CANADIAN CONSTRUCTION SAFETY CODE 1975

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PREFACE

The Canadian Construction Safety Code is published by the National Research Council of Canada through the Associate Committee on the National Building Code. The Code provides for the safety of both the public and workmen during any construction, alteration or demolition operation.

The requirements for the protection of the public, formerly in Part 8 of the National Building Code, appear in Section 2 of this Code, and are referenced in the National Building Code. The requirements which apply to the protection of workmen on a project are in Section 3.

The Canadian Construction Safety Code was prepared for the purpose of providing a single set of construction safety regulations which may be applied throughout Canada. It is one of a special Code series written in regulatory form so that it may be adopted for legal use by a Municipality or Provincial body jointly with or separately from the National Building Code.

Inquiries regarding this document should be directed to: The Secretary, Associate Committee on the National Building Code, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

Le Code national du bâtiment, ses suppléments et les documents qui s'y rattachent sont disponibles en français. On peut se les procurer en s'adressant du Secrétaire, Comité associé du Code national du bâtiment, Conseil national de recherches du Canada, Ottawa, Ontario K1A 0R6.

SECTION 1 GENERAL

SUBSECTION 1.1 APPLICATION

1.1.1. Construction safety regulations issued by the appropriate Provincial authority shall apply in addition to the requirements in this Code.

1.1.2. Section 2 of this Code applies to the protection of the public for the duration of a *project* or to any incompleted or abandoned *project.*

1.1.3. Section 3 of this Code applies to the protection of the workmen and other persons on a *project.*

1.1.4. In addition to the administrative requirements of this Code, the appropriate requirements in Part 2 of the National Building Code of Canada 1975 shall apply.

SUBSECTION 1.2 DEFINITIONS AND ABBREVIATIONS

1.2.1. Definitions of words and phrases used in this Code that are not included in the list of definitions in this Section shall have the meanings which are commonly assigned to them in the context in which they are used in this Code, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

1.2.2. The words and terms in italics in this Code shall have the following meanings:

Appliance (as applying to heating and cooling systems) means a device to convert fuel into energy, and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Code.

Appropriate authority having jurisdiction means the departments of the provincial governments and agents thereof that have authority over the subject that is regulated.

Approved means approved by the *authority having jurisdiction* or the *appropriate authority having jurisdiction.*

Authority having jurisdiction means

(a) with respect to the proclamation and amendment of this Code, and the creation of a Board of Appeal, the adopting governmental body, or

(b) with respect to the administration of this Code, the person (designated official) appointed by the adopting governmental body and any person authorized by him to administer this Code.

Bearing pressure, design (as applying to foundations) means the pressure applied by a *foundation unit* to a soil or rock, and which is not greater than the allowable bearing pressure.

Blasting area means any area extending at least 50 yards in all directions from any place in which charges are being primed or in which unexploded charges exist.

Building means any structure used or intended for supporting or sheltering any use or *occupancy.*

Caisson (see *pile*).

Cleat means a member of shoring that directly resists the downward movement of a *wale* or a *strut.*

Combustible (as applying to an elementary building material) means that such material fails to conform to CSA B54.1-1972, "Determination of Noncombustibility in Building Materials."

Construction hoist means a mechanism for use on a *project* for hoisting and lowering materials or workmen or both, which is equipped with a car that moves in guides during its vertical movement and includes a hoistway and hoistway enclosure.

Constructor means a person who contracts with an *owner* or his authorized agent to undertake a *project,* and includes an *owner* who contracts with more than 1 person for the work on a *project* or undertakes the work on a *project* or any part thereof.

Deep foundation means a *foundation unit* that provides support for a *building* by transferring loads either by end-bearing to a soil or rock at considerable depth below the building or by adhesion or friction, or both, in the soil or rock in which it is placed. *Piles* are the most common type of *deep foundation.*

Design bearing pressure (see bearing pressure, design).

Detonator means a blasting cap actuated by a fuse or by electricity or other like device used to explode commercial explosives.

Floor area means the space on any storey of a *building* between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits and vertical service spaces that pierce the storey.

Foundation unit means one of the structural members of the foundation of a *building* such as a footing, raft or *pile.*

Materials hoist means a *construction hoist* for hoisting or lowering materials.

Noncombustible (as applying to an elementary building material) means that such material conforms to CSA B54.1-1972, "Determination of Noncombustibility in Building Materials."

Occupancy means the use or intended use of a *building* or part thereof for the shelter or support of persons, animals or property.

Owner means any person, firm or corporation controlling the property under consideration.

Pile means a slender *deep foundation unit* made of materials such as wood, steel or concrete or combination thereof, which is either premanufactured and placed by driving, jacking, jetting or screwing, or cast-in-place in a hole formed by driving, excavating or boring. (Cast-in-place bored *piles* are often referred to as *caissons* in Canada).

Post means a vertical member of shoring that acts as a spacer between *wales.*

Prefabricated support system means a trench box, trench shield or similar structure composed of members connected to one another to resist the pressure from the walls of a trench and which is capable of being moved as a unit.

Primed charge means an explosive cartridge to which a *detonator* has been attached.

Project means any construction, alteration or demolition operation.

Public way means a sidewalk, street, highway, square or other open space to which the public has access, as of right or by invitation, expressed or implied.

Residential occupancy means the *occupancy* or use of a *building* or part thereof by persons for whom sleeping accommodation is provided, but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.

Sheathing means the vertical members of shoring that are placed up against and directly resist pressure from a wall of a trench.

Strut means a transverse member of shoring that directly resists pressure from a *wale* or *sheathing.*

Subcontractor means a person who contracts with a *constructor* for the work on part of a *project.* (A person who contracts with a *subcontractor* is also a *subcontractor.)*

Support system means shoring and includes a *prefabricated support system.*

Type 1 soil means soil that is hard and solid.

Type 2 soil means soil that may crack or crumble.

Type 3 soil means soil that is loose, soft, sandy or that has been previously excavated.

Type 4 soil means soil that is wet, muddy or will flow easily unless supported immediately after excavation.

