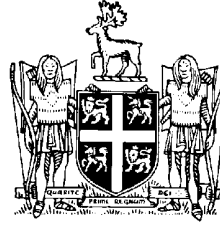


June 15, 2010



**NEWFOUNDLAND AND LABRADOR  
REGULATION /10**

*Occupational Health and Safety Regulations, 2009  
(Amendment)  
under the  
Occupational Health and Safety Act  
(O.C. 2010- )*

*(Filed )*

Under the authority of section 65 of the *Occupational Health and Safety Act*, the Lieutenant-Governor in Council makes the following regulations.

Dated at St. John's,

Gary Norris  
Clerk of the Executive Council

**REGULATIONS**

*Analysis*

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NLR 70/09

**1. The *Occupational Health and Safety Regulations, 2009* is amended by adding after section 516 the following:**

**PART XXVIII.1  
UNDERGROUND MINE OPERATIONS**

Definitions

**1. In this Part**

- (a) "bulkhead" means a structure built for the purpose of impounding water or hydraulic backfill in a drift, cross-cut or other mine opening, and constructed in a manner as to completely close off the mine opening;
- (b) "dam" means a structure built for the purpose of impounding water in a drift, cross-cut or other mine opening, and constructed in a manner as to permit an unobstructed overflow of the water;
- (c) "remote control unit" means a remote control unit, system, device or controller that produces radio frequencies or radiates electromagnetic energy;
- (d) "remote controlled equipment" means equipment that can be operated or moved by use of a remote control unit; and
- (e) "working face" means a place where unconsolidated material is loaded and the material is at an angle steeper than 45° from the horizontal.

**PART XXVIII.2  
GENERAL REQUIREMENTS FOR MINING**

Definitions

**2. In this Part**

Underground  
Illumination

**3. An employer shall have suitable permanent lighting installed in an underground workplace to provide adequate illumination in the following locations:**

- (a) all workshops, service garages, and other places where moving machinery or equipment could be a hazard;
- (b) main shaft stations and active shaft landings;

- (c) first aid stations;
- (d) conveyor galleries, drives, and transfer stations; and
- (e) as required by a mine inspector.

Cap lamps

4. (1) An employer shall provide every person entering an underground workplace with an approved cap lamp and the person shall keep the lamp in his or her possession while he or she is underground.

(2) Cap lamps shall be capable of providing a peak luminance of at least 1,500 lux at 1.2 metres from the light source, throughout a working shift.

(3) An employer shall develop a procedure for assessing and maintaining cap lamps and a copy of the procedure and the results of the assessment shall be made available upon request to a mine inspector.

Auxiliary lighting

5. Where a person has to assess ground conditions in an underground workplace at a distance greater than the effective range of a cap lamp, his or her employer shall supply, and the person shall use, auxiliary lighting adequate for safely carrying out the assessment.

Conveyor belts

6. (1) An employer shall ensure that conveyor belts installed underground, in an enclosed building or closed in structure, or another place at a mine where, because of limited access, a fire could endanger the lives of workers,

- (a) are equipped with a device that guards against excessive slip or blockage between the belt and driving pulley; and
- (b) are made of flame retardant material or provided with an automatic fire extinguishing system that protects the entire length of the belt.

(2) Conveyor belts shall meet the CSA M422 "Fire Performance and Antistatic Requirements for Conveyor Belting Standard".

(3) A worker shall not ride, and an employer shall not direct or permit a worker to ride, on a conveyor belt.

(4) A worker shall not clean manually, and an employer shall not direct or permit a worker to manually clean, a conveyor belt or its rollers or pulleys while the belt is in motion.

(5) Servicing or cleaning up spillage on or around, a moving conveyor belt shall be carried out only

- (a) where the conveyor system is so constructed that the work can be done safely and without removing a protective fence or guard; and
- (b) by a person fully trained and authorized by the employer to do the work.

Emergency stop,  
warning device and  
guarding

7. An employer shall provide and maintain on each conveyor belt

- (a) guards that extend at least one metre from the pinch point at all head, tail, drive, snub and tension pulleys or drums;
- (b) a pull cord or emergency shut down device along the full length of the conveyor by means of which the conveyor can be stopped but not restarted;
- (c) a means to warn persons along the full length before the conveyor belt is started whenever the full length of the conveyor belt is not within sight of the starting control;
- (d) guards on all load bearing rollers, return rollers and idler assemblies within 2.13 metres of the ground, a walkway or platform;
- (e) guards along all take up pulleys or systems; and
- (f) guards or barriers along all counter weights and tensioning drums.

Conveyors general  
requirements

8. (1) Conveyors that operate over areas used by workers shall be designed to prevent broken parts of the conveyor from falling into these areas.

(2) Return rollers or idler assemblies shall be guarded along the underside of all conveyors.

(3) Walkways, throughways under conveyors used by workers shall have guardrails installed along the access route and an overhead canopy installed with an engineered protection plate able to withstand a belt impact from belt breakage.

(4) A worker shall not cross a conveyor except at established walkways and throughways shall be not less than one metre in width and shall be equipped with guardrails on all open sides.

(5) Access ladders on conveyors shall have self closing gates on all ladder exits.

(6) All nip points along receiving hoppers and belts shall be effectively guarded.

(7) An effective dust control system shall be used to suppress or remove dust that may be generated along the conveyor belts and transfer points.

Conveyor systems

**9.** (1) With respect to a conveyor that starts automatically, an employer shall post warning signs at each access point indicating that the conveyor is subject to automatic start.

(2) The conveyor-control system shall incorporate a pre-start warning circuit that sounds an audible alarm throughout the length of the conveyor.

Procedure where  
flow of gas under-  
ground

**10.** (1) Where, during a drilling operation underground, a worker encounters a flow of gas from the rock, the worker shall immediately

- (a) evacuate the area and close it to all persons; and
- (b) notify the worker's supervisor.

(2) The employer shall

- (a) examine the area referred to in subsection (1) and identify the gas; and
- (b) establish and enforce a procedure by which the work can be continued safely.

Examination of  
mine

**11.** The employer at each mine shall ensure that a supervisor

- (a) examines, during each shift, all parts of the mine where work is being performed;
- (b) examines, at least once a week, all the other portions of the mine not closed off under section 14; and
- (c) takes an action necessary to correct unsafe conditions noted during the examinations.

Scaling procedure

**12.** (1) During scaling procedures in a workplace, the employer shall not permit any other work to be carried out if the other work affects or could affect the safety of a worker carrying out a scaling procedure.

(2) Where workplaces, travelways or other areas of a mine cannot be maintained in a safe condition by scaling, the employer shall ensure that they are suitably supported by rock bolting, timber, shotcrete, cased or lined.

Rockbolts

**13.** (1) Rockbolts shall be installed to within 1.5 metres of the face.

(2) The rock bolts shall be installed after each hole is drilled.

(3) Rockbolts shall be properly installed and a portion of them shall be tested for proper installation and adequacy of materials used.

(4) A record of the tests required by subsection (3) shall be made available to a mine inspector upon request.

Unventilated or unsafe mine area

**14.** (1) The employer shall ensure that a section of a mine that is not ventilated or maintained in a safe condition

(a) is effectively barricaded to prevent inadvertent entry; and

(b) is posted with signs warning that entry is prohibited.

(2) Before a person enters or is permitted to enter a section of a mine that is not ventilated or maintained in a safe condition, the employer shall ensure that the atmosphere is tested and conditions examined by competent personnel.

(3) An employer shall not resume or permit a person to work in a workplace where

(a) the oxygen content of the atmosphere is less than 20% by volume; or

(b) the concentration of contaminants in the atmosphere exceeds the threshold limit values as established by ACGIH.

(4) The requirements of subsection (3) do not apply for mine rescue teams or persons wearing self contained breathing apparatus.

Mining method

**15.** Every method of mining practiced in an underground mine shall be safe and applicable to the structure of the ore deposit or part of the deposit being mined.

Mine design

**16.** (1) The employer of an underground mine shall ensure and maintain a mine design by a professional engineer assessing the ground stability of the active and proposed workings of the mine.

(2) The mine design shall consist of drawings, plans or specifications and shall

(a) describe the geology of the mine including structural features;

(b) outline the geometry of existing and proposed excavations;

(c) describe previous occurrences of ground instability;

(d) describe the mining method including stope sequencing and blasting methods;

(e) specify the ground support system; and

(f) describe measures, as instrumentation and computer modeling, planned and used to assess potential ground instability.

(3) The mine design shall be assessed and updated before an alteration is made to the mine that may significantly affect the ground stability of the mine.

(4) The mine design shall be available at the mine site for review by a mines inspector and by the occupational health and safety committee, or worker representative.

Shaft pillar	<b>17.</b> Stopping shall not be done within 60 metres of a shaft that is used for transporting persons unless authorized by the minister.
Boundary pillar	<b>18.</b> A pillar of not less than 30 metres shall be maintained on either side of a party boundary adjoining underground mining properties.
Record and warning of unsafe condition	<b>19.</b> Where at the end of a shift an unsafe condition exists in an area of a mine, the employer shall make and maintain, at the end of the shift, a written record of the unsafe condition.
Duty of supervisor on change of shift	<b>20.</b> The supervisor on the on-coming shift shall read and counter-sign the written record referred to in section <b>19</b> .
Provision of scaling equipment and chute bars	<b>21.</b> (1) The employer shall provide and make available (a) an adequate supply of properly dressed scaling bars and other scaling equipment; or (b) where required for clearing hung up chutes, bars which are blunt on one end and have a flexible rubber sleeve on the blunt end. (2) A worker shall not use a scaling bar for clearing hung up chutes.
Protection when handling material	<b>22.</b> Where material is being loaded, unloaded or moved in a bucketway or material slide, the employer shall establish and the worker shall follow a procedure to prevent injury from falling objects.
Steeply inclined raises	<b>23.</b> The employer shall ensure that a raise being driven that is inclined at more than 50° from the horizontal, and that is to be more than 16 metres slope length and into which a worker shall enter (a) is driven by a raise climber or other hoisting device that protects the worker from falling material while ascending and descending; or (b) is divided into at least 2 compartments, one of which is maintained as a ladderway and is timbered to within a safe distance of the face, but that distance shall not exceed 7.5 metres.

Raise climbers

**24.** Every employer shall ensure that each raise climber or other hoisting device referred to in section **23** is equipped with

- (a) at least 2 independent means of braking,
  - (i) each of which is capable of stopping and holding the climber with its maximum rated load,
  - (ii) each of which is arranged to permit independent testing, and
  - (iii) one of which is as close as practicable to the final drive of the motor;
- (b) an automatic overspeed brake to safely decelerate and hold the climber in the event of the climber travelling at a speed in excess of a predetermined rate;
- (c) a notice attached to the conveyance showing the maximum load that can be carried, as certified by the manufacturer;
- (d) when driven by electrical power,
  - (i) a suitable emergency switch in the cab that cuts off the power to the drive motors if the main control contactor fails to open, and
  - (ii) a means by which the power can be isolated from the raise service area; and
- (e) a suitable headcover after 8 metres of advance.

