, aids or modifications to be provided

Describe workplace supports, aids or modifications, e.g. rest breaks, buddy system, special tools, equipment, training, etc.

Specific duties or tasks to be avoided

Describe the specific duties and tasks that are to be avoided or restricted, e.g. no loading pallets, tasks that are only to be undertaken with the assistance of another worker.

Medical restrictions

Describe the restrictions on the most recent *Certificate of Capacity* or from other sources, e.g. phone call with the worker's treating health practitioner, other medical information provided by the Worker Compensation Authority Agent. What date or for what period(s) do these restrictions apply?

[illegible]

Hours of work

It is recommended that where reduced hours are required the hours are gradually increased where appropriate.

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total p/w
Week 2	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total p/w
Week 3	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total p/w
Week 4	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total p/w

Work Location (address, team, department)	Start date	/	/
--	-------------------	---	---

Start date	/	/
------------	---	---

Supervisor (name, position, phone number)	Review date	/	/
--	--------------------	---	---

Review date	/	/
-------------	---	---

Prepared by (name, position, phone number)

--

Prepared on (date)

/	/
---	---

Worker I will participate in these return to work arrangements

Name	Phone	Signed	Date
------	-------	--------	------

[illegible][illegible][illegible]

			/ /
--	--	--	-----

Return to Work Coordinator *I will monitor and review these return to work arrangements*

[illegible][illegible][illegible][illegible]

			/ /
--	--	--	-----

Supervisor *I will implement these return to work arrangements in the work area*

Name	Phone	Signed	Date
------	-------	--------	------

[illegible]

Name	Phone	Signed	Date
------	-------	--------	------

[illegible]

			/ /
--	--	--	-----

Treating health practitioner *These return to work arrangements are consistent with the worker's capacity*

[illegible][illegible][illegible][illegible]

			/ /
--	--	--	-----

NOTES/ADDITIONAL INFORMATION

If there is additional information you wish to include in this form, please attach any supporting documentation e.g. medical reports, position descriptions, photos etc.

[illegible]

USING THIS TEMPLATE

Employers have a legal obligation under workers compensation legislation to provide suitable or pre-injury employment to their injured worker following a work-related injury or illness. Employers must also plan for their worker's return-to-work which includes assessing and proposing suitable or pre-injury employment.

Use this template to document your worker's return to work arrangements, including details of suitable or pre-injury employment. It's not mandatory to use this template, however completed templates can be used to demonstrate your efforts in providing clear, accurate and current details of return-to-work arrangements to your worker.

You should endeavour to propose suitable or pre-injury employment options even before your worker's treating health practitioner has certified that the worker has a capacity for work. The proposed options should be based on the worker's anticipated capacity for work, taking into account the nature of their injury. By doing this, you can show your support for the worker's return-to-work and indicate suitable duties that could be made available when the worker is ready to return to work.

Once completed, this *Return-to-Work Arrangements* template can be used to communicate the return to work arrangements to your worker, their treating health practitioner and any other people involved in the return to work process.

PLANNING RETURN TO WORK

There are a number of important steps you must take when planning your worker's return to work:

- **Obtain relevant information** about your worker's capacity for work. Review their current *Certificate of Capacity*, speak to your worker and their treating health practitioner who issued the certificate.
- **Assess suitable or pre-injury employment options** that are consistent with your worker's current or anticipated capacity for work and **consider whether there are reasonable workplace supports or modifications** that will assist your worker's return to work. Talk to the people who can help, such as the worker's supervisor or colleagues. See WorkSafe's *Step by Step Guide to Assessing Suitable Employment Options*. Your WorkSafe Agent (the Agent) can also help you in this process.
- **Consult** with your worker (as well as the individual representing, assisting or supporting them, if the worker has chosen one) their treating health practitioner and other key people such as an occupational rehabilitation provider (when involved).
- **Propose suitable or pre-injury employment** to your worker, their treating health practitioner and any other relevant person. This template can be used to document these arrangements. Although agreement is not essential, where possible it is preferable to achieve agreement between the relevant parties on the return to work arrangements and suitable employment as this assists successful return to work.
- **Provide clear, accurate and current details** of the worker's return to work arrangements to the relevant parties. Ideally, the worker should sign these arrangements to indicate their support.
- **Implement your worker's return to work arrangements**. Ensure relevant people know what your worker can and can't do.
- **Monitor your worker's progress** and update return to work planning when appropriate.

Other important steps that can help improve the return to work planning process:

- **Consider your worker's individual circumstances**. A one size fits all approach to return to work will not meet the specific needs of your worker, their injury, their worksite, or their supervisor. Taking these circumstances into account when planning return-to-work can result in a more successful and sustainable outcome.
- **Maintain your worker's privacy**. Only communicate information that is essential to assist your worker's return to work. For example, the worker's supervisor will need information about the worker's duties, restrictions and breaks - they should not need medical information relating to their injury.
- **Obtain information** such as your worker's contact details and their pre-injury job description.
- **Inform your Agent** about your worker's return to work arrangements and return to work progress. An easy way to do this is to send or email a copy of these return-to-work arrangements to your Agent each time they are updated.

MONITOR AND REVIEW YOUR WORKER'S RETURN TO WORK

Return-to-work planning and arrangements should be continually monitored, reviewed and updated. This includes consultation with your worker and their treating health practitioner. Ongoing monitoring and review helps support your worker and ensures that the return-to-work arrangements that are being implemented are consistent with the worker's capacity. It also ensures adjustments are identified and implemented as required.

Employers are expected to engage in an ongoing process of planning. Return-to-work planning and any arrangements that are in place would ideally be reviewed at the following stages:

- If your worker's condition changes, refer to your worker's next *Certificate of Capacity* for information about their changed condition. This review date will usually be less than 28 days from the last review.
- When you are preparing for your worker's recovery, take into account the nature of their injury. This will help you indicate duties that could be made available as your worker recovers.
- When requested by your worker, their treating health practitioner, your RTW Coordinator or an occupational rehabilitation provider (if involved), or the Agent.
- When you become aware of any relevant change to your worker's injury or circumstances.

OTHER IMPORTANT INFORMATION

- Contact your Agent for further advice and assistance whenever required.
- For detailed information on how to meet your obligations, refer to WorkSafe's Return-to-Work Compliance Codes:
 - *Compliance Code 1 of 4: Providing employment, planning and consulting about return to work*
 - *Compliance Code 2 of 4: Return to Work Coordinators*
 - *Compliance Code 3 of 4: Return to work information*
 - *Compliance Code 4 of 4: Cooperating with labour hire employers about return to work*
- Your Agent may engage occupational rehabilitation providers to assist with return to work planning and help identify suitable employment. This assistance does not remove your obligations to plan your worker's return to work and provide them with suitable or pre-injury employment.
- Training is available for Return-to-Work Coordinators and is recommended for those who need assistance to meet their return to work obligations. Details are available from your Agent or the WorkSafe website [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au).
- For more information about how to meet your return to work obligations, refer to *What to do if your worker is injured - A guide for employers* or the WorkSafe website [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au).

- ☐ **GOOD STANDING** – Request letters of good standing at the beginning of a contract to ensure your contractors are in good standing and registered with the WSCC.
- ☐ **FINAL** – Request final clearance letters before releasing final payments to your contractor. A final clearance relieves principals of any assessment liability related to a specific contract.