Wale means a longitudinal member of shoring that is placed against and directly resists pressure from *sheathing.*

Workmen's hoist means a *construction hoist* for hoisting or lowering workmen or material.

1.2.3. Abbreviations in this Code for the names of organizations or authorities shall have the following meanings:

ACNBC ..... Associate Committee on the National Building Code
(National Research Council of Canada
Ottawa, Ontario. K1A 0R6)

CSA ..... Canadian Standards Association
(178 Rexdale Blvd, Rexdale, Ontario M9W 1R3)

NBC ..... National Building Code of Canada
(National Research Council of Canada
Ottawa, Ontario. K1A 0R6)

1.2.4. Abbreviations of words and phrases in this Code shall have the following meanings:

cfm ..... cubic foot (feet) per minute
deg. ..... degree(s)
diam. ..... diameter
ft ..... foot (feet)
ft lb ..... foot pound(s)
in. ..... inch(es)
lb ..... pound(s)
sq ft ..... square foot (feet)

SUBSECTION 1.3 ADMINISTRATIVE REQUIREMENTS

1.3.1. The *constructor* shall ensure compliance with this Code. This shall not relieve the *subcontractor* or workmen of their responsibilities.

1.3.2. Every *subcontractor* shall ensure that all equipment, materials and safeguards provided by him are maintained in a safe condition and used as prescribed. This shall not relieve the workmen of their responsibilities.

1.3.3. Every workman or other person on a *project* shall conduct himself so as not to endanger the safety of other persons.

1.3.4. Notwithstanding the presence or absence of a specific regulation, the *constructor,* the *subcontractor* and the workmen shall take every precaution that is reasonable in the circumstance to ensure that no person is exposed to undue risk.

1.3.5. Alternative materials, methods and equipment may be adopted provided it has been shown to the satisfaction of the *appropriate authority having jurisdiction* that they are at least as safe as those described in this Code.

1.3.6. A copy of all pertinent provincial and municipal regulations, including this Code and the Workmen's Compensation Board regulations concerning accident, injury and first aid shall be provided and maintained in good condition in a location readily accessible to the workmen.

1.3.7. Notices shall be posted in the languages that may be deemed necessary by the *appropriate authority having jurisdiction* to ensure that workmen are acquainted with their rights and responsibilities under the regulations specified in Article 1.3.6.

SECTION 2 PROTECTION OF THE PUBLIC

SUBSECTION 2.1 FENCING AND BARRICADES

2.1.1.(1) Work shall not commence on the construction, alteration, repair, dismantling or demolition of a *project* until a covered way has been provided as described in Article 2.1.2. to protect the public when so required by the *authority having jurisdiction,* except where

(a) the work is done within a solid enclosure,
(b) the *building* is at a distance of 7 ft or more from a *public way* used by pedestrians, or
(c) site conditions warrant a distance greater than provided in Clause (b).

2.1.2.(1) A covered way shall

(a) have a clear height of not less than 8 ft.
(b) have a clear width of at least 5 ft or the width of the *public way* whichever is the lesser,
(c) be designed and constructed to support safely all loads that may be reasonably expected to be applied to it, but in no case less than 50 lb/sq ft on the roof,
(d) have a weathertight roof sloped toward the *project,*

(e) be totally enclosed on the *project* side with a structure having a reasonably smooth surface facing the *public way,*
(f) have a railing 42 in. in height on the street side where the covered way is supported by posts on the street side, and
(g) be adequately lighted when the *public way* is lighted.

2.1.3. When a *project* is located 7 ft or more from a *public way,* a strongly constructed fence, boarding or barricade not less than 6 ft in height shall be erected between the *project* and the *public way* or open sides of a construction site when so required by the *appropriate authority having jurisdiction.* Such structures shall have a reasonably smooth surface facing the *public way* and shall be without openings, except those required for access. Any such openings shall be equipped with gates constructed in a similar manner, which shall be kept closed and locked when the *project* is unattended and shall be maintained in place until completion of the *project.*

2.1.4. Where any special hazard exists from which it is not possible to protect the public by other means, watchmen shall be employed to prevent the public from entering the danger zone at any time of the day or night.

2.1.5.(1) When work on a construction site is suspended or ceases so that it will not be occupied during normal working hours, the hazardous part of the construction site shall be protected by
(a) covering with a securely fastened barricade all windows, doors and other openings located within 10 ft of the ground which may give access to the *building,*
(b) a fence or barricade constructed according to the requirements of Article 2.1.3., or
(c) such other *approved* means.

SUBSECTION 2.2 FIRE PROTECTION

2.2.1. Fire extinguishing equipment shall be provided and installed in accordance with the appropriate regulation in the Fire Prevention Bylaw or, in the absence of such Bylaw, the National Fire Code of Canada 1975.

2.2.2.(1) Fire extinguishing equipment shall be
(a) provided where risk of fire exists,
(b) suitable as to type and size for combatting any likely fire,
(c) protected from mechanical damage,
(d) located for easy access at suitably marked stations,
(e) maintained in good operating condition, and
(f) protected from freezing.

2.2.3. Where a permanent standpipe and hose system are to be installed in a *building,* they shall be installed progressively in accordance with Subsection 6.7.3. of the National Building Code of Canada 1975, so far as is practicable, as the building construction proceeds.

2.2.4.(1) At least 1 water-type fire extinguisher of a stored-pressure, cartridge-operated or pump-tank type, having a capacity of 2 Canadian gallons, shall be provided
(a) in every workshop,
(b) in every storage *building* for *combustible* materials,
(c) in places where welding or flame-cutting operations are being carried on and for a reasonable time thereafter, and
(d) on each storey having a floor area of 5000 sq ft or less in an enclosed *building* being constructed or altered, and an additional fire extinguisher provided for each additional 5000 sq ft of floor area in the storey or any fraction thereof, except that this does not apply to *buildings* of *residential occupancy* of not more than 2 storeys in building height, or a single-storey *building* of any *occupancy* without basement or cellar.

2.2.5.(1) At least 1 pressurized dry-chemical fire extinguisher with a capacity of at least 4 lb, or other equally effective extinguisher, shall be provided where
(a) flammable liquids are stored or handled,
(b) temporary oil- or gas-fired equipment is used, or

(c) a tar or asphalt kettle is used.