Use of raise climbers

**25.** (1) When a raise climber or other hoisting device referred to in section **23** is used at a mine, the employer shall ensure that

- (a) a stop block is in a position that prevents the climber from being taken beyond the track, except when the track is being extended;
- (b) an effective means of communication is established between the climber and the raise service area;

- (c) the climber is operated by a person authorized by the employer;
- (d) means are available by which workers can escape from the climber;
- (e) where the total length of raise to be driven exceeds 200 metres, a mechanical means by which workers can be reached and removed from the climber is available for use in the event of a malfunction of the climber or rails;
- (f) the climber is equipped with a first aid kit as required under the *Occupational Health and Safety First Aid Regulations*;
- (g) the climber is examined and tested
  - (i) each shift before being used, to determine that the brakes and controls are functioning effectively, and
  - (ii) weekly, in respect to its mechanical and electrical parts and safety devices, by a competent person, and for the purpose of the examination the climber shall be thoroughly cleaned;
- (h) the main shafting of the drive train is examined by a competent person using ultrasonic methods to determine if it is in sound condition
  - (i) before the raise climber is first put into service at the mine, and
  - (ii) during each major overhaul of the climber and at least once every 500 hours of use; and
- (i) a log book is maintained at a location conveniently available to the operator in which shall be recorded
  - (i) the examination required by paragraph (g),
  - (ii) the findings from the examination,
  - (iii) a repair or modification, and the signature of the person performing the examination, repair or modification, and

(iv) the signature of the supervisor authorizing the repair or modification referred to in subparagraph (iii).

(2) An employer shall not permit and a worker shall not load or operate a raise climber or other hoisting device in excess of the capacity certified by the manufacturer.

(3) Where a cable lift raise platform is to be used at a mine, the employer shall, before installation, submit to the minister

(a) drawings of the device and installation; and

(b) the procedure to be followed for the examination, testing and use of the system.

Presence on sub-level prohibited

**26.** Where a mechanical raise climber or hoisting device is the sole means of access for persons to and from the workplace, a worker shall not remain, and an employer shall not permit a worker to remain, on a sub-level, landing, staging or other place in a raise when the mechanical raise climber or hoisting device is moved from the place.

Precautions for chutes

**27.** (1) Where there are chutes for the control of ore, waste or other material, the employer shall

(a) ensure that the chutes are so constructed, and their parts and controls so arranged that workers are safe from an anticipated surge or spillage of material;

(b) establish a procedure to be followed in the event of an unexpected surge or spillage; and

(c) ensure that workers do not enter the discharge end of a chute for the purpose of clearing a chute.

(2) Where ore, waste, fill or other material is pulled from a chute or drawpoint and the settling of the broken material above the chute or drawpoint could endanger a person, the employer shall ensure that

(a) every worker in the area is notified of the hazard;

(b) the area that could be affected by settling of the material is protected by signs and barricades or guarding; and

- (c) the area is examined and made safe before the signs and barricades are removed.

Mucking

**28.** (1) Where there is mucking from a pile of unconsolidated material underground, a worker shall not, and an employer shall not require or permit a worker to,

- (a) undercut a mucking face; or
- (b) except where the equipment is operated by remote control, keep a vertical height of the mucking face greater than can be reached by the equipment being used.

(2) Notwithstanding paragraph (1)(b), where mobile equipment is used in underground mucking operations, the employer shall protect the operator from striking the walls by

- (a) locating the operator's position within the physical dimensions of the equipment;
- (b) guarding of the operator's position; or
- (c) locating the operator in a position remote from movement of the mobile equipment.

(3) Where compressed air driven mobile equipment or railbound loaders are used in underground mucking operations, the employer shall provide, and the worker shall use

- (a) a stand for the operator which is securely attached to the machine; and
- (b) a means by which the operator, in an emergency, can quickly bring the machine to a standstill.

Water accumulation  
in mine workings

**29.** (1) The employer shall take precautions to prevent unsafe accumulations of water in raises, ore and waste passes, chutes and other mine workings used for the storage or transfer of ore, waste or fill.

(2) Where a raise, ore or waste pass, chute or other mine working containing ore, waste or fill could contain an unsafe accumulation of water, a worker shall not pull or be permitted by the employer to pull

material from the place until the employer has implemented a safe procedure for doing the work.

Entry Prohibited

**30.** A worker shall not enter, or be permitted by the employer to enter, a drawpoint, chute, transfer raise or other mine opening used for the passage of ore, rock or other material by gravity in which the material is hung up, unless

- (a) the worker has been authorized by a competent supervisor who has examined the condition with the worker and they have found it to be safe for the work to be performed;
- (b) the hang-up is visible from the point of entry; and
- (c) the work is performed under the direct supervision of a supervisor.

Plotting of diamond  
drill holes

**31.** (1) The employer shall plot all diamond drill holes, and other drill holes over 6 metres in length, excluding blast holes and holes drilled for ground support, on all working plans.

(2) The employer shall establish a procedure by which all workers involved are advised of the intersection of a diamond drill hole before the heading is within 8 metres of the intersection.

(3) The employer shall mark the collar and points of intersection of the drill holes referred to in subsection (1)

- (a) at the time when drilling is discontinued or an intersection made; and
- (b) with a single capital letter "H" in a conspicuous paint, measuring at least 300 millimetres in height and within at least 1,200 millimetres of the collar or intersection.

(4) The employer shall grout all diamond drill holes

- (a) drilled from surface to a depth of at least 30 metres below an elevation at which flows of water might occur, and the grouting shall be done before the hole is abandoned or the casing is pulled; and

- (b) drilled from underground which intersect a water source of potential danger to the mine workings and the grouting shall extend at least 30 metres from the water source.

Emergency Procedure, Mine Rescue

**32. An employer at a mine shall**

- (a) establish in writing a procedure to be followed that effectively provides for the safety of all workers in the event of a fire and the control of the fire whether on surface or underground;
- (b) post copies of the procedure established under paragraph (a), or extracts from the procedure, in conspicuous places on the surface and underground at the mine;
- (c) instruct each worker respecting
  - (i) the procedure established under paragraph (a) that relates to the worker's safety in the event of a fire,
  - (ii) the recognition of an emergency warning system in use at the mine, and
  - (iii) the escape exits from the mine;
- (d) maintain at the mine, ready for instant use, an emergency warning system, capable of promptly and effectively warning all workers underground or on the surface of an emergency requiring speedy evacuation of the workplace;
- (e) at every underground and open pit mine, establish, equip, maintain and operate a mine rescue station in compliance with applicable guidelines or codes and standards set by the commission;
- (f) require that workers attend training courses in mine rescue work;
- (g) provide self rescuers for workers underground; and
- (h) ensure self rescuers are worn on the belt of the workers unless permitted by the minister to do otherwise.

Tests and reports of  
emergency warning  
system

- 33.** (1) At least once in each year the employer shall
- (a) make a test of the effectiveness of the procedures and emergency warning system or systems referred to in section 32; and
  - (b) submit a report within 7 days after the test to a mines inspector and the occupational health and safety committee or worker representative.
- (2) Where a test shows that a procedure or emergency warning system is ineffective, the employer shall
- (a) immediately make a change necessary to make the procedure or system effective and re-test the effectiveness of the procedure and the system; and
  - (b) submit a report within 7 days of the re-test to a mines inspector and the occupational health and safety committee or worker representative.

Emergency exits  
from underground

- 34.** Except during the initial exploration and development stages of an underground work place, an employer shall provide and maintain at all times 2 independent means of exit from the underground workings to the surface, which shall be
- (a) at a distance of more than 30 metres from one another;
  - (b) isolated underground one from the other by fire doors that meet the requirements of subsection 38(2);
  - (c) of sufficient size to afford passage for mine rescue crews wearing self-contained breathing apparatus;
  - (d) provided with ladders from the deepest workings to the surface; and
  - (e) marked on all levels by conspicuous signs with arrows pointing toward and marking the exits in a manner to expedite evacuation of the underground workplace.

Refuge stations

- 35.** (1) The employer shall provide and maintain refuge stations constructed in accordance with section 37 where

- (a) procedures established under subsection 32(1) require their use;
  - (b) the auxiliary route of exit from the mine is not in the fresh ventilating air circuit; or
  - (c) the minister gives notice to the employer in writing requiring the construction.
- (2) Each refuge station provided under subsection (1) shall be
- (a) clearly identified;
  - (b) constructed of noncombustible material;
  - (c) of sufficient size to accommodate the workers that are required to assemble in it;
  - (d) equipped with
    - (i) a suitable supply of breathable air,
    - (ii) a supply of potable water,
    - (iii) a suitable means of communication with surface,
    - (v) canned foods and openers, and
    - (iv) a means of sealing to prevent the entry of gas; and
  - (e) suitably located underground to allow access within 20 minutes by walking from the work area or within 300m of work area.

Buildings near  
headframes, shaft  
house or portal  
house

**36.** (1) An employer shall not erect or permit the erection of a building at a distance of less than 15 metres from a closed-in portion of the headframe, shaft house or portal house.

(2) A building may be erected closer than 15 metres to a headframe, shaft house or portal house where

- (a) a second means of exit has been provided from the underground workings; or

- (b) the headframe, shaft house or portal house and all buildings within 15 metres and all buildings adjoining it
  - (i) are constructed of noncombustible materials,
  - (ii) have a fire wall of 2 hour fire resistance rating separating the headframe, shaft house or portal house from adjoining buildings, and
  - (iii) are not used for the storage of flammable or combustible materials.

(3) Where a hoist is located above a mine shaft, the employer shall ensure that the supporting and enclosing structure of the hoist is constructed of noncombustible material.

Air supply for hoist operator

**37.** Where, in an underground or tower mounted hoist room, the normal air supply could become contaminated in an emergency, the employer shall provide and keep available uncontaminated air available to the hoist operator by means of

- (a) an enclosed booth with a positive supply of uncontaminated air; or
- (b) one or more units of self-contained breathing apparatus, together with a fully charged cylinder of compressed air or oxygen of sufficient capacity to allow safe evacuation of all underground workers.

Fire doors

**38.** (1) An employer at an underground workplace shall provide and maintain fire doors that

- (a) isolate the shaft or the main entrance and the workings directly associated with it from other workings;
- (b) isolate the 2 independent means of exit from the underground workings from each other; and
- (c) close off from other underground workings each
  - (i) service garage, and

(ii) oil storage place where more than 1,000 litres of oil, grease or flammable liquid are stored.

(2) Fire doors installed under subsection (1) shall be

(a) constructed of noncombustible material;

(b) maintained to preclude more than a minimum leakage of air when closed;

(c) kept clear of obstructions; and

(d) provided with a securing device that

(i) can be opened from either side, and

(ii) prevents the door from being opened by a reversal of the air current.

Boilers, engines and  
compressors

**39.** An employer shall not install or permit the installation

(a) within 23 metres of the collar or other opening to the underground workplace, of a

(i) steam boiler,

(ii) diesel engine,

(iii) compressor; or

(b) servicing, garaging or storage of an engine using gasoline or other flammable liquid or gases within

(i) 15 metres of the building housing the hoist, or

(ii) 30 metres of a shaft or other opening to the underground workings.

Reciprocating type  
air compressors

**40.** (1) A reciprocating type air compressor driven by a prime mover exceeding 30 kW, that is lubricated by oil and discharges to a closed system over 100 kPa, shall have,

- (a) a temperature-indicating device installed at the high-pressure discharge pipe; and
  - (b) the normal operating temperature marked on the device.
- (2) The discharge air temperature of an air compressor referred to in subsection (1) shall be
- (a) read at least once every operating shift; and
  - (b) recorded in a compressor log book.
- (3) Subsection (2) does not apply where an automated, continuous monitoring system designed to be fail safe has been installed.
- (4) Where an air compressor driven by a prime mover exceeding 25 kW is installed in an underground workplace, the compressor shall be
- (a) designed and installed to minimize the hazard of fire or explosion due to the accumulation of carbonaceous materials in the air system;
  - (b) provided with protective devices that prevent its operation where
    - (i) the temperature of the air at the discharge line is in excess of normal,
    - (ii) the temperature of the compressor cooling water and cooling air is in excess of normal,
    - (iii) the flow and pressure of compressor lubricating oil is below normal, or
    - (iv) carbon monoxide content of compressed air between high pressure discharge and receiver exceeds 25 ppm;
  - (c) provided with an alarm that
    - (i) is audible and visible to the worker in charge of the compressor,

(ii) operates when a protective device referred to in paragraph (b) is activated, or

(iii) operates as long as the conditions exist that direct a device as referred to in paragraph (b) to operate; and

(d) provided with other suitable protective devices.