Principal (the company awarding the contract)			Employer Number
Address			
Attention	Phone Number	Fax Number	Email Address

Contractor (the company contracted by the Principal)			Employer Number
Address			
Attention	Phone Number	Fax Number	Email Address

Contract / Project #					Location				
Description of Work									
Contract Value \$					<input type="checkbox"/> Material <input type="checkbox"/> Labour <input type="checkbox"/> Equipment				
Starting Date	MM	DD	YY		Completion Date	MM	DD	YY	

Subcontractors: ☐ YES ☐ NO

Subcontractor (the company contracted by the contractor)										Employer Number							
Address																	
Attention					Phone Number				Fax Number				Email Address				
Description of Work																	
Contract Value \$							<input type="checkbox"/> Material				<input type="checkbox"/> Labour				<input type="checkbox"/> Equipment		
Starting Date		MM	DD	YY					Completion Date		MM	DD	YY				

Additional subcontractors, please complete page two of this form.

The WSCC may use this information for the administration of the *Workers' Compensation Acts*, the *Safety Acts*, and/or the *Mine Health and Safety Acts*, and their associated *Regulations*.

SECTION 80 OF THE *WORKERS' COMPENSATION ACT(S)* HOLDS THE PRINCIPAL RESPONSIBLE FOR ANY UNPAID ASSESSMENTS FROM A CONTRACTOR / SUBCONTRACTOR. PLEASE ENSURE THE CONTRACTOR / SUBCONTRACTOR IS REGISTERED WITH THE WSCC.

Requested by _____ Signature _____
(Please Print)

Phone Number () _____ ext. # _____ Date _____

Subcontractors (SECTION 4) Continued

Subcontractor (the company contracted by the contractor)					Employer Number				
Address									
Attention			Phone Number		Fax Number		Email Address		
Description of Work									
Contract Value \$					<input type="checkbox"/> Material		<input type="checkbox"/> Labour		<input type="checkbox"/> Equipment
Starting Date		MM	DD	YY	Completion Date		MM	DD	YY

Subcontractor (the company contracted by the contractor)					Employer Number				
Address									
Attention			Phone Number		Fax Number		Email Address		
Description of Work									
Contract Value \$					<input type="checkbox"/> Material		<input type="checkbox"/> Labour		<input type="checkbox"/> Equipment
Starting Date		MM	DD	YY	Completion Date		MM	DD	YY

Subcontractor (the company contracted by the contractor)					Employer Number				
Address									
Attention			Phone Number		Fax Number		Email Address		
Description of Work									
Contract Value \$					<input type="checkbox"/> Material		<input type="checkbox"/> Labour		<input type="checkbox"/> Equipment
Starting Date		MM	DD	YY	Completion Date		MM	DD	YY

Subcontractor (the company contracted by the contractor)					Employer Number				
Address									
Attention			Phone Number		Fax Number		Email Address		
Description of Work									
Contract Value \$					<input type="checkbox"/> Material		<input type="checkbox"/> Labour		<input type="checkbox"/> Equipment
Starting Date		MM	DD	YY	Completion Date		MM	DD	YY

Head Office: Box 8888 • Yellowknife, NT X1A 2R3 • Telephone: (867) 920-3888 • Toll Free: 1-800-661-0792 • Fax: (867) 873-4596 • Toll Free Fax: 1-866-277-3677
 Box 669 • Iqaluit, NU X0A 0H0 • Telephone: (867) 979-8500 • Toll Free: 1-877-404-4407 • Fax: (867) 979-8501 • Toll Free Fax: 1-866-979-8501

Email: employer@wscc.nt.ca • employernu@wscc.nu.ca
wscc.nt.ca • wscc.nu.ca

Employer's Report of Fatal Injury

WSSC Claim Number:							
Worker's Last Name:				Employer Name:			
Worker's First Name:				Mailing Address:			
Full Address:				Telephone:			
				Place of Incident – Address, City/Town:			
				Date and Hour of Incident: A.M. P.M.		Date and Hour of Death: A.M. P.M.	
				Date and Hour Reported: YY at A.M. P.M.			
Age:	Sex:	Marital Status:	Social Insurance Number:	Name and Address of Attending Doctor or Coroner:			
Date Worker was Hired:		Occupation:					
Describe the incident in as much detail as possible. Include what the worker was doing, and what equipment was being used.							
<p>Questions answered “Yes” require complete explanation. Use the back of this form if necessary.</p> <p>Was the deceased worker the owner or partner in the business, or a contractor or sub-contractor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Did the worker hold the position of President, Vice-President, Director, Secretary or Treasurer? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Did the incident occur outside the Northwest Territories or Nunavut? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Was the worker, at the time of the incident, doing work other than for the purpose of the employer's business? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Was any person not in your employ to blame for, or involved in, the incident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>In your opinion, is there any reason compensation should not be paid? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>							
List dependent members of the family. Include names, addresses, and relationships. Identify next of kin.							

Any information received as a result of the claims process is confidential. Further use or disclosure of the information could result in a fine pursuant to the *Workers' Compensation Acts*.

Completed by (please print):	Signed at (city, town, village):	
Authorized Signature:	Phone Number:	Date:

If you would like assistance completing this form, or more information, please contact one of our offices listed below.

Head Office: Box 8888 • Yellowknife, NT X1A 2R3 • Telephone: (867) 920-3888 • Toll Free: 1-800-661-0792 • Fax: (867) 873-4596 • Toll Free Fax: 1-866-277-3677

or

Box 669 • Iqaluit, NU X0A 0H0 • Telephone: (867) 979-8500 • Toll Free: 1-877-404-4407 • Fax: (867) 979-8531 • Toll Free Fax: 1-866-979-8501

www.wscs.nt.ca • www.wscs.nu.ca

Employer's Report of Injury

Employer, or employer representative, completes the Employer's Report of Injury.

**If you need assistance filling in this form, or more information, please contact our Tele-claim service.
NWT Toll Free: 1-800-661-0792 • Nunavut Toll Free: 1-877-404-4407**

ATTENTION:

By law, an employer who does not submit a fully completed incident report within three business days faces the following penalties:

- \$250 for each of the first two occurrences;
- \$500 for each of the next two occurrences; and
- \$1,000 for each additional occurrence.

A – Employer Information							
Business Name			Legal Name			WSCC Account #	
Mailing Address			Community			Territory/Province	Postal Code [][][][][][]
Contacts	Name	Phone	Fax	Email			
Wage Information		[][][][][][][][][]	[][][][][][][][][]				
Details of Injury		[][][][][][][][][]	[][][][][][][][][]				
Return to Work		[][][][][][][][][]	[][][][][][][][][]				
B – Worker Information							
First Name				Last Name			
Mailing Address			Community			Territory/Province	Postal Code [][][][][][]
Residential Address (if different than above)					Date of Birth [][][][][][][][][]		Gender <input type="checkbox"/> Male <input type="checkbox"/> Female
Telephone (include Area Code) [][][][][][][][][]		Cell (include Area Code) [][][][][][][][][]		Email Address			
Social Insurance Number [][][][][][][][][]		Job Title (no abbreviations)					
Does the worker work in more than one territory/province for your organization? <input type="checkbox"/> Yes <input type="checkbox"/> No							
If yes, please list the territories/provinces:							

IMPORTANT:

Notification of an incident must reach the Workers' Safety and Compensation Commission office within three working days. Any information received by the employer as a result of the claims process is confidential and any further use or disclosure could result in a fine pursuant to the *Workers' Compensation Acts*.