2.2.6.(1) A fire extinguisher shall
(a) be recharged immediately after use and returned to its designated position,
(b) be inspected at least monthly and the date of the last inspection recorded on it, and
(c) not contain carbon tetrachloride, methyl bromide or other similar vapourizing liquid.

2.2.7. Access shall be provided and maintained at all times to all fire-fighting equipment including fire hose, extinguishers, sprinkler valves and hydrants. Access to the *project* shall be provided for the local fire department at all times.

SUBSECTION 2.3 EXCAVATION

2.3.1. Except as provided in Article 2.3.2., before excavation begins, all existing gas, electrical, water, steam and other services shall be shut off, capped and labelled so as to permit easy identification outside the limits of the excavation. In each case the service company involved shall be notified in advance. If it is necessary to maintain any such service, it shall be relocated as necessary, and shall be protected from damage in such a way to afford safety to the public.

2.3.2.(1) Existing gas, electrical, water, steam and other services may be left within the area of the excavation provided
(a) before work begins the approval of the service company involved is obtained to the proposed method of operation,
(b) their location is determined before excavation commences,
(c) a suitable method of excavation is adopted which will ensure that they are not damaged, and
(d) suitable temporary supports are provided.

2.3.3. Excavations shall be kept reasonably clear of water so as not to endanger the safety of the public or to create conditions hazardous to health.

2.3.4. If the stability of adjoining structures, walks, walls or services may be endangered by the work of excavating, adequate underpinning, shoring and bracing shall be provided to prevent damage to, or movement of, any part of the adjoining property, or the creation of a hazard to the public.

SUBSECTION 2.4 USE OF STREETS OR PUBLIC PROPERTY

2.4.1.(1) Except as provided in Article 2.4.2., provisions shall be made at all times for the safe passage past the *project* site of both pedestrian and vehicular traffic. Material or equipment shall not be placed on any street or other public property, except as authorized by the *appropriate authority having jurisdiction.*

(2) Except as provided in Sentence (3), where a sidewalk exists adjacent to the *project* it shall be kept clear of obstructions at all times.

(3) Where the construction operations necessitate the obstruction of the sidewalk, a temporary sidewalk shall be provided when required by the *appropriate authority having jurisdiction,* and it shall be kept clear of obstruction at all times.

2.4.2. Operations such as the hoisting of major components onto a tall *building* from which the public cannot be protected by barricades or similar means shall not be carried out until the street or other *public way* is closed.

2.4.3. Excavations in streets or public property shall be adequately barricaded and warning signs or lights shall be installed on each section of such barricades. Back-filling of such excavations shall be executed in accordance with the requirements of the *appropriate authority having jurisdiction.*

2.4.4. All sidewalks, streets or other public property that have been damaged shall be restored to a safe condition, and all obstructions pertaining to the *project* shall be removed when the need for such obstruction is ended.

2.4.5. Warning lights shall be placed and shall be in operation during the hours of darkness at all obstructions on streets or other *public ways.*

SUBSECTION 2.5 DIRECTION TO VEHICULAR TRAFFIC

2.5.1.(1) Where a hazard to vehicular traffic on a *public way* is created by work on the construction site, one or more of the following shall be provided to direct the traffic:

(a) one or more flagmen,
(b) warning signs,
(c) barriers,
(d) lane control devices, or
(e) flashing lights or flares located at a suitable distance from the hazard.

2.5.2.(1) When a flag is used to direct traffic it shall be

(a) red,
(b) not less than 18 in. by 20 in.,
(c) mounted on a staff at least 36 in. long with the long side attached securely to the staff along its entire length, and
(d) maintained in a clean and untorn condition when being used.

2.5.3.(1) When a sign is used to direct traffic it shall be

(a) diamond-shaped and of material at least as rigid as ¼-in. thick plywood,
(b) at least 18 in. by 18 in. in size and mounted at 1 corner on a substantial pole approximately 4 ft in length,
(c) red on one side with black corner areas so that the red area is a regular 8-sided figure, and with the word "STOP" or "ARRET" in clearly distinguishable white letters approximately 6 in. in height located centrally on the sign,
(d) yellow on the other side with the word "SLOW" or "LENTEMENT" as appropriate for the district in which the *project* is located, in clearly distinguishable black letters approximately 6 in. in height located centrally on the sign or symbols recognized by the International Traffic Code, and
(e) maintained in a clean condition when being used.

2.5.4.(1) A workman who is directing traffic shall

(a) be equipped as required by Article 2.5.5.,
(b) be instructed in the signals to be used in controlling traffic,
(c) be provided with a copy of written instructions on the correct methods for traffic direction, and
(d) direct traffic by using either a flag or sign.

2.5.5.(1) A workman while directing traffic shall wear the following clothing which shall be fluorescent and coloured either blaze orange or red:

(a) a vest, or
(b) sleeves that extend from above the elbow to the wrist.

SUBSECTION 2.6 DEMOLITION

2.6.1.(1) Adequate provisions to prevent damage to adjoining properties shall be made before demolition is commenced.

(2) The structural design characteristics of the *building* shall be determined before commencement of demolition, and the demolition method submitted for approval to the *authority having jurisdiction.*

(3) Demolition shall be supervised at all times by a person who is qualified by knowledge, training and experience.

2.6.2.(1) Before demolition commences, all existing gas, electrical, water, steam and other services to the site shall be disconnected and labelled as required by the service company or utility providing that service.

(2) In each case the service company or utility shall be notified in advance.

(3) If it is necessary to maintain any such service it shall be relocated as necessary and shall be protected from damage and in such a way to afford safety to the public.

2.6.3. Prior to any demolition all glass in the *building* shall be removed or otherwide protected to ensure the safety of the public.

2.6.4. Adequate precautions shall be taken to prevent the public from entering the area affected by demolition operations.

2.6.5. Except as provided in Article 3.13.13., the area into which material is to be dropped shall be barricaded to prevent the entry of the public, and shall be sufficiently large to prevent material or debris falling or deflecting outside the barricades.