Noncombustible  
materials to be used

**41.** An employer shall ensure that only noncombustible materials are used for the construction of structures and enclosures underground for

(a) shops and lunchrooms;

(b) housing and supporting machinery powered by an electrical or internal combustion engine;

(c) the storage of material that will readily burn; and

(d) a heating device.

Fire protection  
equipment

**42.** (1) An employer shall at a suitable location provide and maintain suitable fire extinguishing equipment in a

(a) headframe, shaft house and portal house;

(b) shaft and winze station;

(c) underground electrical installation;

(d) piece of mobile equipment;

(e) underground place where electrical or internal combustion powered machinery is installed or used;

(f) underground shop, garage or fueling area;

(g) combustible building or closed in structure on surface; and

(h) location where a fire might endanger the safety of workers.

(2) An employer shall provide and maintain a fire suppression system consisting of sprinklers, foam or other suitable means of suppressing a fire

- (a) on each piece of equipment containing more than 25 litres of flammable fluids;
- (b) on each piece of equipment operated by remote control;
- (c) at each underground fuel storage area or fueling area where more than 500 litres of oil, grease or combustible liquids are stored;
- (d) in a building or structure, except a fan house located above or adjacent to an opening to an underground mine;
- (e) a deflector plate on electric hydraulic drills; and
- (f) a temperature probe in the hydraulic oil, which will shut down the drill if oil temperature reaches 65° Celsius.

Examination for  
compliance

**43.** At least once a month an employer shall

- (a) examine for compliance with these regulations all
  - (i) fire protection equipment, fire suppression systems and extinguishing systems and tag to indicate date of inspection,
  - (ii) exit routes from the mine,
  - (iii) refuge stations, and
  - (iv) fire doors;
- (b) record the results of the examinations and the condition of the items referred to in paragraph (a) and any corrective action taken or planned; and
- (c) make available to the occupational health and safety committee, a copy of the record referred to in paragraph (b).

Storage of flammable material

**44.** (1) An employer shall not store or permit the storage of volatile flammable liquids, oil, grease or other combustible material in a head-frame, shaft house or portal house, shaft station or building in which the outbreak of fire might endanger an entrance to the underground workings.

(2) Subsection (1) does not prohibit the storing of an amount of lubricating oil or grease which does not exceed the requirements for one day's operation.

(3) An employer shall not store or permit to be stored at an underground workplace

(a) a flammable or combustible liquid that is not in a closed container; or

(b) a lubricating oil or hydraulic oil underground in excess of the requirements for 7 days use.

Fueling vehicles underground

**45.** Where an internal combustion engine is fueled underground, the employer shall ensure that

(a) except in the case where it is not practicable, the engine is fueled in a fueling station;

(b) each fueling station

(i) has a concrete floor,

(ii) has a curb or sump to contain spills of fuel,

(iii) has a supply of noncombustible absorbent material to be used to absorb a spillage of fuel that could occur, and

(iv) is conspicuously marked by signs bearing the words "Shut Off Engine While Refueling" and "No Smoking";

(c) before refueling, the engine is shut off and the battery isolated;

(d) where a mobile fueling supply tank is used, the tank is of an approved design and is clearly labeled with "no smoking" signs; and

- (e) arrangements are made so that a spillage in the fueling operation is removed at once, deposited in a fireproof receptacle and removed without undue delay.

Fuel transfer or  
delivery systems

**46.** Where fuel for an internal combustion engine is to be taken or delivered underground, the employer shall

- (a) before beginning of an installation of a fuel transfer or delivery system, submit a plan of the system to the mines inspector;
- (b) ensure that all receiving tanks in a fixed delivery system incorporate a bottom filling arrangement; and
- (c) when the storage capacity of an area exceeds 1,000 litres, provide an enclosing structure constructed of noncombustible material and arranged so that all openings close automatically in the event of a fire.

Fuels on surface

**47.** Where liquid or gaseous fuels are used or stored on the surface, the employer shall ensure that all liquid fuels and liquefied petroleum gases are stored at a location

- (a) more than 30 metres from a shaft or other opening to the underground workings; or
- (b) where the drainage from the storage site is in a direction away from the location of a shaft or other opening to the underground workings.

Prohibition of  
transfer of fuel by  
air

**48.** A worker shall not transfer or be permitted to transfer a flammable or combustible liquid by the direct application of air under pressure.

Combustible refuse

**49.** (1) Every employer shall ensure that

- (a) all underground workings, shaft stations, headframes and buildings are kept clear of accumulations of combustible materials; and
- (b) all underground timber which is not in use and not intended for use in current operations, is promptly removed from underground.

(2) Every employer shall ensure that a written report, certifying that there is no accumulation of flammable refuse in the area under his or her supervision, is made weekly by each supervisor to the supervisor in charge of the mine.

Hot work in mines

**50.** (1) Where gas or electric welding or cutting equipment, blow torches or other heat-producing devices or materials for doing hot work are used underground, or in a headframe, shaft house or portal house or building in which the outbreak of fire might endanger an entrance to the underground workings, the employer shall establish and implement a written safe work procedure for the prevention of fires.

(2) All combustible material within a radius of 3 metres, or upon which sparks or hot metal could fall, shall be made wet with water before hot work is begun, and again after hot work is finished.

(3) The area where hot work is done shall be inspected for smoldering fires between one and 2 hours after hot work is finished.

(4) Fire-fighting equipment shall be on hand at all times during the operation and until completion of the inspection referred to in subsection (3).

(5) Hot work shall not be done within 10 metres of the place where an explosive is stored or being transported.

(6) Except when used for burning or cutting, propane or other similar fuel that is heavier than air when in a gaseous state shall not be permitted or kept underground.

(7) When propane or other similar gas that is heavier than air is being used underground for burning or cutting, the containers shall be suitable for underground use and shall not be larger than 12 kilograms in capacity.

Mine ventilation  
and auxiliary  
ventilation systems

**51.** (1) An underground workplace shall be mechanically ventilated and a ventilation plan shall be prepared by a professional engineer.

(2) The employer shall ensure that every mine working that is to be advanced more than 50 metres from a source of fresh air is equipped with suitable, effective auxiliary ventilation.

(3) The employer shall install a fresh air supply system in

- (a) every raise;
  - (b) every subdrift more than 10 metres in length driven from a raise; and
  - (c) every stope without through ventilation.
- (4) The fresh air supply system referred to in subsection (3) shall be
- (a) independent of an air supplied to a machine or drill used in the workplace;
  - (b) controlled from a place outside the entrance to the heading; and
  - (c) operated after each blast that has been fired in the workplace.
- (5) A person shall not enter or remain in, or be permitted to enter or remain in a workplace affected by blasting contaminants until the ventilation system removes the airborne contaminants or renders them harmless.
- (6) Before beginning installation of a system for heating the mine ventilating air, an employer shall submit to the minister a proposal containing drawings, specifications and details.

Fire protection for  
ventilating system

**52.** (1) Every employer using an oil or gas fired system for heating ventilating air shall ensure that

- (a) the system is installed and maintained in accordance with CSA 139 Installation Code for Oil Burning Equipment, CSA B149.1 Natural Gas and Propane Installation Code and National Fire Code; and
- (b) a log book is kept and maintained, in which are recorded all service, maintenance and tests of the system.

(2) Every employer shall ensure that

- (a) structures housing fans that ventilate a part of the underground workings are constructed of noncombustible materials; and
- (b) pipes or ducts used to convey ventilating air are fabricated of material which will not continue to burn after removal of the heat source.

Internal combustion  
engines under-  
ground

**53.** (1) An employer shall not install or operate, or permit to be installed or operated, an internal combustion engine underground unless

- (a) the engine has been approved as being suitable for underground use by a testing laboratory and the approval specifies the amount of ventilation required; and
- (b) before taking the engine underground for the first time, the employer submits an application for approval to use the equipment underground with
  - (i) particulars of the approval referred to in paragraph (a),
  - (ii) a plan showing the areas of the mine in which the unit will be operated, and
  - (iii) details of the ventilation system to be provided.

(2) An internal combustion engine that uses gasoline, propane or other volatile substance as a fuel shall not be used underground.

(3) When an internal combustion engine is operated underground, an employer shall

- (a) provide and maintain a quantity of ventilating air past the engine as specified by the approval referred to in paragraph (1)(a);
- (b) where more than one engine is operating in the same ventilating circuit, provide an amount of ventilating air which amounts to the sum of
  - (i) 100% for the largest engine,

- (ii) 75% for the second largest engine, and
  - (iii) 50% for additional engines, to a minimum of 2.81 m<sup>3</sup> a minute for each kilowatt of the aggregate engines in the circuit;
- (c) ensure that tests are made of the undiluted exhaust gases with respect to carbon monoxide, carbon dioxide, aldehydes, oxides of nitrogen and, where the tests are conducted on the surface, of respirable combustible particulates
- (i) before being used underground,
  - (ii) following major overhaul of the engine, and
  - (iii) not less than once in every 12 month period, or more often when requested by the occupational health and safety committee;
- (d) ensure that tests are made of the atmosphere at the operator's position for carbon monoxide and oxides of nitrogen at least weekly or on the request of the operator;
- (e) ensure that the volume of air flowing in each workplace affected by the exhaust from diesel-powered equipment, is measured weekly or sooner at the request of the operator or occupational health and safety committee;
- (f) order the immediate shutdown of operation of the engine where
- (i) carbon monoxide in the undiluted exhaust exceeds 750 ppm, or
  - (ii) carbon monoxide exceeds 20 ppm in the general operating area or another exhaust contaminant at the operator's position exceeds the requirements of subsection (1); and
- (g) maintain a log book or recording system in which are recorded
- (i) the results of tests and measurements required under paragraphs (c), (d), and (e), and

- (ii) reports of engine maintenance and repairs which may affect the engine exhaust.

Replacements  
engines

**54.** Engines for which particulars, plans and details are submitted as required by section **61** may be replaced with identical engines when the changes are

- (a) recorded in the log book or recording system referred to in paragraph (4)(h); and
- (b) reported to the mines inspector.

Operation vehicles

**55.** (1) A worker shall not

- (a) keep a diesel engine running underground for more than 10 minutes when not in use; or
- (b) leave a diesel powered locomotive unattended, unless the brakes have been set and the engine shut off.

(2) All diesel vehicles underground shall meet CSA 424.2-M90 (R2007) "Non-Rail-Bound Diesel-Powered Machines for Use in Non-Gassy Underground Mines".

(3) A worker operating a vehicle underground shall

- (a) drive at a reasonable and prudent speed having regard to the actual and potential hazards of the area, and shall not proceed if a person's safety is endangered;
- (b) ensure that the lights are operative;
- (c) sound the audible warning device
  - (i) when approaching a pedestrian,
  - (ii) when approaching manways unless alternative protection is provided,
  - (iii) whenever a person's safety may be endangered by the vehicle's movement, and
  - (iv) where the vehicle travels on rails, before starting;

- (d) trim and secure a load being transported to prevent spillage and damage;
- (e) ensure before moving the vehicle that each passenger is seated; and
- (f) if the vehicle is electrically powered, set the brakes, place the control lever in the neutral position, and disconnect the source of power before leaving the vehicle unattended.