PLEASE PROCEED TO 2ND PAGE. →

Worker's Full Name:

C – Incident Details

1. Date of Incident MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM	2. Place of Incident Community: _____ Territory/Province: _____
3. Date first reported to Employer MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM	4. Did incident occur on employer's premises? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If no, where?</i>
5. Please describe the incident in as much detail as possible. Include: where it took place; what the worker was doing; what equipment was being used; and, whether the incident involved gas, chemicals, or extreme temperatures (<i>attach sheet if necessary</i>).	
6. What body part was injured? (left/right side, hand, eye, back, etc.) What type of injury? (sprain, bruise, fracture, etc.)	
7. Was the injury or incident caused by a person(s) not employed by the employer? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, please attach an explanation and include contact information.</i>	
8. Are you disputing this claim? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, please attach an explanation.</i>	
9. Were the worker's actions at the time of injury for the purpose of your business? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If no, please attach an explanation.</i> <i>If yes, is the activity part of the worker's regular work?</i> <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If not, please attach an explanation.</i>	
10. Was first aid given at the work site? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, please attach a copy of the first aid report.</i>	
11. Did the worker seek medical attention beyond the work site? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, where?</i>	

D – Return to Work (*Give full explanations and attach extra sheets if necessary.*)

12. Is a job description available? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, please attach.</i>	
13. Did the worker stop working? <input type="checkbox"/> Yes <input type="checkbox"/> No When? MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM Has the worker returned to work? <input type="checkbox"/> Yes → When? MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM <input type="checkbox"/> No → Has the worker been offered alternate/modified duties? <input type="checkbox"/> Yes <input type="checkbox"/> No	What is the worker's current return to work status? <input type="checkbox"/> Returned to pre-injury job with no changes <input type="checkbox"/> Returned to pre-injury job with duties only changed <input type="checkbox"/> Returned to pre-injury job with hours only changed <input type="checkbox"/> Returned to pre-injury job with duties and hours changed <input type="checkbox"/> Returned to work in a different job to accommodate injury <input type="checkbox"/> Other accommodations, specify _____
14. Did you complete a Return to Work plan for this worker? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>Attach plan or forward within five days.</i>	

PLEASE PROCEED TO 3RD PAGE. →

Worker's Full Name:

E – Employment Category

15. Is the worker a subcontractor? ☐ Yes ☐ No
If yes, who is the contractor?

16. Is the worker an owner or operator? ☐ Yes ☐ No

17. Worker's Type of Employment

Permanent

- ☐ Term (Over 1 year) ☐ Relief
☐ Full / Part-time Permanent ☐ Other
☐ Apprentice

Non-permanent

- ☐ Term (Under 1 year) - ☐ Apprentice
Term End Date: ☐ Seasonal -
☐ Summer Student Start Date:
☐ Casual End Date:

18. Is the job subject to seasonal layoffs? ☐ Yes ☐ No

19. Is the job subject to lack of work layoffs? ☐ Yes ☐ No

20. Worker's day of hire

21. What was the contract / term / season start date (if applicable)?

F – Schedule Information

22. Number of days on _____
Number of days off _____

23. Regular hours per day _____

24. Regular hours per rotation _____

25. Please indicate days on for one full rotation:

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Week 1 - Hours per day							
Week 2 - Hours per day							
Week 3 - Hours per day							
Week 4 - Hours per day							

26. Date rotation started

Date rotation ended

27. Are travel days included in the on/off work rotation? ☐ Yes ☐ No

28. How many hours are paid for on travel days? _____

G – Wage Information (Please complete all questions.)

29. What is the hourly rate of pay? _____ / hour. What are the annual gross earnings? _____
What is the overtime rate? _____ / hour. If the worker is paid other than hourly or on salary, please attach an explanation.

30. Does the worker regularly work or get paid for overtime? ☐ Yes ☐ No

If yes, how many hours per day are overtime? _____

Provide an estimate of regular overtime hours _____ / ☐ day ☐ week ☐ month

31. Does the worker receive any other benefits? (Vacation Pay, Northern Allowance, Bonus, etc.) ☐ Yes ☐ No

If yes, explain in detail with amounts or averages:

Are these benefits paid out to the worker with their regular pay cheque? ☐ Yes ☐ No

What percent of vacation pay does the worker receive? _____ %

Is vacation pay paid on each cheque? ☐ Yes ☐ No

PLEASE PROCEED TO 4TH PAGE. ➡

Worker's Full Name:

G – Wage Information (continued)

32. Are you paying the worker for lost time? ☐ Yes ☐ No Please provide the dates that will be paid for? _____

33. Will you continue to pay benefits? ☐ Yes ☐ No (eg: Northern Allowance)

Please add any additional information in the space provided.

It is your responsibility to provide a copy of the Employer's Report of Injury form to your worker.

Completed by (please print)	Signed at (Community)																	
Authorized Signature	Phone Number <table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>											Date <table border="1"><tr><td>M</td><td>M</td><td>D</td><td>D</td><td>Y</td><td>Y</td></tr></table>	M	M	D	D	Y	Y
M	M	D	D	Y	Y													

It is your responsibility when providing an email address to ensure reasonable safeguards are in place to protect the confidentiality and security of your personal information within your email account.

The WSCC may use this information for the administration of legislation under our authority, including the *Workers' Compensation Acts*, the *Safety Acts*, and/or the *Mine Health and Safety Acts*, and their associated *Regulations* and to contact you in relation to the requirements under the relevant legislation.

If you need assistance filling in this form, or more information, please contact us.

Head Office: Box 8888 • Yellowknife, NT X1A 2R3 • Telephone: (867) 920-3888 • Toll Free: 1-800-661-0792 • Fax: (867) 873-4596
Toll Free Fax: 1-866-277-3677 • Email: nwtclaimsservices@wscc.nt.ca

or

Box 669 • Iqaluit, NU X0A 0H0 • Telephone: (867) 979-8500 • Toll Free: 1-877-404-4407 • Fax: (867) 979-8501
Toll Free Fax: 1-866-979-8501 • Email: nuclaimsservices@wscc.nu.ca

wscc.nt.ca • wscc.nu.ca

Worker's Report of Injury

If you need assistance filling in this form, or more information, please contact our Tele-claim services.
 NWT Toll Free: 1-800-661-0792 • Nunavut Toll Free: 1-877-404-4407

IF A QUESTION DOES NOT APPLY, INDICATE WITH “N/A”.

A – Worker Information

First Name

Last Name

Also Known As

Mailing Address

Community

Territory/Province

Postal Code

Residential Address (if different than above)

Date of Birth

Gender

Telephone (include Area Code)

Cell (include Area Code)

Email Address

Social Insurance Number

Preferred Language

Job Title (no abbreviations)

B – Employer Information

Employer Name

Address

Supervisor Name

Telephone (include Area Code)

Do you work for this employer in a province or territory other than the Northwest Territories or Nunavut?

☐ Yes
 ☐ No

If yes, where?