2.6.6. When there is reasonable possibility of danger to the public, the wrecking of a structure or part thereof with a heavy weight suspended by a cable from a boom or hoist, by the use of a power shovel, tractor or other mechanical contrivance or by the use of explosives shall be permitted only when *approved.*

2.6.7. Where a swinging weight is used, the supporting cables shall be of such length or shall be so restrained that the weight will not swing against any structure other than the structure being demolished.

2.6.8. If during the progress of demolition a condition develops that may endanger adjoining property, such demolition affecting the adjoining property shall be stopped until the measures necessary to prevent damage have been taken.

2.6.9. No part of a structure being demolished shall be left in such a condition that it may endanger the public.

2.6.10. On completion of the demolition work, the site shall be left in such a condition that no hazard exists. Cellars and excavations that are not adequately barricaded shall be backfilled to the level of the surrounding ground. Sidewalks, roads and other property to which the public has access shall be left free of obstructions and in a safe condition.

2.6.11. Any demolition site on which work has been temporarily suspended or which is left without continuous supervision shall be closed to prevent unauthorized entrance.

SUBSECTION 2.7 WASTE MATERIAL

2.7.1. Except as provided in Article 2.7.2., waste material or other material shall not be permitted to fall freely from one storey to another.

2.7.2.(1) The clearing away of waste material shall be carried out as quickly as possible, and shall
(a) be carried out by means of appropriate containers,
(b) be guided into an enclosed shaft or chute conforming to Sentence (3), or
(c) be carried out by means of a hoisting apparatus if large pieces or objects are involved.

(2) Waste material cleared as provided in Sentence (1) shall be deposited in an enclosure
(a) so arranged as to prevent waste material from being projected beyond the confines of the enclosure, and
(b) not accessible to the public.

(3) The chute described in Clause (1)(b) shall

(a) be closed if it is inclined more than 45 deg. with the horizontal,
(b) be kept closed or covered at its entrance when not in use, and
(c) have a device to prevent wheelbarrows from entering the top of the chute.

SECTION 3 PROTECTION OF THE WORKMEN AND OTHER PERSONS ON A PROJECT

SUBSECTION 3.1 PROTECTIVE CLOTHING, EQUIPMENT AND DEVICES

General

3.1.1.(1) Every employer shall require his workmen to wear or use protective clothing or equipment to provide protection from the hazards to which they are likely to be exposed.

(2) Every other person on a *project* shall wear or use such protective clothing or equipment as is appropriate to provide protection from the hazards to which he is likely to be exposed.

(The clothing and equipment required by this Article shall conform to the appropriate CSA standard where one exists. Where no CSA standard exists, conformance to a suitable standard may be specified by the *appropriate authority having jurisdiction.)*

3.1.2. *Approved* safety hats shall be worn by workmen or other persons in all work areas where there is a potential hazard due to falling, flying or thrown objects or other harmful contacts.

3.1.3. Where workmen or other persons are exposed to electrical hazards they shall wear non-conductive safety hats designed to minimize these hazards.

3.1.4. Where workmen or other persons are likely to be exposed to eye injury due to flying particles, hazardous substances or harmful light or other rays, they shall be protected against such injury by a suitable device conforming to CSA Z94. 3-1969, "Eye Protectors."

3.1.5. Where there is danger of crushing or puncturing the feet, the workmen shall wear *approved* safety footwear or outer footguards.

3.1.6. Where workmen are likely to be exposed to injury due to skin contact with a noxious gas, liquid, fume or dust, they shall be protected by suitable wearing apparel or suitable skin cream.

3.1.7. Where adequate ventilation is not provided, workmen shall be protected by suitable respiratory equipment where there is a danger from the inhalation of noxious gas, fumes or dust or from lack of oxygen.

Safety Belts

3.1.8. Except as provided in Article 3.1.13., an *approved* safety belt or harness shall be used by every workman or other person on a structure where there is a danger of the workman or other person falling more than 10 ft, or a safety net providing equal protection shall be provided.

3.1.9. Every safety belt and harness shall be fitted with an attachment rope which shall be secured to a fixed anchor or to a lifeline, so that in the event of falling a person will not drop more than 4 ft.

3.1.10. Every lifeline shall serve not more than 1 person and shall be secured to a fixed anchor.

3.1.11. Every safety belt, harness, attachment rope, lifeline and anchor shall have the capacity to absorb at least 2500 ft lb of energy without failure of any component.

3.1.12. Every lifeline and attachment rope shall be free of knots and splices.

3.1.13. Article 3.1.8. does not apply where the work of placing structural members of a skeleton frame structure prevents the use of the protective measures in Article 3.1.8.

Work Over Water

3.1.14. Where a workman or other person is exposed to a risk of drowning, he shall wear an *approved* life jacket designed to hold his head above water without any effort on his part.

3.1.15.(1) Except as provided in Sentence (2), where workmen are exposed to the risk of drowning, adequate rescue equipment shall be provided in a suitable location near the *project* and where practicable shall consist of

(a) a boat in operating condition, equipped with
  (i) a life buoy attached to at least 50 ft of rope having at least the equivalent strength of ⅜-in. manilla rope, and
  (ii) two life jackets as prescribed in Article 3.1.14., but not less than 1 for each of the persons needed to operate the boat, and
(b) where there is a current in the water, a rope at right angles to the current to which there is attached floating objects capable of providing support for a person in the water.

(2) The requirements in Sentence (1) may be waived provided every workman is protected by an *approved* safety belt or harness or a safety net.

(3) In locations where the water is extremely rough or swift, the boat prescribed in Sentence (1) shall be a power boat suitable for the conditions.

(4) Where workmen are exposed to the risk of drowning, 1 or more persons shall be designated to be available to perform any rescue operations that may be necessary, and a suitable alarm system shall be provided. The designated person or persons shall immediately start rescue operations when the alarm is given.

SUBSECTION 3.2 HOUSEKEEPING

General

3.2.1. The *project* site including all means of access to and egress from the site shall be kept in a tidy condition and no hazard allowed to develop from the storage of material or equipment, the accumulation of debris or from any other cause.