Underground  
locomotives

**56.** (1) An employer shall provide and maintain on each underground locomotive

- (a) a light that provides illumination in the direction of travel;
- (b) an audible warning device;
- (c) brakes that will stop and hold the locomotive and its train of cars under full load conditions on a grade on which it operates;
- (d) when the locomotive is electrically powered, control levers so attached that they cannot be removed when the power is on;
- (e) an enclosure that will protect the driver in the event of a collision or impact;
- (f) when operated by remote control or by an automatic system, a means by which, in the event of failure of a part of the control or system, the brakes will be applied immediately; and
- (g) a restraining device that prevents a failure of the drive shafts or couplings from causing damage to the vehicle control systems.

(2) A worker shall not operate and an employer shall not permit the operation of a train of cars without a taillight on the last car.

(3) Where the motor crew includes a switchman, the employer in consultation with the occupational health and safety committee may designate riding zones and shall develop procedures to ensure the safety of the operation.

(4) Where an automated or remotely controlled tramming system is to be installed, an employer shall submit details of the system and procedures to be used to the minister before the system is installed or used.

Remote controlled  
equipment

57. (1) Where remote controlled equipment is used,

- (a) the employer shall, in consultation with the occupational health and safety committee, develop a written procedure for use of the remote controlled equipment to ensure the health and safety of workers;
- (b) the employer shall ensure that the equipment is operated on a frequency such that
  - (i) a remote control unit used to operate one piece of equipment cannot be used to operate another piece of equipment, and
  - (ii) the equipment cannot be affected by another remote control unit or radio communications at the site;
- (c) the equipment shall have a selector device that enables the operator to control the equipment either manually or by remote;
- (d) the equipment shall be used within the operator's sight, except where a robot system is used, in which case access to the working site where the robot system is used shall be barricaded and under camera surveillance; and
- (e) the entrance to the site at which the equipment is being used shall clearly identify by means of a sign that remote controlled equipment is being used at that site.

(2) A remote control unit used to operate equipment shall be operated only by the worker who is in charge of that equipment.

(3) When a remote control unit is used to operate or move equipment, the employer shall maintain a log book setting out the make, model, serial number, identification code, frequency and maintenance record of the unit, and other particulars relating to the unit.

- (4) An employer shall ensure that a remote control unit
- (a) is equipped with a means or device that, when it reaches an incline or decline of 45° from the horizontal, automatically stops the engine and applies the brakes on the equipment;
  - (b) answers or responds to the frequency assigned to it, which frequency can operate only one piece of equipment;
  - (c) is equipped with an emergency switch that stops the engine on the remote controlled equipment instantly and applies the brakes on the equipment;
  - (d) is disconnected and locked by a safety device when not in use; and
  - (e) is not capable of firing a detonator.

(5) An employer shall ensure that the emergency switch referred to in paragraph (4)(c) is marked in red and operational when pressed.

(6) The procedures selecting or altering a frequency for a remote control unit shall be kept sealed.

Clearances for rail  
haulage

**58.** On each level underground on which mechanical track haulage is employed, an employer shall maintain

- (a) a minimum total clearance of at least 1.2m between sides of the haulageway;
- (b) a clearance of 600 millimetres on one side of the vehicle; and
- (c) safety stations in the walls of the haulageway.

Safety stations

**59.** A safety station referred to in paragraph **58**(c) shall be

- (a) plainly marked;
- (b) clean and free of obstructions;
- (c) cut perpendicular to the haulageway; and

(d) at least

(i) one metre in depth, in addition to existing clearance between the vehicle and the wall,

(ii) 2 metres in height, and

(iii) 1.5 metres in width.

Clearances for  
mobile equipment

**60.** In underground haulageways where mobile equipment is used, an employer shall maintain

(a) a minimum total clearance of 1.5 metres between the sides of the workplace and the mobile equipment;

(b) a clearance of 300 millimetres above equipment having a covered cab;

(c) safety stations, at intervals not exceeding 30 metres

(i) when the working is simultaneously used for pedestrian traffic and there is less than 2.1 metres total horizontal clearance, and

(ii) on any ramp and the safety station may consist of a slash taken up-ramp to provide one face perpendicular to the ramp; and

(d) minimum one side clearance of 600 millimetres.

Operation of mobile  
equipment on ramps

**61.** (1) An employer shall provide a vehicle to transport workers up and down a ramp where the ramp exceeds a vertical depth of 100 metres unless there is intermediate access to the ramp from a shaft at vertical intervals of less than 200 metres.

(2) An employer shall submit a procedure at the request of the mines inspector which

(a) regulates vehicular traffic on a ramp; and

(b) includes provisions respecting personnel vehicles, transportation of explosives, and emergency situations.

(3) An employer shall ensure that a ramp which is driven for the purpose of accommodating mobile equipment traffic, shall be so designed that no runaway vehicle can run for more than 300 metres.

(4) Ramps and haulageways shall be engineered and built to permit the safe travel of all of the vehicles in regular services.

(5) Ramps and haulageways shall be graded and maintained by placement of crushed rock material.

Boreholes in advance of working face

**62.** Where a workplace in a mine approaches abandoned or other workings which cannot be inspected and in which there is or could be an accumulation of water, the employer shall

- (a) ensure that boreholes are kept at least 6 metres ahead of the working face; and
- (b) take those additional measures as are considered necessary by the employer or the director to preclude a sudden breakthrough of water.

Dams and bulkheads

**63.** (1) An employer shall ensure that the location of every underground dam and bulkhead is clearly shown on mine plans.

(2) An employer shall not permit the construction of a dam or bulkhead underground without first submitting to the minister for approval a proposal that meets the requirements of subsection (3).

(3) The proposal referred to in subsection (2) shall include

- (a) structural design specifications;
- (b) design calculations;
- (c) detailed drawings of the structure; and
- (d) the signature and stamp of a professional engineer.

(4) The requirements of subsection (3) do not apply

- (a) in the case of a dam that is less than 900 millimetres in height that is used solely for diverting the ordinary level drainage or impounding less than 25 tonnes of water; or

Placement of fill  
material in mine  
workings

- (b) to cut and fill stopes, where provision is made for the control and removal of water from the fill by those means as permeable fences, drainage towers, manways or decanting.

**64.** (1) An employer shall not place or permit to be placed fill material by hydraulic means in a stope or other mine working before

- (a) the proposed system for underground transfer, storage, placing, containment and water removal is certified by a professional engineer; and
- (b) a plan of the system referred to in paragraph (a) is submitted and approved by the minister.

(2) Before material containing cyanide is used for back fill in an underground mine, an assessment shall be conducted to determine the precautions to be taken to protect the health and safety of workers.

(3) Backfill materials shall be assessed for other hazardous materials to protect the health and safety of workers.

(4) Where bulk fill is to be placed, the proposal referred to in subsection (1) shall include procedures for monitoring fill and water inflows, drainage, saturation calculations and hydrostatic pressure on confining bulkheads.

(5) Where bulk fill is to be placed, an employer shall ensure that

- (a) the proposed system referred to in subsection (1) and subsection (4) is constructed, operated, monitored and maintained in accordance with the certified design;
- (b) records are maintained of the quantity of fill placed, the quantity of water inflow and outflow, and observations of hydrostatic pressures; and
- (c) procedures are developed assigning responsibilities and action levels, where
  - (i) blasting is conducted in the immediate area,
  - (ii) saturation of the fill mass exceeds 90%, or

(iii) hydrostatic pressures reduce the effective factor of safety of bulkheads below 5.

(6) When material is dumped from a vehicle that is occupied by a person, the dump point shall include features designed to prevent the vehicle from going over the bank, into a raise or other open hole.

**PART XXVIII.3  
SHAFTS AND CONVEYANCES**

Definitions

**65.** In this Part

Record books

**66.** (1) The employer shall maintain the following record books for every mine where a hoist is used for hoisting persons or material in a shaft:

- (a) hoist operator's log book;
- (b) machinery record book;
- (c) rope record book;
- (d) shaft inspection record book; and
- (e) electrical hoisting equipment record book.

(2) The record books required under subsection (1) shall be maintained in a form approved by the minister.

Shaft installations

**67.** (1) An employer shall ensure that every shaft or raise opening made at the surface is

- (a) solidly collared to bedrock with concrete; and
- (b) constructed in accordance with drawings and specifications prepared by a professional engineer and submitted to the minister under subsection (3).

(2) A shaft, raise opening in an underground mine shall be securely fenced, covered, or otherwise guarded.

(3) Before the beginning of shaft sinking, an employer shall submit to the minister drawings and specifications showing details of

- (a) the shaft timbering or lining program;
- (b) equipment to be used during sinking;
- (c) sinking procedure;
- (d) final shaft layout; and
- (e) equipment to be used in the finished shaft.

Shaft requirements

**68.** (1) An employer shall provide and maintain in each shaft in which a shaft conveyance operates

- (a) sufficient clearance to provide a distance for an overwind that exceeds the greater of
  - (i) twice the stopping distance of the hoist at the maximum speed permitted by the hoist controls, and
  - (ii) 3 metres;
- (b) secure timbering, lining or casing;
- (c) means to guide each shaft conveyance to prevent its contact with another shaft conveyance or shaft furnishing;
- (d) a gate at each shaft opening on the surface, each level, and each loading pocket, that is not otherwise securely closed off, which
  - (i) has not more than 40 millimetres clearance beneath its lower edge, and
  - (ii) is capable of withstanding impact by a vehicle travelling on rails leading up to the shaft, or a mobile equipment which can approach the shaft;
- (e) a derail or other precaution, additional to the requirement of paragraph (d), if the mines inspector considers it necessary;
- (f) a suitable walkway or ladderway that is
  - (i) constructed as prescribed in Part XI, and

- (ii) separated from the compartment or division of the shaft in which material is hoisted, by a partition that prevents a person in the walkway or ladderway from contacting the shaft conveyance and prevents falling material from entering the walkway or ladderway;
- (g) at each level or other access to the mine workings from the shaft,
  - (i) suitable standing room outside the shaft, and
  - (ii) a suitable passageway from each shaft compartment in which persons can be hoisted, and from the shaft manway to the level or other access to the mine workings;
- (h) about each counterweight,
  - (i) in a timbered shaft, a separate compartment suitably guarded to prevent inadvertent access, or
  - (ii) in an untimbered shaft, suitable guards that prevent a hazard to persons at pass points, landing places or another place of access to the shaft; and
- (i) means to prevent a hoisting conveyance carrying persons from being lowered into water in the bottom of the shaft.
- (2) A conveyance may be operated in a shaft that does not contain a walkway or ladderway if
  - (a) the physical dimensions of the shaft preclude the installation of a walkway or ladderway;
  - (b) an independently powered conveyance is available for use in place of the ladderway; and
  - (c) the employer has submitted to the minister a suitable procedure for emergency access.

Compartment lining  
at levels

**69.** Except during sinking operations, the employer shall provide and maintain in each timbered shaft where material is handled, a partition

- (a) around each compartment at the collar and at all levels except on the sides on which material is loaded or unloaded; and
- (b) that extends above the collar and all levels a distance not less than the height of the hoisting conveyance plus 1.8 metres and extends below the collar and all levels at least 1.8 metres.

Shaft inspection

**70.** (1) An employer at a mine at which a hoist is in use shall ensure that at least once in each week

- (a) a thorough examination is made of the operating compartments of each shaft; and
- (b) a report is made and signed in the shaft inspection record book of
  - (i) every examination, and
  - (ii) all work and repairs done as a result of an examination.