The WSCC may use this information for the administration of legislation under our authority, including the *Workers' Compensation Acts*, the *Safety Acts*, and/or the *Mine Health and Safety Acts*, and their associated *Regulations*, and to contact you in relation to the requirements under the relevant legislation.

The WSCC may only use my personal information, as provided here for the sole purpose of conducting an investigation for my compensation claim. The WSCC may gather more information on my work incident and medical and work history to administer my claim for compensation. For that purpose only, the WSCC may disclose some personal information to my employer, medical personnel, and other relevant third parties.

Having read the requirements above, I understand and authorize the WSCC to collect and provide such information from all necessary sources.

Initial _____ Part of the body injured _____ Injury date: _____

I understand and acknowledge that incomplete information from me may delay my claim.
 It may be a criminal offence to work and earn income while receiving workers' compensation benefits without the WSCC's approval.

Signature: _____ Date: _____
 Witness: _____ Date: _____

It is your responsibility when providing an email address to ensure reasonable safeguards are in place to protect the confidentiality and security of your personal information within your email account.

PLEASE PROCEED TO 2ND PAGE. ➡

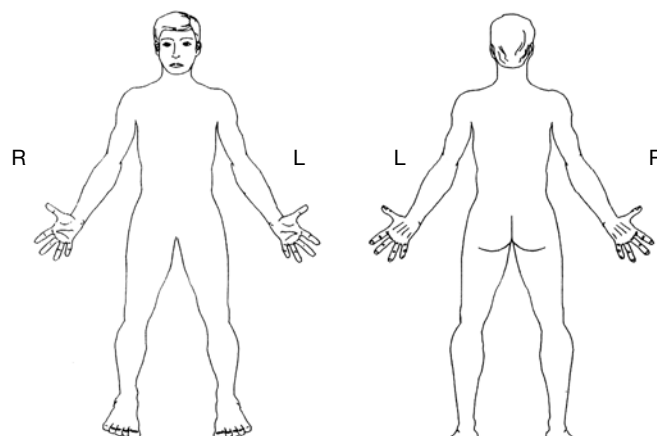
Worker's Full Name:

C – Incident Details

1. Date of Incident MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM	2. Place of Incident Community: _____ Territory/Province: _____
3. Did you delay reporting for more than one day? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, why? (Please explain)	
4. Did incident occur on employer's premises? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, where did the incident occur?	
5. Name and position of person you reported incident to: Name: _____ Position: _____ Phone: _____	
6. Did you stop working due to your injury? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, when? MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM	

IMPORTANT

7. Please describe the incident in as much detail as possible.
Include: what you were doing; where the injury took place; what equipment you were using; and, whether the incident involved gas, chemicals or extreme temperatures (Please use attached sheet if necessary).



What body parts did you injure? (left/right side, hand, eye, back, etc.)
Please also indicate the body parts on the diagram.

What type of injuries? (sprain, bruise, fracture, etc.)

8. IMPORTANT - Please list any witnesses.

Name	Address	Contact Number

Name	Address	Contact Number

9. Did you seek medical attention? <input type="checkbox"/> Yes <input type="checkbox"/> No	When? MM DD YY
10. Where did you receive medical attention?	When? MM DD YY Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM

11. If medical attention was given by First Aid or Medical Aid, please provide contact information.

First Aid:	Name	Phone	Email

Medical Aid:	Facility Name		

PLEASE PROCEED TO 3RD PAGE. →

Worker's Full Name:

D – Past Injuries

12. Have you previously injured or experienced ongoing pain in the same body part? ☐ Yes ☐ No
If yes, please explain. Include dates if possible.

13. Do you have any previous compensation claims with the WSCC, or any other workers' compensation board? ☐ Yes ☐ No
If yes, provide dates and nature of injury.

E – Return to Work

14. Did your employer offer you modified or alternative work? ☐ Yes ☐ No
If yes, what are the modified duties?

When?

M	M	D	D	Y	Y
---	---	---	---	---	---

15. Did you return to work? ☐ Yes ☐ No If yes, ☐ Light Duties ☐ Regular Duties
If no, when do you expect to return to work (e.g., a month, 2 days, etc.) _____

When?

M	M	D	D	Y	Y
---	---	---	---	---	---

F – Employment

16. Worker's Type of Employment

Permanent

- ☐ Term (Over 1 year) ☐ Relief
☐ Full / Part-time Permanent ☐ Other
☐ Apprentice

Non-permanent

☐ Term (Under 1 year) -

Term End Date:

M	M	D	D	Y	Y
---	---	---	---	---	---

- ☐ Summer Student
☐ Casual

☐ Apprentice

☐ Seasonal -

Start Date:

M	M	D	D	Y	Y
---	---	---	---	---	---

End Date:

M	M	D	D	Y	Y
---	---	---	---	---	---

G – Schedule Information

17. Number of days on _____
Number of days off _____

18. Regular hours per day _____

19. Regular hours per rotation _____

H – Wage Information (Please complete all questions.)

20. What is your hourly rate of pay? _____ / hour. What are your annual gross earnings? _____

21. Do you regularly work overtime? ☐ Yes ☐ No

If yes, how many hours per day are overtime? _____ Provide an estimate of regular overtime hours _____ / ☐ day ☐ week ☐ month

22. Do you receive any other earnings? Please check all that apply.

☐ Vacation pay ☐ Uniform allowances ☐ Northern living allowance

☐ Other: (please specify) _____

23. Do you have a second job? ☐ Yes ☐ No If yes, did you miss time from this job due to your injury? ☐ Yes ☐ No
(If you have more than one employer, please list all employers and their contact information.)

Name of second employer: _____ Contact name: _____

Contact phone:

--	--	--	--	--	--	--	--

Wage Information (for tax purposes)

24. Marital Status
☐ Single ☐ Married ☐ Common Law ☐ Widowed ☐ Divorced

25. Number of Dependents

26. If married or common-law, does your spouse reside in the same territory/province as you? ☐ Yes ☐ No

WORKER'S CONSENT

I claim compensation for my work-related injury or disease and declare the information provided in support of my claim is true and accurate to the best of my knowledge and belief. I acknowledge it may be a criminal offence to make a false claim.