3.2.2. Waste material and debris shall not be dropped from one level to another, but shall be lowered by means of chutes or in suitable containers in accordance with Subsection 3.13.

3.2.3. Protruding nails in lumber or scrap shall be removed when they present a hazard to the workmen, unless the lumber or scrap is stored in a container.

3.2.4. Scaffolds, platforms and other working areas shall be kept in a tidy condition, and only equipment or material required for the operations being carried out shall be placed or allowed to remain on them.

3.2.5. The space for the operator around a power tool shall be kept clear of obstruction at all times.

3.2.6. All waste material, shavings or sawdust shall be removed frequently from around a power tool to prevent any hazardous accumulation.

Smoking

3.2.7. Smoking shall be prohibited where flammable liquids, flammable gases or materials which give off flammable vapour are used or stored, unless such liquids, gases or materials are in closed containers which prevent them from being a hazard.

3.2.8. Smoking shall be prohibited in the vicinity of *combustible* materials where such materials are of such a type and quantity to be a fire hazard.

3.2.9. Signs bearing the words "No Smoking" shall be posted in areas where smoking is prohibited.

Snow and Ice Removal

3.2.10. When in use, scaffolds, platforms and working areas shall be kept clear of snow and ice.

3.2.11. Platforms, scaffolds and runways shall be sprinkled where necessary with sand or other suitable abrasive materials to prevent slipping.

Danger Signs

3.2.12.(1) Legible signs bearing the word "DANGER" in lettering not less than 6 in. in height shall be posted

(a) where a covering prescribed by Article 3.10.1. has been removed temporarily to enable work to be carried out,
(b) where a required guardrail has been removed temporarily to enable work to be carried out,
(c) adjacent to a hoisting area,
(d) under a suspended scaffold, and
(e) at the outlet end of a chute.

Lanes, Walks and Work Areas

3.2.13. All means of access to and egress from the site and all lanes of travel, walks, paths, runways, stairs and passages on the site shall be maintained clear of hazardous obstructions.

3.2.14. Where a hazard to a workman is created on a *project* by vehicular traffic on a street or other *public way* or on a haul road, one or more of the safeguards specified in Subsection 2.5 shall be provided as appropriate to provide adequate protection for the workmen.

SUBSECTION 3.3 HANDLING AND STORING MATERIALS

General

3.3.1.(1) All materials on a *project* shall

(a) be stored so as not to endanger the workmen, and
(b) when being moved or transported, be moved or transported in such a manner that does not endanger the workmen.

3.3.2. When material is moved from a vehicle or stockpile, any blocking, chain, metal band or wire rope shall not be removed where such removal may endanger the workmen.

3.3.3. Building materials or equipment shall not be placed or stored on a permanent or temporary structure so as to exceed the safe loadings of the structure or any part thereof. (See Sentence 4.1.1.3.(2) of Part 4 of the National Building Code of Canada 1975.)

3.3.4.(1) Except as provided in Articles 3.3.5. and 3.3.6., building materials shall not be stored or piled within 6 ft of any

(a) opening in a floor or roof,
(b) edge of a floor, roof or balcony, or
(c) edge of an excavation.

3.3.5. Where a *building* or a solidly enclosed part of a *building* is used solely for the storage of materials, the restrictions in Article 3.3.4. may be waived.

3.3.6. Small masonry units, including bricks and blocks, may be piled near an edge or opening in a floor or roof provided they are to be used at that edge and the height of the pile is less than the distance of the pile from such edge or opening.

3.3.7. Flammable liquids in excess of 1 day's supply shall not be stored in a *building* unless such storage is in a room with sufficient window area to provide explosion relief venting to the outside and which is separated from the remainder of the *building*.

3.3.8.(1) Flammable, corrosive or toxic substances shall be stored in suitable containers clearly labelled to identify

(a) the substance,
(b) the hazard involved in the use of the substance,

(c) the prohibited uses of the substance, and
(d) the protective measures to be taken by workmen before, during and after using the substance.

3.3.9. Liquefied petroleum gas cylinders shall be installed in accordance with CSA B149.2-1969, "Installation Code for Propane Burning Appliances and Equipment" and Supplement No. 2-1973.

Lumber

3.3.10. Lumber shall be neatly piled and, where the pile exceeds 4 ft in height, it shall be cross-tied or secured to prevent toppling.

Masonry Units

3.3.11. Masonry units shall be stacked in tiers on level planks or platforms or other suitable bases.

3.3.12. Stacked piles of masonry units shall not exceed 6 ft in height unless the units above this height are stepped back and wood strips placed between the tiers to prevent toppling.

3.3.13. Masonry units shall be bonded where necessary to stabilize the pile.

Pipe and Reinforcing Steel

3.3.14. Pipe and reinforcing steel shall be stacked in racks or frames unless otherwise suitably restrained.

Bagged Material

3.3.15. When bagged material is not stored in bins or other suitable enclosures, the vertical face of piles shall not exceed 10 bags in height and the outside layer shall be cross-piled or otherwise suitably tied to prevent toppling.

3.3.16. When bags are removed from a pile they shall be removed from the top of the pile so that the top is maintained approximately level.

SUBSECTION 3.4 SERVICES

Sanitation

3.4.1. At least 1 water closet shall be provided for each 30 employees or fraction thereof within easy access of their place of work.

3.4.2. Water closets shall be enclosed so that the occupants are sheltered from view and protected from the weather and falling objects.

3.4.3. Natural or artificial illumination shall be provided in water closet enclosures.

3.4.4. Water closet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant and toilet paper shall be provided.

3.4.5. An adequate supply of potable water shall be supplied from a piping system or from a clean, covered container having a drain faucet in a location readily accessible by the workmen. Where drinking cups are necessary, a drinking cup shall be provided for each workman.

3.4.6. Where corrosive materials or harmful liquids are being handled, adequate washing facilities shall be provided in a convenient location.

Electrical Wiring and Lighting

3.4.7. All electrical equipment, installation and wiring shall conform to the appropriate provincial regulations or, in the absence of such regulations, to the provisions of the CSA C22.1-1972, "Canadian Electrical Code, Part I," and to the requirements in Articles 3.4.8. to 3.4.14.