(2) The supervisor in charge of the maintenance of the shaft and headframe shall

- (a) at least once in each week, review the entries made in the shaft inspection record book during the preceding week;
- (b) ascertain that the examination required under subsection (1) has been made and that all necessary servicing and repairs are completed, in progress or scheduled for repair without undue delay;
- (c) upon completion of the review required under paragraph (a), certify in the shaft inspection record book that the supervisor has complied with paragraphs (a) and (b); and
- (d) record over the supervisor's signature in the shaft inspection record book a dangerous condition reported concerning the shaft and the action taken to correct the condition.

Protection of  
workers

**71.** (1) A worker shall not, and an employer shall not direct or permit a worker to, work or conduct an examination

- (a) in a shaft compartment, above or below the shaft collar, while hoisting operations are in progress in the compartment, except where the hoisting operation is necessary to perform the work or examination; or
- (b) in a shaft or in a workplace that is part of, or adjacent to, the shaft, unless the worker is protected from accidental contact with a moving shaft conveyance or counterweight and objects falling in the shaft.

(2) A worker shall not enter or cross, and an employer shall not permit a worker to enter or cross, a hoisting compartment of a shaft in which hoisting operations are in progress, except for the purpose of entering or leaving the shaft conveyance in the compartment, or making the examination required under paragraph 70(1)(a).

Staging or equipment suspended in shaft

72. (1) An employer shall not use or permit the use of open hooks in conjunction with the suspension of a staging, working platform or equipment in a shaft.

(2) Where a worker is required to be on or below a staging or work platform suspended in a shaft, or where the staging or work platform is being moved, the employer shall ensure that a means of support is used in addition to the means of suspension.

Use of buckets

73. Where a bucket is used in a shaft for other than sinking purposes, an employer shall

- (a) not permit simultaneous operations to be carried on at more than one elevation until the service doors required under paragraph 84(e) have been installed at the collar and at every point of service in the shaft;
- (b) ensure that the service doors are kept closed at all times when tools, supplies or materials are being loaded into or taken out of the bucket at the location; and
- (c) provide and direct to be used a suitable landing or platform at every working level to enable the safe loading and unloading of persons.

Construction of cages and skips

74. An employer shall ensure that all cages or skips used for hoisting persons

- (a) are so constructed as to prevent a portion of the body of a person riding on it or a part of material that could be transported on it from accidentally coming into contact with the timbering or sides of the shaft;
- (b) have a hood made of mild steel plate not less than 5 millimetres in thickness or of a material of equivalent strength;
- (c) have a casing of mild steel plate, not less than 3 millimetres in thickness, or of a material of equivalent strength, and the casing
  - (i) extends from the floor to a height not less than 2.0 metres above the floor, and
  - (ii) encloses the full area of the floor;
- (d) have positive protection against inadvertent dumping;
- (e) have an exit in the roof that can be opened from inside or outside the cage for the emergency exit of persons;
- (f) in the case of a cage, is equipped with doors which
  - (i) have a device for positively latching the door in the closed position,
  - (ii) have a clearance of not more than 20 millimetres above the floor of the cage,
  - (iii) extend not less than 1.5 metres above the floor of the cage, and
  - (iv) are constructed and arranged so that it is not possible for the doors to open outwards;
- (g) are equipped, if suspended from a single rope or attachment, with safety catches and mechanisms which
  - (i) have sufficient strength to hold the shaft conveyance, with its maximum static load, at any point in the shaft, and

- (ii) are of a type and design that meet the requirements of section 76;
- (h) are designed with a factor of safety, when carrying its maximum static load, of not less than
  - (i) 10 for all load bearing parts attaching the conveyance to the rope and to other conveyances,
  - (ii) 8 for all other parts of the conveyance; and
- (i) are thoroughly inspected annually by a competent person for wear, damage or structural deterioration which could reduce the factor of safety.

Certificate of load capacity

**75.** Before the installation of a shaft conveyance in a shaft, an employer shall submit to the mines inspector a certificate issued by the manufacturer of the conveyance or a professional engineer showing

- (a) the load capacity of the conveyance and attachments;
- (b) the weight of a tail rope and other suspended load; and
- (c) the designed factor of safety.

Free fall tests

**76.** (1) Before a shaft conveyance equipped with safety catches and mechanisms is used for hoisting persons, an employer shall conduct free fall tests in accordance with subsection (2).

(2) Free fall tests shall consist of 2 tests where the deceleration rates are within 15%, and 3 tests where the deceleration rates of the first 2 tests differ by more than 15% and shall be performed under the following conditions:

- (a) the shaft conveyance shall carry a weight equal to its maximum permitted load of persons;
- (b) the shaft conveyance shall travel at a speed equal to its designed hoisting speed when transporting persons; and
- (c) the guides on which the test is made shall be representative of those in the shaft.

(3) A free fall test is considered to be successful if

(a) the shaft conveyance is decelerated to a stop within one and 3 times the rate of gravity; and

(b) there is no damage to the safety dogs and mechanisms.

(4) The employer shall enter a report of the free fall test in the machinery record book and send a copy of the report to the mines inspector.

(5) When alterations or significant repairs are made to safety catches or mechanisms which could affect their performance, the employer shall conduct

(a) a drop test in accordance with paragraph 77(1)(b), before the conveyance is used; and

(b) a free fall test in accordance with subsection (2) within 3 days after the day the alterations or repairs are made.

Regular examination of safety catches

77. (1) An employer shall designate a worker who shall

(a) at least once in each operating day, examine the safety catches to be sure they are clean and in proper adjustment and working condition; and

(b) at least once in every 3 months, perform a drop test to test the safety catches by releasing the conveyance suddenly from rest to ensure that the safety catches are able to stop it.

(2) A worker making the examination and tests required under subsection (1) shall

(a) record the results of the examination and tests in the machinery record book and sign the record; and

(b) immediately report a malfunction to the worker's supervisor.

(3) If the safety catches do not operate correctly, the employer shall not permit the conveyance to be used for hoisting persons unless the safety catches have been repaired and proven to operate correctly.

Chairing devices

**78.** (1) Where chairs are used for the purpose of landing a shaft conveyance at a point in a shaft, an employer shall arrange the chairs so that they

(a) clear the shaft when the conveyance is lifted off the chairs; and

(b) can only be operated from outside the conveyance.

(2) A worker shall not use, and an employer shall not permit a worker to use, chairs for the purpose of landing a shaft conveyance at a point in a shaft

(a) where persons are on the shaft conveyance; or

(b) without having given a proper chairing signal to the hoist operator.

Hoisting persons

**79.** (1) A person shall not be, and an employer shall not permit a person to be, hoisted in a shaft or other underground opening unless the person is

(a) in a cage constructed in accordance with section 74;

(b) in or on a raise climber or scaling platform;

(c) hoisted by means, certified by a professional engineer, for hoisting persons engaged in construction, repair or maintenance work; or

(d) inside a bucket

(i) during shaft sinking, or

(ii) before the installation of permanent shaft conveyances, in accordance with section 73.

(2) While employed in shaft inspection and maintenance, workers may be hoisted

(a) in a bucket or skip; or

(b) on top of a conveyance, where

- (i) a safety cover, either permanent or temporary, is installed overhead to prevent danger from falling objects,
- (ii) the conveyance top consists of a platform equipped with a guard-rail that allows the workers to perform their work safely, or
- (iii) suitable fall arrest system in accordance with Part X is used by the workers.

(3) Persons may be hoisted in a skip to clear them from the mine or to rescue persons if the equipment normally used for hoisting persons is unserviceable because of failure or defect.

(4) Subject to section 67, and in consultation with the occupational health and safety committee, the employer may permit persons to be hoisted in a skip that meets the requirements of section 74, except paragraph (g), where a conveyance normally used for hoisting persons is unserviceable and arrangements are made for loading and unloading which preclude danger to persons.

(5) A conveyance shall not travel in excess of one-half its normal speed and in no case shall the speed be permitted to exceed 5 metres a second.

Shaft conveyances

**80.** When a shaft conveyance is operated in a shaft or other underground opening, the employer shall ensure that

- (a) the shaft conveyance is in the charge of a cagetender or skip-tender who is competent in those duties; and
- (b) a certificate issued by a professional engineer is posted at the collar of the shaft or winze showing the number of persons allowed to ride in the cage, skip or bucket, and the weight of materials allowed to be loaded on the conveyance.

Content of certificate

**81.** (1) The data shown on the certificate issued by a professional engineer under section 80 shall be determined in accordance with the maximum material load on a shaft conveyance which shall not exceed the lesser of

- (a) the maximum allowable suspended load for the hoist, less the sum of the weight of the hoisting ropes, the weight of tail ropes, and the weight of the conveyances and attachments;
- (b) the breaking strength of the rope, divided by the required factor of safety, minus the maximum weight of rope suspended in one compartment, minus the weight of the conveyance and attachments in the compartment, but where multiple ropes are used, the lowest breaking strength of a rope is used for all ropes in load calculations; and
- (c) the maximum allowable load for which the conveyance is rated by the manufacturer.

(2) The unbalanced load on the hoist as rated by the manufacturer or as certified by a professional engineer competent in the design of mine hoisting plants shall not be exceeded.

Shaft conveyance  
without cagetender

**82.** Notwithstanding paragraph **80(a)**, a shaft conveyance may be operated without a cagetender when the installation is designed and installed in compliance with section 5.8.12 of CSA Standard CAN-M421-00.

Operation of conveyance

**83.** (1) The cagetender or skiptender authorized to be in charge of a shaft conveyance under paragraph **80(1)(a)** shall

- (a) not load or permit the conveyance to be loaded in excess of the number of persons or weight of material shown in the certificate issued under section **80(1)(b)**;
- (b) not permit the hoisting of a person while ore or waste material is being hoisted
  - (i) in the skip of a skip-cage combination, or
  - (ii) in a skip which is in balance with the cage;
- (c) permit only those workers required to handle material or equipment to be in or on the shaft conveyance while material or equipment is being hoisted;

- (d) ensure that material and equipment is loaded and secured so as to prevent it from shifting its position or catching the shaft timber or any obstacle;
- (e) notify the hoist operator of an unusually heavy or irregularly shaped load on or under the shaft conveyance, and not permit a person to ride in the conveyance when the load is being carried;
- (f) except during shaft inspection, close and keep closed all conveyance doors and hatch covers until a full stop is made at the destination signalled for, unless there are no persons riding in the conveyance; and
- (g) if not riding in the conveyance, remain available within hearing of the shaft signal at all times that persons are underground in an area serviced by the conveyance.

(2) A cagetender or skiptender who is authorized to be in charge of the shaft conveyance and who is a member of the only crew working on a particular level may leave the vicinity of the shaft after giving the conveyance release signal if

- (a) no person is on another level; or
- (b) no person, or group of persons, on another level is without a person authorized to give signals.

(4) In the case of an inadvertent stop in the shaft, the cage doors may be opened and persons may leave the shaft conveyance on instruction to do so from the employer or supervisor in charge at the mine after the employer or supervisor has advised the hoist operator.