Initial _____

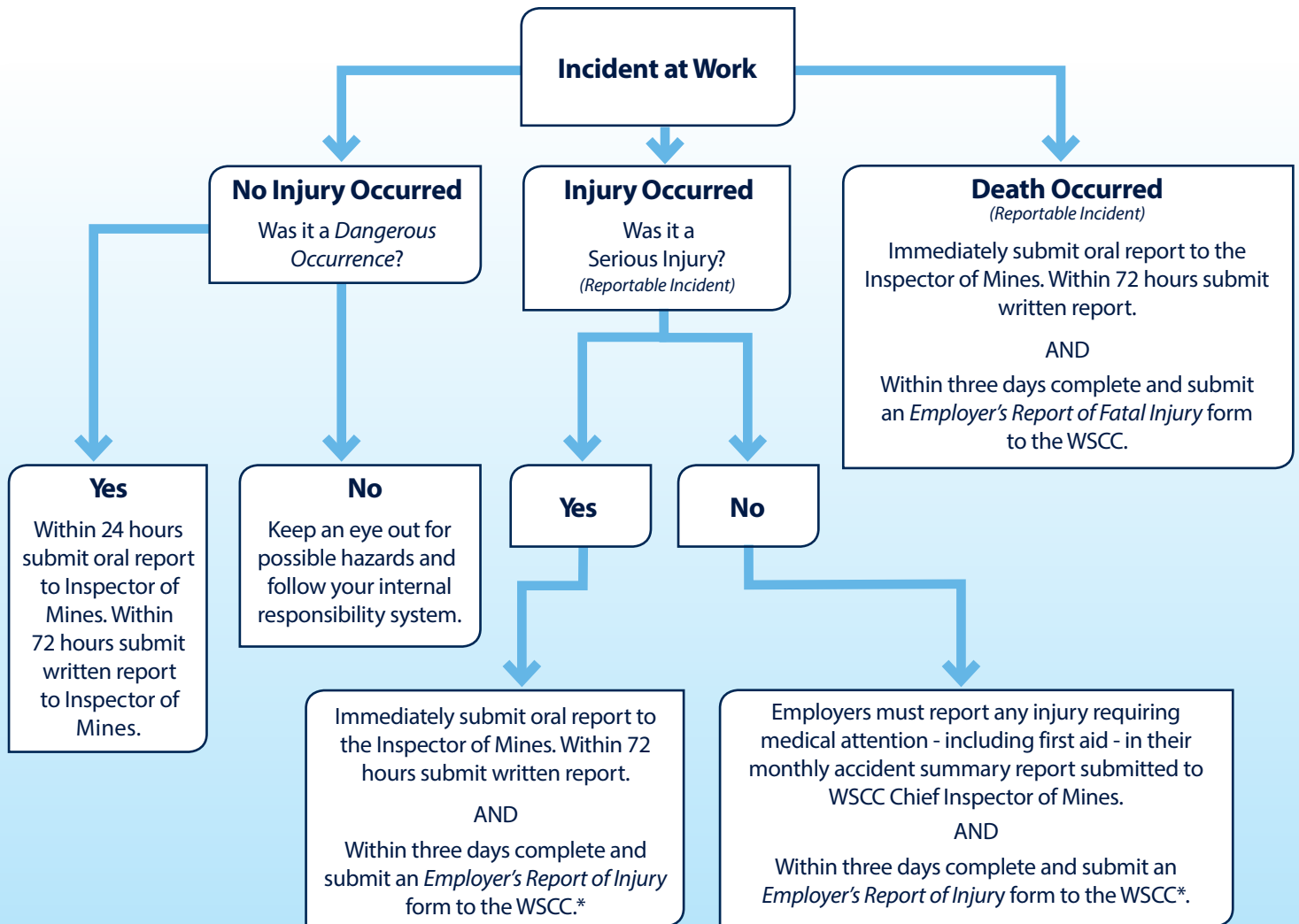
PLEASE PROCEED TO 4TH PAGE. →

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

M	M	D	D	Y	Y
---	---	---	---	---	---

Mine Health and Safety

Employer's Incident Reporting



*Employers must submit the *Employer's Report of Injury* form when the worker:

- needed medical aid;
- cannot return to their work the day that the injury occurred;
- is unable to return to their job after the day of their injury;
- lost consciousness; or
- was exposed to a dangerous substance.

If any ONE of these instances apply.

24-HOUR INCIDENT REPORTING LINE
1-800-661-0792

For more information, refer to the *Mine Health and Safety Regulations*, Section 16, and the *Workers' Compensation Act*, Section 18.



WSCC Workers' Safety & Compensation Commission
wsccl.nt.ca 1.800.661.0792

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wsccl.nt.ca 1.877.404.4407

Employer's Responsibilities

If your employee suffers a workplace injury, you must report it to the WSCC. Here's a checklist of what you need to do:

- ☐ Get the employee immediate medical attention, if necessary. You must provide the injured worker with transportation if they require it.
- ☐ Follow the steps on the front page to determine the right course of action.
 - Not completing and submitting your ***Employer's Report of Injury*** form to the WSCC within three days may result in penalties.
 - You must keep record of all injuries for a period of three years.

DEFINITIONS:

Dangerous Occurrence: a major incident not resulting in injury or death. For example, you are driving a motor vehicle and are involved in an accident, but no one is hurt. Serious injury could have occurred, and may if the accident happens again. Refer to Section 16.01 of the *Mine Health and Safety Regulations* for a full outline of what constitutes a dangerous occurrence.

Reportable Incident: an incident involving serious injury or death. Refer to Section 16.01 of the *Mine Health and Safety Regulations* for a full outline of what constitutes a reportable incident.

IMPORTANT INFORMATION

What are my safety responsibilities as an employer?

You must:

- provide a safe workplace;
- provide equipment and machinery of a safe design and in safe condition;
- appoint competent supervisors who set performance standards and ensure workers follow safe work procedures;
- inform workers of their rights, responsibilities, and duties;
- provide adequate job training;
- train workers on any potential hazards; how to safely use, handle, store, and dispose of hazardous substances; and how to handle emergencies;
- supply personal protective equipment and make sure workers know how to safely and properly use it;
- support and participate in an Occupational Health and Safety Committee;
- meet first aid standards; and
- report workplace incidents and injuries to the WSCC.

Worker's Injury Reporting

- needed medical aid;
- cannot return to work the day that the injury occurred;
- are unable to return to your job after the day of your injury;
- lose consciousness; or
- were exposed to a dangerous substance.

If any ONE of these instances apply.

1-800-661-0792



WSSC Workers' Safety & Compensation Commission | Գնահատման և Կոմպենսացիայի Կոմիտե
wssc.nt.ca 1.800.661.0792 | wssc.nu.ca 1.877.404.4407

Worker's Responsibilities

REPORTING AN INJURY

If you get injured at work, you must report it to your employer and the WSCC. Here's a checklist of what you need to do:

- ☐ Get immediate medical attention if necessary. *Your employer must provide transportation if you need it.*
- ☐ Tell your health care provider you were hurt at work. Ask them to send the appropriate medical reports to the WSCC.
- ☐ Tell your employer you are hurt. Ask your employer to send their completed **Employer's Report of Injury** form to the WSCC within three days of your incident (as per legislation).
- ☐ Complete the **Worker's Report of Injury** form and send it to the WSCC as soon as possible, or use our Tele-claim service to file over the phone with a Claims Representative.

DID YOU KNOW?

We offer Tele-claim services. Call us at 1-800-661-0792 in Northwest Territories and 1-877-404-4407 in Nunavut to file your claim over the phone with one of our Claims Representatives.

CONTACT US:

Need help filling out the form, or have questions? Contact us!

Northwest Territories

Phone: 1-800-661-0792

Email: nwtclaimsservices@wscc.nt.ca

Nunavut

Phone: 1-877-404-4407

Email: nuclaimsservices@wscc.nu.ca

FAQ

What is the difference between First Aid and Medical Aid?

First aid refers to help given to an injured person until full medical aid is available or required. Medical aid refers to seeking additional care (beyond first aid) from a health care provider (e.g., Doctor, Nurse, Physician's Assistant, or Psychologist).

If you receive first aid you must let your employer know that you were injured at work. They must fill out an **Employer's Report of Injury** form and keep it on file for three years. The WSCC only needs the **Employer's Report of Injury** form if criteria in WSCC *Policy 11.02; Reporting an Injury, Disease or Death*, are met.

What are my safety responsibilities on the job?