3.4.8. Every electrical panel board shall be securely mounted on a substantial vertical support located in an area where water will not accumulate. Such panel board shall be readily accessible and clear of any obstruction for 3 ft to the front.

3.4.9. Every switch controlling a service supply, feeder or branch circuit shall be securely mounted on a substantial vertical support located in an area where water will not accumulate. Such switches shall be readily accessible and clear of any obstruction for 3 ft to the front.

3.4.10.(1) Switches described in Article 3.4.9. shall
(a) not be locked in the closed position,
(b) be capable of being locked in the open position, and
(c) have over any uninsulated current-carrying part a cover which shall be locked when the switch is in the closed position.

3.4.11. Cables and wires for electrical distribution shall be suspended overhead and adequate clearance provided for traffic where necessary. Where necessary such wires shall be protected by metal conduit, boards or planks.

3.4.12. Extension cords shall be disconnected from the power source when not in use.

3.4.13. Adequate lighting shall be provided in all work areas and in the means and paths of travel to and from such areas.

3.4.14.(1) Except where the connection is made by inserting an attachment plug cap on the cord of the electrical equipment or tool into a convenience receptacle, no person other than a workman qualified as an electrician or a workman who is similarly qualified by training and experience shall connect any electrical equipment or tool to a power source or disconnect any electrical equipment or tool from a power source with the exception of
(a) changing lamps, or
(b) inserting or removing of a plug cap serving equipment up to 600 volts.

(2) Where 240 or 600 volt equipment is used, the switch controlling such equipment shall be disengaged before plugs are inserted or removed.

(3) Workmen shall not use any cord-connected electrical equipment or tool unless the equipment or tool is effectively grounded with the exception of *approved* double insulated type tools.

Temporary Heat and Steam Supply

3.4.15. Temporary heat and steam supply shall be provided by *approved* apparatus installed and operated in a safe manner.

3.4.16. Heating *appliances* using gasoline or naphtha-type fuels are prohibited.

3.4.17. Adequate ventilation shall be provided for unvented oil- and gas-fired heaters.

3.4.18. Temporary steam piping shall be securely supported. Where such piping is within reach of workmen it shall be provided with guards or insulation to prevent burns. All piping, connections and valves shall be maintained in safe condition.

3.4.19. All fuel supply lines shall be securely supported and shall be protected from damage.

3.4.20. Electric heaters shall be designed and installed in accordance with CSA C22.1-1972, "Canadian Electrical Code, Part I."

3.4.21. Oil-fired heating *appliances* shall be installed in accordance with CSA B139-1971, "Installation Code for Oil Burning Equipment," except for Clause 12.3 of that Standard.

3.4.22. Natural-gas-fired heating *appliances* shall be installed in accordance with CSA B149.1-1971, "Installation Code for Natural Gas Burning Appliances and Equipment" and Supplement No. 1-1973.

3.4.23. Propane-fired heating *appliances* shall be installed in accordance with CSA B149.2-1969, "Installation Code for Propane Burning Appliances and Equipment" and Supplement No. 2-1973.

3.4.24. Solid-fuel-fired heating *appliances* shall be of *approved* construction and shall be vented by means of a permanent flue connection. The mounting and clearance for such *appliances* shall conform to the ACNBC Canadian Heating, Ventilating and Air-Conditioning Code 1975.

3.4.25. The clearances for flue pipes shall conform to the ACNBC Canadian Heating, Ventilating and Air-Conditioning Code 1975.

3.4.26. Warm air supply and exhaust ducts shall be constructed of *noncombustible* material and shall be adequately supported.

Fire Protection

3.4.27. The requirements in Subsection 2.2 for the safety of the public shall apply for the safety of the workmen and other persons on a *project.*

SUBSECTION 3.5 EXCAVATION

General

3.5.1. Requirements in Subsection 2.3 for safety of the public during excavation shall apply for the safety of the workmen and other persons on a *project.*

3.5.2. Where an excavation constitutes a hazard to workmen an effective barricade shall be provided around it.

3.5.3. When workmen are working near any excavation which is not required to be protected by a barricade as prescribed in Article 3.5.2., warning lights shall be provided and properly maintained from ½ hr before sunset until ½ hr after sunrise and at such other times when visibility is equally restricted.

3.5.4. Except as provided in Article 3.5.5., the sides of every excavation shall be securely shored and, unless written permission is obtained from the *appropriate authority having jurisdiction,* the shoring shall extend at least 1 ft above the top of the excavation.

3.5.5.(1) Shoring need not be provided
(a) where the excavation is 4 ft or less in depth,
(b) where the excavation is in solid rock,
(c) where the excavation is in *Type 1 soil* and does not exceed 6 ft in depth,
(d) in that portion of an excavation with sides sloped at an angle of not more than 45 deg. to the horizontal, or
(e) where the depth of excavation below the sloped sides in (d) does not exceed 4 ft.

3.5.6. Where the depth of excavation below the sloped sides in Clause 3.5.5.(d) exceeds 4 ft, the shoring shall extend at least 1 ft above the bottom of the sloped sides and shall be fitted with toeboards to prevent material from falling into the bottom of the excavation.

3.5.7. Shoring shall be installed as excavation proceeds or before excavation begins.

3.5.8. Removal of shoring shall be supervised by a person experienced in such work.

3.5.9. Equipment and material shall not be placed in or adjacent to an excavation in a manner that may endanger a person in the excavation.

3.5.10. Excavated material shall be placed at least 2 ft away from the edge of an excavation and piled so that the material cannot fall into the excavation.

3.5.11. Equipment shall not be driven or operated or located so as to endanger the stability of the walls of excavations in which persons are working.

3.5.12. Where necessary, additional bracing shall be installed in excavations to resist earth pressures due to loads from adjacent equipment or stored material.

3.5.13. Where work is being carried on in excavations, the sides of excavations shall be scaled and trimmed to reduce the danger of material falling on workmen. Overhanging banks, trees and stumps that may endanger workmen shall be removed.

3.5.14. No person shall work alone in a trench unless another person is on duty outside the trench close to where the person is working.