Shaft sinking  
requirements

**84.** Preliminary development work during shaft sinking, the employer shall install and maintain

- (a) where a vertical shaft has reached a depth of 100 metres below the head sheaves, a crosshead to guide the sinking bucket which is
  - (i) equipped with a safety device for attaching the bucket to the crosshead in a manner that the crosshead cannot

- stick in the shaft compartment without stopping the bucket,
  - (ii) landed on at least 2 chairs, at the bottom crosshead stop, to prevent distortion of the crosshead, and
  - (iii) of a type that encloses the bucket;
- (b) dump doors that
- (i) prevent material from falling down the shaft when the bucket is being dumped, and
  - (ii) are provided with devices that automatically latch the dump doors when the sinking bucket is moved out of the shaft;
- (c) service doors that cover the sinking compartment of the shaft completely at the collar and another location in the shaft where tools and other materials are loaded or unloaded from the bucket, except the shaft bottom, and that are
- (i) equipped with mechanical devices that automatically latch the doors open, clear of the shaft compartment,
  - (ii) kept closed when a bucket is being loaded or unloaded with tools and other materials at that location, and
  - (iii) kept closed when persons are entering or leaving the bucket at that location except where a closed crosshead provides equal protection;
- (d) a suitable landing or platform at each service point to ensure the safe loading and unloading of persons;
- (e) dual lights that indicate to the hoist operator that
- (i) the dump doors are in or out of the shaft compartment,
  - (ii) the service doors are in or out of the shaft compartment, and

- (iii) the bucket is not descending without the crosshead from the bucket dumping position;
- (f) timbering, lining or casing which secures the shaft walls and provides for safe operation of a conveyance, and which is maintained within a distance of the bottom not exceeding 20 m;
- (g) an auxiliary ladder that extends from the permanent ladders to the shaft bottom and that can be lowered promptly; and
- (h) where multi-deck staging is used, staging that is designed by a professional engineer.

Riding in bucket

**85.** Where persons are transported in a bucket during shaft sinking operations, the shaft leader shall ensure that

- (a) the bucket is steadied before leaving the top or bottom of the shaft;
- (b) the bucket, when descending, is brought to a complete stop at least 5 metres above the shaft bottom and remains there until a separate signal to lower has been given to the hoist operator;
- (c) the bucket, when ascending from the bottom, is brought to a complete stop at the crosshead, and a distinct pause is made before hoisting is resumed; and
- (d) on the initial trip after a blasting operation, the bucket
  - (i) is stopped at the point where, owing to the blast, it might be unsafe to proceed without careful examination, and the point is not lower than 15 metres above the blasting site, or elevation of the blasting operation,
  - (ii) is lowered slowly from the point referred to in subparagraph (i) on signal from a worker in the bucket and at the speed as to be fully under control, by signal, of the worker, and
  - (iii) carries on the trip only sufficient workers as are required to examine the shaft.

Prohibition of  
certain sinking  
buckets

**86.** An employer shall not permit the use in a shaft of a sinking bucket with a ball and chain attached which could inadvertently dump the bucket.

Load in sinking  
bucket

**87.** A worker shall not fill a sinking bucket so that a piece of loose rock projects above the rim.

Work at different  
elevations

**88.** An employer shall not permit work to be done simultaneously in a shaft at more than one elevation unless all workers in the lower elevation are protected from the danger of falling objects by a covering extending over as much of the shaft as necessary to provide complete protection from the danger.

Shaft mucking  
machine

**89.** An employer shall not permit a worker to be, and a worker shall not be, on or below a shaft mucking machine unless the machine is secured in position by 2 independent means, each capable of supporting the full load.

#### **PART XXVIII.4 MINE HOISTING**

Test specimen

**90.** All wire rope used for hoisting shall be in accordance with test procedures of CSA Standard G4, "Steel Wire Rope for General Purpose and for Mine Hoisting and Mine Haulage".

Hoist operations

**91.** All hoist operations shall comply with the Newfoundland and Labrador Hoist Operations Safety Standards prescribed by the minister.

Examination of  
mechanical parts

**92.** (1) An employer shall implement and document in writing a procedure, consistent with the requirements of this section, for the systematic examination, testing and maintenance of the hoist, safety devices and controls, sheave wheels, hoisting ropes, rope attachments, shaft conveyances and counterweights, and the procedure shall prescribe

- (a) the frequency of each examination and test;
- (b) the method to be used in each examination and test; and
- (c) the criteria for assessing the results of each examination and test.

(2) An employer shall provide a copy of the procedure prescribed by subsection (1) to the minister.

Defects

**93.** (1) Where on an examination a weakness or defect is discovered by which the safety of persons could be endangered, the person discovering that weakness or defect shall immediately report it to the hoist operator and the person's supervisor.

(2) Except for remedial measures, until the weakness or defect referred to in subsection (1) is remedied

- (a) the hoist operator shall not operate the hoist or conveyance; and
- (b) the employer shall not direct or permit the hoist to be operated.

Machinery record book

**94.** (1) An employer shall ensure that there is recorded in the machinery record book an entry of

- (a) every examination and test that is required under these regulations, as specified in the book;
- (b) a failure of or accident involving the hoist, rope, conveyance or shaft; and
- (c) a correction of or repair to, the hoist, hoist controls, signalling systems, hoisting rope, shaft conveyance or another part of the hoisting, dumping or loading equipment; which shall be signed by the worker making the examination or report.

(2) The entries referred to in subsection (1) shall be read and signed by the supervisor of the worker referred to in subsection (1).

Duties of supervisor

**95.** A supervisor in charge of the hoisting equipment shall

- (a) at least once in each week, review the entries made in the machinery record book during the preceding week;
- (b) ascertain whether an examination required by these regulations has been made and that all required work is being or has been carried out; and

- (c) certify in the machinery record book that he or she has complied with paragraphs (a) and (b).

**PART XXVIII.5  
EXPLOSIVES IN MINES**

Definitions

**96.** In this Part

Blasting in mines

**97.** (1) Explosives shall be used in a safe manner and as required in Part XIX General Blasting.

(2) Blasting procedures shall be developed and made available to a mine inspector upon request.

(3) The employer shall permit only competent and authorized persons to handle, load and blast explosives in a mine.

Explosives in mines

**98.** (1) Explosives including detonators at a mine shall be stored in a magazine with written permission of the director.

(2) Where less than 160 kilograms of explosives are stored in an underground mine they may be stored in storage receptacles at locations removed from drilling operations or to the capacity of the magazine as stated on the license.

(3) Where long hole blasting is followed in an underground mine, the quantities of explosives that can be loaded in a 24 hour period only may be stored at the blast loading place.

(4) Explosives shall not be stored within 60 metres of

- (a) hoistroom;
- (b) shaft station;
- (c) refuge station;
- (d) transformer station;
- (e) fuel storage area;
- (f) garage or shop;

(g) access ramp; or

(h) where a vehicle may collide with the stored explosives.

Magazines locked

**99.** Magazines shall be locked and maintained as required by the requirements of the explosives magazine application, permit and in accordance with Magazine Standards for Blasting Explosives and Detonators, Explosives, Explosives Branch, Natural Resources (Canada).

Maintenance of magazines

**100.** Magazines shall be maintained in a clean state, free from grit and

(a) no metallic equipment shall be stored inside; and

(b) no flammable material shall be stored in or around a magazine.

Grounding

**101.** Explosive magazines on surface shall be electrically grounded.

Permit

**102.** The explosive magazine permit shall be posted inside the magazine.

Inventory control

**103.** Inventory control and log book of explosives shall be maintained at the magazine.

Explosives used underground

**104.** (1) Explosives used in an underground mine shall be of Fume Class 1 rating as established by the Explosives Division of the Department of Natural Resources Canada.

(2) If other than Fume Class 1, a procedure shall be prepared in writing, and implemented, that will ensure that no worker is exposed to fumes that may endanger the worker's health and safety.

(3) A copy of the procedure referred to in subsection (2) shall be submitted to the occupational health and safety committee, and the mine inspector.

(4) Subsections (1) and (2) do not apply to explosives used for detonating purposes, or as a primer.

Manufacturing  
explosives

**105.** An employer shall not manufacture or mix or permit the manufacturing or mixing of an explosive, or a material for use as an explosive

- (a) underground in a mine; or
- (b) on surface at a mine except when licensed to do so under the Explosives Act and Regulations.

Electricity in  
magazines

**106.** Electricity use in magazines and electrical blasting switches shall meet the requirements of CSA standard M421, "Use of electricity in mines".

Wiring of magazines for explosives  
and detonators

**107.** (1) Electrical equipment in explosives or detonator magazines shall be suitable for Class II, Division 2 hazardous locations.

(2) Explosive or detonator magazines on the surface shall be located at least 60 metres from overhead lines and at least 100 metres from electrical substations.

(3) Overhead lines supplying explosives or detonator magazines shall be protected against lightning surges.

Electric blasting

**108.** (1) An isolated, ungrounded power source shall be used for electrical blasting; it shall have adequate capacity for the number of caps involved, and it shall be used for blasting only.

(2) Acceptable blasting-circuit conductors shall be

- (a) not less than No. 12 AWG;
- (b) without splices as far as practical; and
- (c) readily identifiable as being for blasting use, red in colour.

(3) Where expendable connecting wires are used from the lead wires to the leg wires of the blasting caps, they shall not be less than No. 20 AWG.

(4) Where the power-distribution system is not used for blasting, the mine shall establish alternative procedures.

(5) The mine shall have procedures to prevent inadvertent detonation of electrical blasting caps in the presence of radio transmitters or other radio-frequency fields including cellular phones, GPS and portable hand-held radios.

(6) Electrical blasting circuits shall be tested for continuity before a blast is set off.

Electrical blasting devices

**109.** (1) Where a PLC or computer is used to control or initiate a blast, the system shall be approved by a professional engineer.

(2) When blasting by electricity, the blaster shall not enter, or allow another person to enter the area until

- (a) the firing cables have been disconnected from the firing device and short circuited; or
- (b) in the case of a blasting operation using a power or lighting circuit, the switches of the blasting circuit have been locked in the open position.

Procedures for hazardous dust explosions

**110.** Where in a mine there exists the hazard of sulfide dust explosion owing to high sulfide content of ore, procedures shall be developed to prevent explosions including

- (a) washing of headings, raises and other workplaces within 30 metres of a blasting site to remove dust prior to firing the blast; and
- (b) gas testing after a blast and before work commences to ensure that workers will not be exposed to toxic fumes and gas.

#### **PART XXVIII.6 OPEN CUT WORKINGS IN MINING OPERATIONS**

Definitions

**111.** In this Part

Protection of workings, pits and quarries

**112.** An employer shall ensure that a surface mine working or open face is securely fenced or otherwise protected against inadvertent entry by persons where

- (a) the working constitutes a hazard by reason of its depth;

- (b) the approaches to and openings of the working are not readily visible; or
- (c) the hazard caused by the working is greater than the hazard caused by natural topographical features within 600 metres of the working.

Protective curbs or berms

**113.** (1) An employer shall maintain a protective curb or berm of material at an open pit or quarry along the outer edge of

- (a) a ramp;
- (b) a roadway that is within 20 metres of a hazardous slope in the open pit or quarry;
- (c) a bench, where mobile equipment other than drilling machines is operated within 8 metres of the edge of the bench;
- (d) along the edge of waste dumps;
- (e) access ramps used to feed hoppers, crushers, conveyor system, and when required by mines inspector; and
- (f) all roads used for the haulage of quarried or mined material whether in its raw or concentrate form.

(2) Where it appears that the waste dump is slumping, written safe work procedures shall be developed to address the placement of material on the slumping dumps.

(3) Berms or curbs shall be made of unconsolidated material.

Heights of faces and benches

**114.** (1) An employer shall ensure that

- (a) the bench / face height for quarries with un-consolidated material including sand and gravel does not exceed 5 metres and, in any event, shall not be higher than can be reached with equipment in use;
- (b) the bench / face height for quarries with consolidated material does not exceed 10 metres and, in any event, shall not be higher than can be reached with equipment in use; and

(c) the bench / face height for open pits with consolidated material does not exceed 20 metres and, in any event, shall not be higher than can be reached with equipment in use.

(2) When a quarry referred to in paragraph (1)(a) is worked in 2 or more benches than, it shall be worked at a 45° angle with catchment berms left in place to collect material falling to the bench below.

(3) When a quarry referred to in paragraph (1)(b) is worked in 2 or more benches, it shall be worked at a 55° angle with catchment berms left in place to collect any material falling to the bench below.