You must:

1. do your job safely and follow health and safety rules;
2. ask for training if you need it;
3. use personal protective equipment when required;
4. report all injuries meeting the criteria to your employer and the WSCC; and
5. receive first aid and report medical treatment.

WORKERS' ADVISOR OFFICE

The Workers' Advisor Office is an independent resource, separate from the WSCC, that can answer questions and explain the claims process. You can contact them at:

Web: workersadvisor.ca

Water Treatment Sulphide Shack

At the Prairie Creek Mine, a water treatment system is in place to control the concentration of Zinc being placed into Prairie Creek from the Mine water flow discharging from the portal 870.

Sodium Sulphide is introduced into the mine water flow exiting the 870 Portal. This chemical is used to aid in dropping out the zinc, which drops the zinc concentrations in the water before it enters the natural water flow surrounding the site.

This chemical is premixed in 1000-gallon tanks within an enclosed structure which has ventilation. This chemical is trickled into a mixing hopper which has continuous flow of water (circulated) to aid in the dissolving of the Sulphides in the water.

The worker is wearing the proper PPE, which includes:

- Wearing a tyvek suit, which covers the whole body.
- Chemical resistant gloves, which are elbow length.
- A full-face respirator with the appropriate cartridges for Sodium Sulphide.
- A personal H₂S monitor with an audible alarm.
- Steel toed boots.
- Coveralls under the Tyvek suit.

Procedure for Sulphide mixing.

Refer to the MSDS of Sodium Sulphide before using.

If you have not had proper supervision, ask your supervisor or management for the proper training.

The proper PPE is listed below to be used for mixing Sodium Sulphide

- Honeywell gas cartridge P/N-7582P100L with P100 particulate filters (CL/HC/SD/CD/FM/HF/HS/P100).
- Dupont Tyvek suit (Full piece w/hood). Applicable coveralls meets or exceeds ANSI-101-1996 size standards.
- North 5400 series full-face respirator (elastomeric).
- Ansell chemical resistant gloves-24"
- A personal H₂S monitor with an audible alarm.
- Steel toed boots.
- Coveralls under the Tyvek suit.

During the mixing of the Sodium Sulphide (flake, medium-17kg) into a 1000 gallon tank, the H₂S concentrations were monitored during and every 10 minutes after the mixing was completed for a duration of 30 minutes.

The values are below:

H2S Readings (PPM) during and after Sulphide mixing					
	H2S ppm	CO	O2	Date	Time
Initial Mixing	0	-8	20.9	Nov 5	15:58
10 minutes after mixing	3	0	20.9	Nov 5	16:10
20 minutes after mixing	2	0	20.9	Nov 5	16:20
30 minutes after mixing	1	-6	20.9	Nov 5	16:30

After mixing, the worker immediately exits the building and reports to their immediate supervisor that mixing has been completed.

The Sulphide shack is then off-limits for 1 hour after mixing has been completed.

The draeger was placed on the front of the workers tyvek suit, half the distance to the water surface being mixed and the workers respirator (16”).

Specialized PPE used:

- Honeywell gas cartridge P/N-7582P100L with P100 particulate filters (CL/HC/SD/CD/FM/HF/HS/P100).
- Dupont Tyvek suit (Full piece w/hood). Applicable coveralls meets or exceeds ANSI-101-1996 size standards.
- North 5400 series full-face respirator (elastomeric).
- Ansell chemical resistant gloves-24”

Specialized Detection Equipment used:

- DRAEGER H2S Detector X am 2500

Specialized PPE Equipment Check

North 5400 series full-face respirator

Negative Pressure Field Check by the RPE User

- Place the mask on your face with cartridges removed.
- Close off the inhalation ports with palms of your hands where cartridges attach, inhale gently and hold breath for 5 seconds
- The mask will collapse slightly and remain collapsed while holding breath if a seal is present.
- If the face piece does not remain collapsed while a breath is being held, reposition mask and verify nothing is in between the seal and your face.
- Retest for a negative pressure check.

An inspection of the respirator is required on a regular basis.

The inspection manual is located in the lab room

Do not use a respirator for which a seal check cannot be completed successfully.

Do not share masks, each mask is assigned to one person for use.

CLEANING AND STORAGE

- Remove cartridges from mask and store thread part down in specified place in water treatment lab.
- Take mask and wipe down with non fragrance soap and water with rag.
- Let mask air dry and place in plastic airtight bag for storage.
- Label bag with users name.

Gas cartridge P/N-7582P100L with P100 particulate filters

Inspection and scheduled usage

- Check usage chart for cartridges. After 1 month of cartridge use, new cartridges should be installed on respirator.
- Inspect threads for cracks, seal deterioration or any other deficiencies.

CLEANING AND STORAGE

- Remove cartridges from mask before cleaning mask
- Place cartridges thread side down for storage when not in use.
- Check usage chart on cartridge replacement calendar before re-using. If replacement of cartridge date is reached. Replace cartridge.
- Write on cartridge the date new cartridge becomes in service and record on sheet.
-

Do not attempt to wash cartridges

Dupont Tyvek suit

- Inspect suit for rips or tears.
- Operate Zipper for full range and function.
- Put on suit prior to use if it is new. Check range of motion and mobility of your arms and legs.
- Do not get a tight fitting since you will be lifting, stepping up and down. You want mobility in your upper body.
-

CLEANING AND STORAGE

- Do not fold tyvek suit inside out.
- With mask on, stay upwind and lightly shake loose dust off suit
- store tyvek suit in a locker only designated for the suit and nothing else.

24" Chemical Resistant Gloves

- Inspect gloves for rips or tears.
- Do not share gloves.

CLEANING AND STORAGE

- Rinse gloves with non-sulphide contaminated water.
- Store gloves by hanging them open side down.
- Have clips installed to hang gloves with in storage area.

ALWAYS CHECK YOUR PPE BEFORE USE

Genset Starting

First of all, the genset you are starting should be offline (disconnected from the power grid).
The way to check this is to make sure the primary switch for the desired generator is in the “OFF” position.

Initiate starting sequence below for desired generator:

150 KW Genset



- Check fluids and top off if necessary
- Turn on battery disconnect if applicable
- Turn key counterclockwise all the way and hold, hold key for 1-2 minutes if temperatures are colder than 0 deg Celsius and engine is cold
- Release key and press in murphy button(below key) while you turn the key clockwise to start engine
- Hold murphy button once engine starts
- Once oil pressure builds then it is safe to release murphy switch
- Let engine idle for at least 10 minutes to reach operation temperature
- The engine is now ready to be put online

70 KW JD Genset



- Check fluids and top off if necessary
- Turn on battery disconnect if applicable
- Engine does not have a glow plug button
- Press in murphy button(Red) while you turn the key clockwise to start engine
- Keep holding button as engine is running
- Once oil pressure builds then it is safe to release murphy switch
- Let engine idle for at least 10 minutes to reach operation temperature
- The engine is now ready to be put online

**MAKE SURE RADIATOR IS FREE OF ANY
OBSTRUCTIONS AND THE LOUVRE IS OPEN FOR
COOLING OF THE ENGINE WHEN THE ENGINE IS
ONLINE**