Staging and Escape Ladders

3.5.15. In trench excavations deeper than 4 ft, ladders or other *approved* means of egress shall be installed.

3.5.16. Staging in excavations shall consist of plank platforms supported on trestles or scaffolding.

Explosives

3.5.17. The use of explosives on a *project,* including handling, storing, drilling, placing, blasting cover, warnings and signals shall conform to Subsection 3.15.

Ventilation

3.5.18. In deep excavations adequate forced ventilation shall be provided where necessary for the safety of workmen.

Deep Foundation, Shaft and Tunnel Excavations

3.5.19. Excavations for *deep foundation units,* shafts and tunnels, including work in compressed air, shall be carried out in conformance with the regulations of the *appropriate authority having jurisdiction.*

3.5.20. A copy of the regulations of the *appropriate authority having jurisdiction* pertaining to work in compressed air shall be provided and maintained in good condition in a location readily accessible to the workman. (See also Article 1.3.7.)

3.5.21. Except for *deep foundation units,* the entire wall of every shaft more than 4 ft in depth in which there are workmen shall be braced by protective structures or devices of sufficient strength to prevent collapse.

3.5.22. Except for *deep foundation units,* every shaft opening shall be surrounded by a firm level area, and shall be provided with a barrier at least 42 in. in height consisting of a guardrail-with-toe-boards, or a fence. Such barriers shall be provided with a gate at least as high as the barrier.

3.5.23. Except for *deep foundation units,* a ladder shall be provided in every shaft with a landing or rest platform at vertical intervals not exceeding 20 ft. Such ladder shall not be installed in the same compartment as a hoistway.

3.5.24. All pipes, fittings and wires in shafts shall be securely fastened to supports and located so that they will not interfere with hoisting operations or the use of ladders.

3.5.25. Adequate illumination including emergency lighting in the event of power failure shall be provided in all excavations for *deep foundations,* shafts and tunnels.

3.5.26. Immediately prior to the start of any shift and following the use of explosives, the foreman shall inspect the shaft and all other underground areas. No other workman shall enter such areas until in the opinion of the foreman it is safe to do so.

3.5.27. Except as provided in Article 3.5.28., internal combustion engines shall not be operated in any underground work area or near the entrance to an underground work area or air intake.

3.5.28(1) When *approved,* internal combustion engines may be used in underground work areas provided

(a) effective ventilation is provided in the amount of at least 100 cu ft/min. of air for each brake horsepower of all such engines in all areas where they are operated,

(b) each engine is equipped with a properly maintained and regularly serviced *approved* exhaust gas conditioner,
(c) all engines are shut down immediately if the ventilation system ceases to function and not restarted until the ventilation system is again functioning effectively, and
(d) tests are conducted at least once each shift to determine the presence of harmful gases in such work areas.

Deep Foundation Units

3.5.29. Workmen or other persons entering an excavation for a *deep foundation unit* shall be protected by the installation of a casing of sufficient strength to resist expected pressures. Such casings shall extend from at least 12 in. above the ground level to at least 4 ft from the point where the work is being carried out.

3.5.30. A workman or other person in an excavation for a *deep foundation unit* shall wear a safety-belt with shoulder harness attached to a lifeline. Such lifeline shall extend to the top of the shaft and be attended continuously by another workman while the first workman is in the excavation.

SUBSECTION 3.6 CONSTRUCTION EQUIPMENT

General

3.6.1. No item of equipment shall be used which is unsafe or unsuitable for the operation being carried out.

3.6.2. Except for hand tools, the *owner* of power-driven equipment shall obtain a proper maintenance schedule and shall ensure that the equipment is maintained in good operating condition in accordance with the schedule. A permanent record of such maintenance shall be kept for the life of the equipment.

3.6.3. Repair, maintenance and refueling of equipment shall not be carried out while it is in operation.

3.6.4. Modifications and repairs to any item of equipment shall be carried out so as to retain the same factor of safety as the original design.

3.6.5. Equipment shall be operated by or under the direct supervision of a competent operator, and every employer and supervisor shall ensure that any person who is assigned to operate such equipment is instructed to carry out the assignment in a safe manner.

Trucks

3.6.6. Except when otherwise permitted by the *appropriate authority having jurisdiction* automotive trucks shall be operated by licensed drivers.

3.6.7. Automotive trucks shall be maintained in safe working condition.

3.6.8. When an automotive truck is being backed and may endanger the operator or workmen, another workman who has a clear view of the operator and the intended path of travel of the vehicle shall direct the operator.

3.6.9. The wheels of unattended automotive trucks shall be effectively blocked during loading from an excavation or on sloping ground.

3.6.10. During loading of an automotive truck by a power shovel, persons shall not remain in the truck except that the operator may remain in the truck cab when the cab is strengthened or permanently protected to withstand loads falling from the shovel.

Lifting Jacks

3.6.11. The rated capacity of every lifting jack shall be legibly cast or stamped in plain view on the jack.

3.6.12. Every lifting jack shall be equipped with a positive stop to prevent over-travel, except that an indicator showing the limit of travel may be used when a positive stop is not practicable.

Power-Driven Cranes and Shovels

3.6.13. Power-driven equipment such as cranes and shovels, including erection and use, shall conform to the appropriate provincial or municipal regulations.

Pile Driving Equipment

3.6.14. Driven *piles* and sheet-piling shall be adequately supported during placing, hoisting and removal, and workmen or other persons not engaged in the operation shall not be allowed in the work area.

3.6.15. *Pile* hammers shall be securely chocked when the equipment is not operating or, when this is not possible, the hammer shall not be raised until necessary.

3.6.16. *Pile* heads shall be cut perpendicular to the direction of driving and shall be cleared of debris, bark and slivers prior to driving.

3.6.17. Every steam boiler for *pile* driving shall conform to the appropriate provincial regulations. Every water or air hose connecting to the hammer shall be secured in place. Shut-off valves shall be located within easy reach of the operator.

3.6.18. Every operator of *pile*-driving equipment shall be protected by a cab, screen or other adequate protection. Safe access shall be provided such as by a ladder or steps and hand-holds.