(4) When a quarry referred to in paragraph (1)(c) is worked in 3 or more benches, it shall be work at a 55° angle with catchment berms left in place to collect any material falling to the bench below.

(5) A part of a face or wall of a surface mine or quarry shall not overhang.

Open pit design

**115.** (1) Where 3 or more benches are to be mined, an employer shall

(a) submit to the director a report, certified by a professional engineer, on the pit design, including

(i) the general layout,

(ii) bench heights and berm widths,

(iii) ramp design,

(iv) overall slopes,

(v) stability studies,

(vi) blasting procedures to be used,

(vii) provision for water removal,

(viii) scaling techniques,

(ix) additional wall support,

- (x) a wall monitoring program, and
- (xi) the location of overburden and waste stockpiles;
- (b) operate the pit in accordance with the design; and
- (c) submit a geological characterization and composition analysis of the rock to be mined or quarried

(2) A mine design shall be assessed and updated at least annually and before an alteration is made to the mine that may significantly affect the ground stability of the mine and the mine design shall be kept readily available at the mine site for review by an inspector.

Face of open pit or quarry

**116.** Before permitting a person to work near the face of an open pit or quarry, an employer shall ensure that a supervisor examines the face for hazardous conditions

- (a) following a blast; and
- (b) daily.

Life lines

**117.** A worker shall not work, and an employer shall not permit or direct a worker to work, on the wall of an open pit or quarry or within 3.5 metres of the crest where there is danger of the worker falling more than 3 metres, unless the worker wears an appropriate fall arrest system as required under Part X.

Undercutting of face

**118.** An employer or worker shall not direct or permit a working face to be advanced by undercutting.

Working of unconsolidated material

**119.** In workings of clay, sand, gravel or other type of unconsolidated material, an employer shall ensure that, where ripping is required to loosen frozen material, the equipment

- (a) is operated perpendicularly to the working face; and
- (b) does not approach closer to the working face than a distance equal to the height of the face.

Dumping from vehicle

**120.** Where material is dumped from a vehicle into a raise or over a bank or bench, an employer shall

- (a) provide and maintain a bumper block or berm of material that prevents the vehicle from sliding into the raise or over the bank or bench;
- (b) not direct or permit material to be dumped at a location where the ground at the dumping place could fail to support the weight of a loaded vehicle; and
- (c) ensure that trucks or vehicles approach the dump in a manner which affords the operator an unobstructed view of the raise, bank or bench.

Ramps

**121.** (1) Where 2 lane traffic exists on a ramp, an employer shall ensure that the width of the ramp is not less than 3 times the width of the widest vehicle using the ramp on a regular basis, plus 3 metres.

(2) Where single lane traffic exists the width shall be not less than 2 times the width of the widest haulage vehicle used on the road, plus 3 metres.

(3) Open pit mine haul roads, ramps and surface shall be graded, maintained and have adequate dust suppression used to control dust generation.

(4) A worker shall not use and an employer shall not direct or permit a worker to use a device other than a towbar for towing equipment down a ramp.

Rotary drilling

**122.** (1) An operator of a rotary drill shall not remain on the deck while the drill is running if by so doing the operator is exposed to a hazard or possible hazard.

(2) All production or development drills shall be equipped with an adequate dust suppression system to control dust emissions from the drilling operations.

(3) In the event of a power failure, an operator shall ensure that all controls on a rotary drill are placed in the off or neutral position to avoid possible hazards caused by an inadvertent start-up.

Parking of vehicles

**123.** An operator shall not park, and an employer shall not permit the parking of, small vehicles where the operator is or could be endangered by an operating shovel, loader, production truck or bulldozer.

Operation of  
equipment

**124.** An operator of a mechanical shovel, loader or backhoe shall not operate the equipment in a manner that the load passes over unprotected workers.

Truck cabs

**125.** A worker shall not remain in the cab of a truck being loaded by mobile equipment unless protection is provided above and behind the cab.

Log book

**126.** (1) An employer shall maintain for each off-highway mobile equipment a log book in which shall be recorded defective equipment and the repairs effected on the equipment, and the record shall be signed by the person making the entry.

(2) An employer shall ensure the log book referred to in subsection (1) is available for inspection at all times.

Lighting

**127.** Where a hazard would be caused by the lack of artificial lighting, an employer shall provide suitable lighting at

- (a) areas where trucks are being loaded and dumped;
- (b) dumps; and
- (c) areas where the loading of explosives is being carried out.

Annual brake  
testing

**128.** (1) Trucks having a manufacturer's rated gross vehicle weight in excess of 45,000 kilograms shall be subjected to downgrade braking tests that at least once a year 50% of the fleet is tested, and every truck in the fleet is tested at intervals not exceeding 3 years.

(2) The test required under subsection (1) shall be as follows:

- (a) the vehicle shall be loaded to the manufacturer's maximum permissible gross vehicle weight;
- (b) the test shall be conducted on a well-graded hard packed downgrade slope of uniform grade of between 8% and 10% or where there is no downgrade slope satisfying this condition, tests shall be conducted on the maximum downgrade slope over which the trucks are operated;
- (c) auxiliary retarding devices shall not be used during the brake tests; and

(d) stopping distances shall be measured from the initial point of application of the service brakes to the final stopping position, from an initial speed of 40 kilometres per hour, and the minimum acceptable brake performance shall be as follows:

(i) initial speed 40 kilometres per hour, and

(ii) grade sloping distance

(A) 10% 84 metres,

(B) 9% 76 metres, and

(C) 8% 68 metres.

(3) An adequate emergency run out lane or run out area shall be available and at the conclusion of tests, the brakes shall be examined by a qualified mechanic who shall record the condition of the brakes.

(4) When a vehicle fails to meet the minimum brake performance standards specified under paragraph (2)(d), it shall be removed from service until corrective measures have been taken and the vehicle meets the standard.

(5) Brake testing shall be witnessed by a certified professional engineer and results shall be forwarded to the minister.

Braking system

**129.** An employer shall ensure that the brake system of a rubber-tired motor vehicle used in a surface mine shall meet the requirements of CSA - M3450, "Braking systems of rubber-tired machines - Performance requirements and test procedures".

Mine road design

**130.** (1) An employer shall prepare traffic control procedures and plans, showing the maximum allowable speeds for the vehicles in use, rules for passing, "stop" and "yield rules," priority rules for various vehicles, rules for night operation, maximum operating grades, emergency runoff protection / lanes, berms, and other information that may be required to ensure the safe operation of all types of vehicles on the mine site.

(2) An employer shall ensure that

(a) appropriate signage is maintained in the open pit;

- (b) accurate mine plans that are updated in accordance with good engineering practice; and
- (c) on roadways where the grade exceeds 5% that runaway lanes or retardation barriers are installed and maintained.

Bench and berm widths - quarries and open pits

**131.** Where a surface mine is worked in benches

- (a) each catchment berm shall be designed so that its final width will not be less than 8 metres;
- (b) loose rock and soil shall not be allowed to accumulate on a bench or catchment berm in a manner that endangers a person working on a lower bench; and
- (c) where loose rock accumulates and where access cannot be gained to clean the catchment berm, and a danger exists to a person working below, a safe working procedure shall be developed.

Water Control

**132.** An employer shall ensure that

- (a) open pits are dewatered by sumps, ditching or other effective means;
- (b) surface run offs are controlled by ditching or other effective means; and
- (c) overburden dumps are maintained free from water run offs by ditching to channel water flows away from overburden material.

Stockpiles

**133.** (1) An employer shall ensure that stockpiles of unconsolidated material are

- (a) inspected for hazardous conditions regularly by a competent person;
- (b) made safe before a worker is allowed to work close to or on top of the stockpile; and
- (c) sloped to the angle of repose.

(2) An employer shall ensure that the vertical height of the working face of stockpiled material is no more than 2.0 metres above the maximum reach of equipment being used.

(3) Where greater than 2 metres the work shall be performed in accordance with safe work procedures certified by professional engineer.

(4) When a tunnel is used under a stockpile for the purpose of reclaiming material from the stockpile, at least 2 exits shall be provided from the tunnel.

Waste dumps

**134.** (1) An employer shall ensure that waste dumps are inspected by a competent person

(a) for hazardous conditions prior to being used, and made safe before a worker is allowed to work close to or on top of the waste dump; and

(b) at least once during and at intervals of not more than 4 hours each shift when material is being dumped.

(2) The person who conducts an examination under subsection (1) shall record the details of the examination.

(3) An employer shall develop written safe work procedures and implement them when hazardous conditions are found.

Dumping over a bank

**135.** An employer shall ensure that a person shall not drive or operate a haulage vehicle, in a manner so as to dump material from the vehicle over a bank that is more than 3 metres high, or dump within 3 metres of the berm crest when the bank is more than 3 metres high, and a berm is in place.

Reverse when dumping

**136.** A driver of a haulage truck shall not

(a) operate the vehicle in reverse for a distance greater than 4 truck lengths on a dump; or

(b) operate the vehicle in reverse for a distance greater than 4 truck lengths, on a stockpile, ramp, road, or a ramp or road that is under construction, unless the ramp or road has a

positive gradient of more than 5% or the driver is trained in an approved written safe work procedure for task.

Dump raised **137.** A driver of a haulage truck shall not operate a vehicle with a dump raised for a distance of 3 truck lengths.

#### **PART XXVIII.7 USE OF ELECTRICITY IN MINES**

Definitions **138.** In this Part

Codes and Standards **139.** All electrical equipment shall be designed, constructed, installed, maintained and operated in accordance with the *Electrical Regulations* made under the *Public Safety Act*, or CSA Standard M421, "Use of Electricity in Mines" as applicable.

Notices and information **140.** (1) An employer shall develop a plan, approved by a registered electrical engineer, for the use of electrical energy at a mine, and shall follow the plan.

(2) A plan shall also be required for any increases in capacity of an existing installation by more than 500 kva.

(3) The plan referred to in subsection (1) shall show

(a) the areas at the mine where the electrical energy is to be transmitted and used, including schematic drawings;

(b) the location of fixed electrical equipment;

(c) the paths of the fixed supply conductors and the grounding networks; and

(d) the power of the electrical conductors and of the electrical equipment on a single-line diagram.

Fire extinguishing devices **141.** (1) A fire extinguishing device shall be provided at each electrical equipment room, vault, switch house, sub station and mobile electrical equipment.

(2) The fire extinguishing devices shall be approved for use on electrical fires, appropriate for the type of equipment, located at an exit from the area and maintained.

Restrictions for  
methane gas

**142.** (1) Electricity shall not be used where the methane content of the air around the electrical apparatus or equipment exceeds 1.25%, as determined with an approved methane detector.

(2) An employer shall ensure that all electrical equipment used in a hazardous location, as defined in the Canadian Electrical Code, is approved for use in a location and for the specific gas, vapour, or dust that is or may be present.

Electrical equip-  
ment rooms

**143.** (1) The location, construction and installation of a room containing electrical equipment shall ensure the protection against

- (a) fire propagation;
- (b) water and dust ingress; and
- (c) corrosive atmosphere.

(2) An electrical room shall be sufficiently ventilated to maintain equipment at safe temperatures.

(3) Lighting shall be sufficient to enable all equipment to be clearly distinguished and all instruments and labels to be read.

(4) Outdoor electrical equipment shall be fenced or guarded in accordance with the Canadian Electrical Code.

(5) Material shall not be stored against the fence work, and the enclosure shall be maintained free of run off water, sloughing of debris and vegetation growth.

(6) All controlled devices installed outdoors shall be of an approved type and suitably protected from the weather.

(7) Every uninsulated energized conductor less than 2.5 metres above the floor or the ground shall be protected by a barrier or a shield and the floor or the ground shall be covered with a non-conductive material.