PROCEDURE FOR USING THE 150KW OR 70 KW GENERATORS

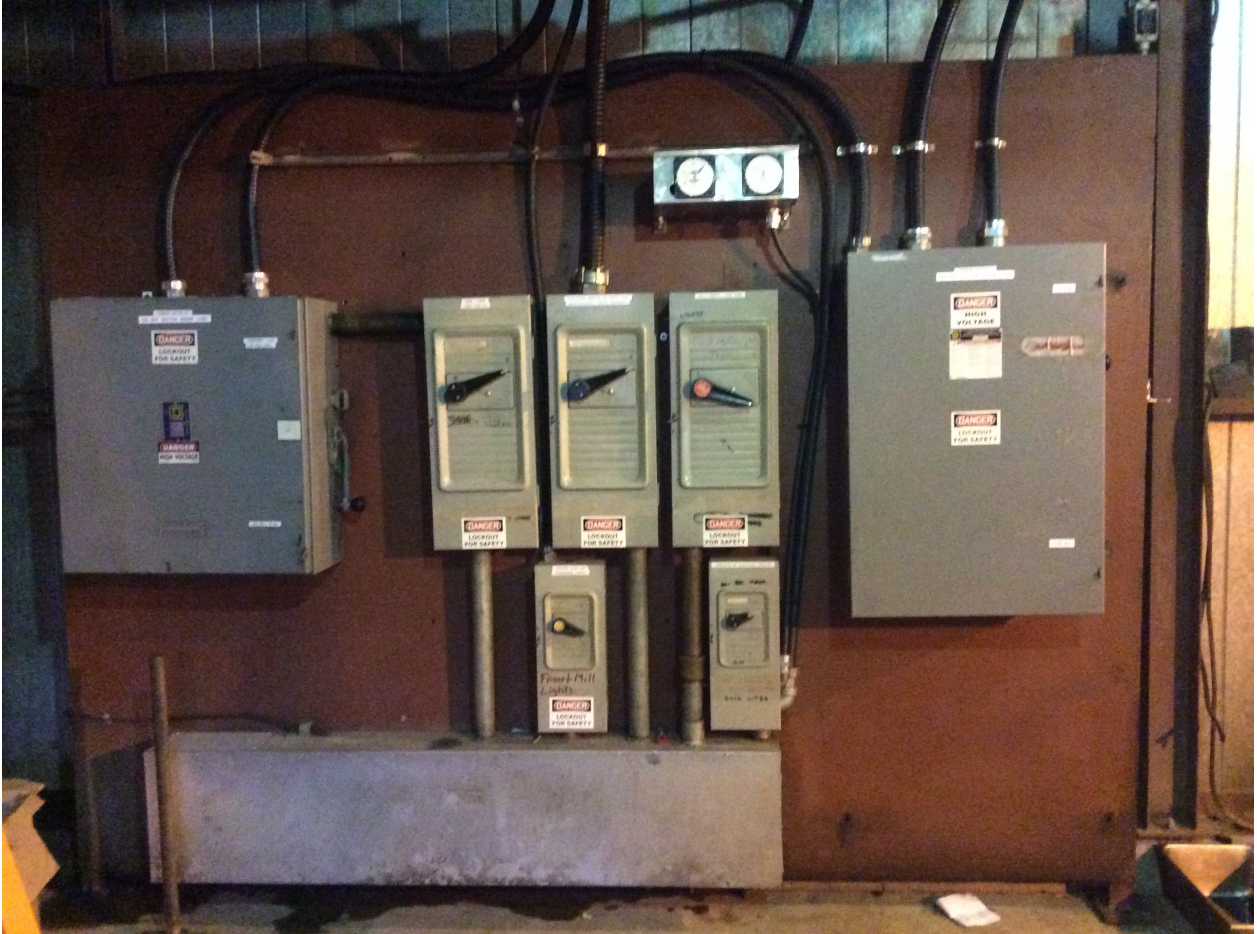
1. Make sure primary switch for the desired generator is in the “OFF” position
2. Warm up generator
3. Move Transfer Switch to the desired generator which reads 70KW/ or150KW
4. Idle up generator to desired RPM before engaging primary generator switch
5. Dial in with the throttle the right hertz and voltage immediately as depicted in the picture.
6. Lock throttle and assess 10 minutes later once site electrical use has stabilized



SHUT DOWN PROCEDURE

1. Shut off generator primary switch
2. Idle down genset immediately

3. Let engine cool down for 10 minutes before shutting off



ENGINE OIL CHANGE

1. Oil change to be done around 12681 hrs.
2. Let engine idle for ten minutes before shutting down to change oil. Have oil hot when changing to drain thoroughly.
3. In mid stream of draining the oil, collect an oil sample. The sample jar is on the desk in the main office.
4. When installing the oil filter, I use grease on the oil filter seal instead of oil. On the next oil change, the oil filter will come off a lot easier. Do not bother filling the oil filter with new oil.

5. Mark the hours on the new oil filter after installing.
6. When cranking the engine to start, do not hold in the murphy switch and watch the oil pressure gauge until you have oil pressure. Crank another 10 seconds once you have pressure.
7. Once you have oil pressure then you can hold in the murphy switch to start the engine.
8. Run engine for a few minutes then shut down, let oil have a chance to settle then check oil to see if it is at the correct level.
9. Before putting the generator back in service, check all the items below:
 - Check for any fuel leaks
 - Check all brackets and bolts for tightness
 - Check coolant level
 - Inspect fan/alternator belts
 - Inspect electrical cables and connections

Log hours in the 70KW log book.

FUELLING OF GENSET

There is a 500 (2000+ litres)gallon tank located outside the genset room within a berm. Whichever genset is operating will determine the amount of fuel demand.

1. Tank a tank dip to determine if it is even feasible to fill the genset
2. Open 2 valves (2") at back of tank
3. Open 1" valve after fuel meter
4. Turn fuel on Honda pump
5. Turn start switch to on
6. Choke engine if necessary and pull start engine, leave engine idling
7. Take fuel nozzle and insert into top of 500 gallon tank
8. Squeeze trigger and lock nozzle on then go down and idle up pump to desired RPM
9. Stand and monitor fuelling at nozzle until trigger automatically shuts off (if trigger does not automatically shut off then shut off manually so tank does not overflow). This has happened so always be present to prevent a spill.
10. Put nozzle and hose away, shut 2", 1" valves, Honda engine valve, shut off Honda pump
11. Log litres pumped into log book inside truck
12. If fuel truck tank gets low, then go fill at tank farm. Remember the truck itself needs fuel to operate so check periodically or fill on a regular basis.

GENSET TANK LEVEL SHOULD NOT DROP BELOW HALF

FUELLING OF FUEL TRUCK

1. Drive the international to the tank farm and park beside the pump that is inside a drip tray.
2. Unlock the 3" valve and turn open 2" – 3".
3. Hook up the spill proof camlock onto the same valve on the back of the truck
4. Open all valves so fuel can be pumped from the big tank into the fuel truck.
5. Make sure Honda pump is full before starting.
6. Start pump and watch tank level on truck
7. Tank should only be filled 2/3 full. You can monitor this by the sight glass on the back of the tank.
8. When tank is 2/3 full, shut valves and shut off pump.
9. Make sure all valves are shut and **big valve on the tank farm tank is always locked.**
10. When unhooking the drip proof camlock, have an absorbent handy since a couple tablespoons will drip out of the camlock when uncoupling.