Transformers

**144.** (1) Transformers shall be of a type and design suitable for the location in which they are to be installed.

(2) Where installed underground, a transformer shall

- (a) be protected against physical damage;
- (b) be guarded in a manner that access by unauthorized persons can be prevented;
- (c) be in an electrical equipment vault;
- (d) be separated from explosives storage areas by 15 metres of undisturbed rock or a distance of 60 metres; and
- (e) have clearances around it to permit safe access or inspection, maintenance, and repairs.

Switchgear

**145.** (1) All switchgear, terminals, connectors, soldered lugs, cable terminals, cable joints, cable taps or connection of apparatus shall

- (a) be regularly cleaned to prevent the accumulation of ore dusts or other conducting matter; and
- (b) protected against physical damage and be guarded in a manner that access by unauthorized persons is prevented.

(2) Switchgear shall be installed at a convenient location on the surface to provide the means for isolating all underground circuits.

(3) A switchboard installed underground shall be located

- (a) where it is separated from travelways or haulways;
- (b) where a floor is installed, so that water cannot accumulate on it;
- (c) at least 3.5 metres from the timbering of a shaft; and
- (d) at least 15 metres from any explosive storage area.

Training and cable  
repair

**146.** (1) An employer shall, in consultation with the occupational health and safety committee, establish a procedure for handling electrical cable energized in excess of 750 volts, and the procedure shall conform with CSA Standard CAN3-M421.

(2) Trailing cables supplying mobile electrical equipment at a voltage of more than 300 volts, including grounding conductors, shall

meet CSA Standard C-22.2 # 96M1989 Portable Power Cables, and the following specifications:

- (a) the cable-filling material shall be rubber or another synthetic material with similar properties;
- (b) each phase conductor shall be of a gauge equal to or larger than No. 8 AWG;
- (c) the grounding conductors shall be un-insulated or shall be covered with a semi-conducting insulation or shall have a total conductance equal to or greater than 60% of that of the largest phase conductor;
- (d) each grounding conductor shall be equal to or larger than No. 8 AWG;
- (e) where the insulated monitoring conductor in a cable supplying energy to a single piece of equipment is supplied to it by a separate power source, the energy supplying the equipment shall be disconnected when the conductors of the separate energy source are cut or when a grounding conductor is broken;
- (f) if they are transmitting electrical power at a potential exceeding 750 volts to ground, they shall have a grounded sheathing consisting of tinned copper wire mesh or equivalent around each power conductor;
- (g) all cables shall enter metal frames of motors, splice boxes, and electric compartments only through acceptable termination fittings;
- (h) all trailing cables shall be secured to machines and to the switchgear by approved cable gland or plug and socket couplings, to protect the cables from damage and to prevent strain on the electrical connections;
- (i) all trailing cables to transportable electrical equipment shall be provided at its point of entry of supply with a switch or equivalent disconnecting device;

(j) where conducting-rubber materials are used in cable construction, the control switch shall provide sensitive ground-fault protection capable of automatically tripping the control switch at a ground-fault level of 750mAa or less;

(k) jackets on cables shall be unpainted; and

(l) where for underground use, they shall have a non-flammable covering, suitably identified.

(3) Where a person is handling an energized trailing cable, he or she shall use suitable protective equipment.

(4) A trailing cable in use shall be tested by a mine electrician at regular intervals and by the operator prior to start of shift.

(5) Damaged cables shall be inspected by a qualified person before they are returned to service, to ensure that they are in safe operating condition and defective cables shall be removed from service.

(6) All permanent repairs to damaged cables shall be made by a qualified person who shall examine and test the trailing cables for continuity and insulation integrity before they are allowed to go back into service.

(7) All permanent splices or repairs in trailing cables shall be mechanically strong, with equivalent electrical conductivity as other sections of the cable and be effectively insulated and sealed to prevent moisture penetration.

Protection of  
trailing cables

**147.** (1) Cables shall be routed to avoid damage and be kept visible by being mounted on suitable markers at regular intervals throughout the cable route.

(2) Cable couplers shall be suitably supported off the ground.

(3) Where cables cross haulage-ways, or where equipment shall pass the cables, cables shall be isolated by elevation or be protected from crushing.

(4) Each cable assembly operating at a voltage in excess of 300 volts shall be provided with a visible means acceptable to the minister.

(5) Trailing cables shall be kept under observation by the machine operator or assistant to effectively prevent damage to them.

(6) Where trailing cables received mechanical or electrical damage they shall be removed from service immediately.

(7) A worker shall not drive and an employer shall not direct or permit a worker to drive a vehicle over an unprotected electrical cable.

(8) An employer shall, in consultation with the occupational health and safety committee, establish a procedure for handling electrical cable energized in excess of 750 volts, and the procedure shall conform with CSA Standard CAN3-M421 Use of Electricity in Mines.

Electrical trailing  
cable reels

**148.** Cable reels installed on mobile equipment shall

- (a) be operational at all times;
- (b) be designed to meet the bending-ratio requirements of CSA Standard C22.1;
- (c) be provided with a limit switch that prevents the removal of all the electrical cable during normal operation;
- (d) be provided with
  - (i) a grounding slip ring,
  - (ii) a ground-check slip ring suitable for control and signal circuits, and
  - (iii) power conductor slip rings; and
- (e) have access to slip rings controlled by a
  - (i) mechanical interlock, to ensure that access is available only after the power supply has been isolated from the supply portable power cable; or
  - (ii) substantial steel cover plate affixed by a multibolt system requiring the use of hand held tools to release and shall carry the warning "DANGER: ISOLATE AT

SUPPLY SOURCE BEFORE REMOVING THIS  
COVER".

Trailing cable  
connectors

**149.** (1) Cable couplers on circuits operating at voltages higher than 300 volts shall be

- (a) of a type designed for the cable on which they are used;
- (b) equipped with covering, hoods or seals to cover the unprotected ends when they are disconnected;
- (c) equipped with cable clamps and gaskets on the joints to prevent an infiltration of water; and
- (d) designed to prevent accidental disconnection when they are energized.

(2) A disconnecting device shall be installed on the end of each trailing cable connected to a piece of mobile electrical equipment.

Quick connect cable  
couplers

**150.** (1) A quick connect coupler used to join portable cables or a cable and a flangemount receptacle, operating at a voltage in excess of 300 volts shall have

- (a) a mechanical fastening arrangement, to join the coupler, with a tensile strength greater than that of the portable power cable;
- (b) strain relief devices suitable for the intended portable power cable;
- (c) a means to prevent the ingress of moisture;
- (d) a means to mechanically lock the coupler, where the circuit voltage exceeds 750 volts;
- (e) a pin arrangement that
  - (i) the ground conductor makes before and breaks after the phase conductors, and
  - (ii) the ground check circuit makes after and breaks before the phase conductors;

- (f) ground fault protection and ground conductor monitoring at the source of supply; and
- (g) a disconnecting device placed less than one metre from the receptacle.

(2) A disconnecting device shall be used to de-energize the receptacle before a plug is connected or disconnected.

Electrical protection and control devices

**151.** All electrical protection and control devices shall be placed, labeled or marked so as to identify the circuits or the electrical equipment protected or controlled by them.

Protection of underground cables

**152.** (1) Suitable circuit breakers and disconnectors shall be inserted in all feeder conductors connected to underground cables.

(2) Circuit breakers and disconnectors shall be readily accessible and as close as practicable to the point of connection between supply circuit and underground cables.

(3) Instruments indicating the presence of ground leaks shall be installed on an ungrounded distribution network whose voltage exceeds 300 volts.

(4) Ground leak protection devices to automatically isolate a defective circuit shall be installed on a neutral grounded distribution network whose voltage exceeds 300 volts.

Out of service wiring

**153.** Damaged or out of service wiring and electrical equipment shall be disconnected from its source of power and removed.

Supply systems for mobile electrical equipment

**154.** (1) Supply systems for mobile electrical equipment shall be tested before being put into service, and at least once a year thereafter, in order to prove the effectiveness of the ground fault tripping and the ground conductor monitoring circuits.

(2) A record of the tests required under subsection (1) shall be kept at the mine and shall be available for examination.

(3) There shall be separate disconnecting means, overload protection, and ground-fault protection for each motor or group of motors.

(4) Grounding and bonding of electrical apparatus on board mobile electrical equipment shall be in accordance with CSA Standard C22.1.

Shaft sinking  
equipment

**155.** Shaft sinking equipment operating at voltages in excess of 300 Volts shall be supplied by portable power cable and have ground fault protection and ground conductor monitoring.

Lightning protec-  
tion

**156.** (1) Equipment for lightning protection shall include lightning arrestors, surge capacitors, high speed protection gaps, guard wires, guard structures and air terminals.

(2) Where overhead lines traverse an area higher in elevation than the sites on a mine property that they interconnect, and where natural conditions require those measures, an overhead lightning-protection wire with supplementary ground electrodes at the high points shall be provided.

(3) Where mine headframes, pipe services, tracks, cables, or other non-system conductors that enter the mine are in danger of being struck or charged by lightning, they shall be protected at the surface by lightning-protection wires or structures grounded by low-resistance grounds as in lightning arrestors.

Radio controlled  
equipment

**157.** Where radio-frequency equipment is used to remotely control machines, cranes, or other devices, procedures shall be implemented to ensure that the transmitter and receiver are correctly matched as a unique set.

Underground  
workplaces

**158.** (1) Where electrical energy is taken underground, provisions shall be made so that the current can be cut off on surface.

(2) Conductors, cables, or portable power cables supplying power to fixed equipment at voltages-to-ground in excess of 150 volts shall be protected by armour or conduit and shall be suitably designed for the conditions under which they will be operated.

(3) Electrical supply lines installed in boreholes shall be armoured.

(4) Trolley wires underground shall be at least 2.4 metres vertically above the top surface of the trolley track rails when 300 V or less and in no case shall they be installed at less unless they are effectively

guarded at places where they may be inadvertently touched by persons or objects.

(5) Where it is impracticable or impossible to install trolley wires at less than 2.4 metres vertically from the top surface of the trolley track rails, the operating voltage shall not exceed 300 volts.

(6) Trolley wires operating in excess of 300V and less than 750 V shall be 2.7 metres above grade.

(7) Trolley wires operating in excess of 750 V shall be 4 metres above grade.

(8) Trolley wire shall be supported by insulated hangers, solidly attached to the roof or ceiling and may not zigzag.

(9) The tracks, in a trolley transport system, used for current return shall be electrically bonded by linkages at the switches, the frogs and other openings in order to provide electrical continuity for the rails and cross bonding shall be installed between the 2 rails at more than 60 metre intervals.

(10) The ends of trolley line conductors or feeders shall be dead-ended by strain insulators.

Communication systems

**159.** Voice communication system voltage shall be 100 vs or less, with the exception of the integral ringing circuit of a telephone.

(2) Adequate precautions shall be taken to prevent electrical signal or telephone conductors, whether insulated or not, from being energized by other electrical conductors.

Grounding

**160.** (1) The metallic covering of a cable shall not be used as the sole grounding conductor.

(2) Electrical motors, component parts, or chambers associated with assembly of machines or equipment shall be grounded with copper conductors to the power supply ground system and the conductance of this ground conductor shall be more than 50% of the conductance of the largest power conductor and have a minimum size of No. 10 AWG.

Electrical cable

**161.** An employer shall, in consultation with the occupational health and safety committee, establish a procedure for handling electrical

cable energized in excess of 750 volts, and the procedure shall conform with CSA Standard CAN3-M421.

Unprotected electrical cable

**162.** A worker shall not drive and an employer shall not direct or permit a worker to drive a vehicle over an unprotected electrical cable.

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