MAIN BUILDING

HOT WATER TANKS

- Electric hot water tank has been installed in January and will not need any maintenance
- Diesel hot water tank will need maintenance but not until I get back next time
- Just turn the oil pump on downstairs in the mechanical room for 5 minutes if the hot water tank stops working and does not want to fire.

FURNACE

- Forced air furnace is online. It does not need any maintenance.

SITE

We are now treating discharge water until further notice or zinc levels drop.
It was understood that the treatment shacks were all operational and good to go. That is not the case.

- Metering pump in the Sulphide shack is leaking. Use the manual 1" ball valve to discharge Sulphide

- Water is coming out of XC-2, into the sump and along the tracks.
- The water is still 3 feet from the decline pipe.
- I have changed all the discharge metering lines to treat the present discharge water coming out of the decline. It was quick and can be revamped, but works.
- The sump pump at the flocc shack should be taken out after every use since it is cast and will deteriorate in time. The breaker for the sump pump is #8.
- The polishing pond is down 2 feet; I have repaired a leaking valve so it should slowly fill up and discharge after a while.
- Initial zinc reading was 2.63, I have not checked since.
- Keep eye on Kirk to see if he is doing the treating right, and check periodically after that.

PRIORITIES AT THE MOMENT

1. Barrel berms to be retarped neatly and properly, shovel more sand along berm, it was a rush job for me and did not have time to finish.
2. Rebuilding utilidor starting from the main building to the pump house (Then to bunkhouses). Slope utilidor for natural drainage.
3. Clean "ALL" drip trays in back shop and repair all holes, rips, etc with other rubber and vulcanizing cement. These drip trays are expensive.
4. Disassemble all bull hose fittings and Victaulic fittings around site and consolidate in cold storage.
5. Inspect all hydrocarbon booms and redo or replace if necessary.
6. Check all spill kits on site and replenish if needed. Make an inventory list of all spill kits on site

MISCELLANEOUS

- The 2 barrels in the dodge is diesel
- have workers clean up their work area every night
- generator room is to be cleaned and stay cleaned
- all mill doors to be closed and locked except the generator room
- Weeds at strip to be cut for plane safety
- Weeds around site to be cut, especially around berms so roots do not hurt the integrity of the berms.
- Barrel berms to be retarped neatly and properly, shovel more sand along berm, it was a rush job for me and did not have time to finish.
- Signs to be put up for berm contents
- NO BURNING OF OIL FILTERS
- Consolidate all Herman nelson socks in JD shed(where core boxes are stored by the carpenters shed).
- Consolidate all clevises and newer slings in warehouse
- Dismantle if necessary and lubricate all chain comalongs, then consolidate in warehouse.
- Wash (in parts wash bin) the D8K cat parts I removed from machine already, they are on the floor beside the cat in back shop
- Fuel all gasoline vehicles/equipment every Monday that have no fuel gauge or has less than half a tank of fuel.

Core Shack Rock Saw SOP

One of the procedures involved in operations at the core shack at Prairie Creek Mine is the cutting of core.

A core saw is used in the cutting of core and splitting for future analysis.

The biggest concern in cutting core is safety to yourself, the safe operation and maintenance of the machine and the proper training needed to operate.

THE WORKER MUST WEAR THE PPE LISTED BELOW BEFORE OPERATING THE SAW

CORE SAW

Standard Operating Procedure

PPE Needed

- Breathing mask(appropriate for the particulates being created).
- Ear protection. (ear plugs and ear muffs)
- Raingear or apron(Coveralls or apron (to protect from splashes and kick back of material being cut).
- Face shield and safety glasses
- Gloves/ rubber/ elbow length
- Steel toed boots

Getting Started

- Get the appropriate PPE before getting started.
- The person training you will explain why you need the specific PPE for this job.
- You will then be taught how to don and wear the PPE.
- All electrical switches, disconnects and operations of the saw will be explained to you.
- Water is needed for the saw. The trainer will demonstrate how to energize the line to bring water to the saw.

Operation

-No one should be present or in the same building when sawing operations commence-

- Remove insulation at vent and turn on ventilation fan.
- Inspect the saw using the inspection guide provided before starting.
- Always make sure water is flowing onto the saw as you cut, or the blade will warp and be rendered useless.
- Energize the electrical system then start saw.
-
- Have trained personnel who has cut before, to train you before attempting to saw yourself. Touch core to saw gently and then apply constant pressure to core.
- If the saw is in need of sharpening –Have trained personnel sharpen the blade
- If work needs to be done on the saw itself (fixing, changing blades, etc) make sure to de-energize the saw entirely via unplugging or locking out if it is hard wired in.
- The instructions will be on the wall for locking out.

Clean-up (daily)

- Run ventilation fan for 15 minutes before shutting off to purge building with non-contaminated air.
- Ensure ventilation fan is turned off and insulation is replaced, particularly during colder seasons.
- Shut water system off and drain lines.
- Scrape any refuse off bottom of the pan and cutting tray or it will become concrete.
- Check your machine and repair any deficiencies or report them before leaving your work area.
- Leave your workspace clean and free of hazards for the next person using it.

Rock Saw Checklist

- Inspect cord for any cracks, cuts or any loose connections.
- Check blade for tightness and for any nicks or damage.
- Test table that it rolls smoothly and all rollers are intact.
- Check water system so all lines are securely mounted and there are no leaks.
- Inspect the floor where you will be standing and ensure you will have good footing even with the addition of water.
- First Aid kit and eye wash should be present before commencing sawing.
-

-if any deficiencies are found, lock out the core saw and report to your immediate supervisor-

Incinerator Safe Work Procedures.

While using or attending the incinerator, PPE provided for this work *must* be worn. This includes the fire retardant jacket and the full visor helmet with fire retardant neck protection. This PPE is **NOT** to be used for any other purpose and must also be properly cared for and put away when not in use. Leather gloves must also be worn when attending the incinerator.

The incinerator door should remain closed while in use. When opening the door to check, stoke or add garbage care should be taken not to stand directly in front of the opening when the door is released. When air is introduced into the combustion chamber by opening the door, the fire could flare up and a sheet of flame could exit the opening endangering you. Keep in mind there is no guarantee that batteries or pressurized containers have not found their way into the bags of “combustible” garbage. Therefore a chance exists that through unfortunate timing, or due to the extra heat created from the influx of air, these items may explode, causing a shower of sparks and/or sharp objects. The best way to open the door is to stand on the “hinge side” of the door and after releasing the catch walk backwards keeping the door between you and the opening as a protective shield and subsequently removing yourself from the immediate area of danger directly in front of the opening. Ensure beforehand there are no obstacles or trip hazards within this work area.

When you have safely opened the door and you have combustible garbage to add, maintain the “safe” position employed when opening the door and toss the garbage inside in a manner that minimizes your exposure to the opening. At no time should you ever stand directly in front of the opening during combustion.

If it is necessary to “stoke” the incinerator during the burn process, use a stoking tool that is long enough to preclude standing in front of the opening. After opening the door in the prescribed manner, stand to the side and stoke the reachable side of the interior. When satisfied that you have adequately stoked this position, walk around the *back* of the incinerator and repeat the procedure to stoke the opposite side of the interior. **DO NOT** shortcut across the front of the opening to do this.

If you any questions or suggestions regarding the safe procedure for incinerator operation, please do not hesitate to speak with site management.