Welding and Cutting

3.6.19. Welding equipment shall be operated by a fabricator or contractor who is fully qualified according to appropriate provincial statutes, or in the absence of such statutes to CSA W47-1947, "Welding Qualification Code for Application to Fabricating and Contracting Firms," or CSA W55.3-1965, "Resistance Welding Qualification Code for Fabricators of Structural Members used in Buildings."

3.6.20. All welding and cutting equipment and procedures shall conform to appropriate provincial statutes or in the absence of such statutes to the provisions of CSA W117-1952, "Code for Safety in Electric and Gas Welding and Cutting Operations."

3.6.21. Precautions shall be taken to reduce the possibility of fire caused by sparks or drops of heated metal from welding, cutting or similar operations.

3.6.22(1) Compressed-gas cylinders shall
(a) not be dropped or subjected to blows,
(b) not be hoisted by slings, and
(c) be secured in an upright position at all times.

3.6.23. Cylinder-valves shall be closed when work is finished or when cylinders are empty, and shall be protected by covers when the cylinders are not connected for use.

3.6.24.(1) Power tools shall be installed and used in accordance with safe practice.

(The intent of this Sentence may be deemed to be met by following the procedures laid down in the operating manual and instructions of the designer of the equipment, except where otherwise required by the *appropriate authority having jurisdiction.)*

(2) Power tools shall
(a) be adequately grounded if electrically operated,
(b) have safety attachments installed and maintained in service,
(c) have starting switches located within safe and easy reach of the operator, and
(d) when unattended be disconnected from the power supply where the tool is portable and is connected by an extension cord.

Explosive-Actuated Fastening Tools

3.6.25. Explosive-actuated tools and their use shall conform to CSA Z166-1966, "Safety Code for Explosive Actuated Tools."

SUBSECTION 3.7 CONSTRUCTION HOISTS

3.7.1. *Workmen's hoists* shall be designed, manufactured, tested, maintained and operated in conformance with CSA Z185-1972, "Safety Code for Workmen's Hoists, Tower and Cantilever Types."

3.7.2. *Materials hoists* shall be designed, manufactured, maintained and operated in conformance with CSA Z256-1972, "Safety Code for Material Hoists."

SUBSECTION 3.8 ACCESS TO AND EGRESS FROM WORK AREAS

General

3.8.1. Except for suspended scaffolds (Article 3.9.12.), adequate means of access to and egress from every excavation, floor, roof, platform and scaffold where work is being performed shall be provided by means of a stair, runway, ramp or ladder.

3.8.2.(1) Every means of access to and egress from work areas prescribed by Article 3.8.1. shall be

(a) maintained in a safe condition at all times,
(b) kept clear of obstructions,
(c) kept clear of ice, snow or other slippery materials, and
(d) where necessary to ensure firm footing, be sprinkled with sand or other suitably abrasive material.

3.8.3.(1) Except for the erection of structural framing and except as provided in Sentences (2) and (3), when work on a *building* or other structure has progressed to 2 storeys or 30 ft above ground level, whichever is the lesser, permanent or temporary stairs shall be provided as a means of egress from every working level to the ground.

(2) Where the stairs in Sentence (1) would interfere with work on the uppermost working level, stairs need not be provided within 2 storeys or 30 ft vertically of the uppermost working level, whichever is the lesser.

(3) Stairs required in Sentence (1) need not be provided for a *building* or other structure intended to be 100 ft or less in height in which permanent stairs are not to be built.

(4) Treads of stairs shall not create tripping or slipping hazards.

Temporary Stairs

3.8.4. Temporary stairs and landings shall be designed and constructed to support a live load of 100 lb/sq ft.

3.8.5.(1) Temporary stairs shall have

(a) treads and risers uniform in width, length and height in any 1 flight,
(b) a slope not exceeding 50 deg.,
(c) a vertical distance between landings not exceeding 12 ft, and
(d) on open sides including landings, a handrail equivalent to the top rail of a guardrail (see Subsection 3.11).

3.8.6. Temporary stairs shall be at least 30 in. in width, except that prefabricated temporary steel stairs with a minimum width of 20 in. may be used in a tower of steel scaffolding.

3.8.7. Metal pan stairs designed to receive concrete or other materials shall have temporary wooden treads securely fastened in place extending the full width and length of the treads and landings.

Runways, Ramps and Platforms

3.8.8.(1) Temporary runways, ramps or platforms other than scaffold platforms shall
(a) be designed and constructed to support all loads that may be imposed on them,
(b) be at least 19 in. in width,
(c) be securely fastened in place, and
(d) have all vertical supports braced diagonally and horizontally where necessary to prevent lateral movement.

3.8.9.(1) Except as provided in Sentence (3), a temporary ramp shall have a slope not exceeding 1 vertical to 3 horizontal.

(2) Except where provided in Sentence (3), where the slope of a temporary ramp exceeds 1 vertical to 8 horizontal, cross cleats shall be provided at regular intervals not exceeding 18 in., consisting of nominal 1-in. by 2-in. wood strips securely nailed to the ramp or other material providing equivalent resistance to slipping.

(3) A temporary ramp installed in the stairwell of a *building* not exceeding 2 storeys in height may have a slope exceeding 1 vertical to 3 horizontal but not exceeding 1 vertical to 1 horizontal provided cross cleats are installed at regular intervals not exceeding 12 in. and which consist of nominal 2-in. by 2-in. wood strips securely nailed to the ramp or of other material providing equivalent resistance to slipping.

Ladders

3.8.10. Every ladder shall be designed, constructed and used so as not to endanger the safety of any workman.

3.8.11. Commercially manufactured ladders used on a *project* shall be designed and constructed in conformance with CSA Z11-1969, "Portable Ladders."

3.8.12.(1) Site-fabricated wood ladders shall conform to Sentences (2) to (5).

(2) Site-fabricated wood ladders shall
(a) have side rails of straight-grained material free of loose knots, sharp edges, splinters and shakes,
(b) have cleats or rungs of straight-grained material free of knots, and
(c) not be painted or coated with an opaque material.

(3) Site-fabricated wood ladders of single width shall
(a) have side rails at least 16 in. but not more than 20 in. apart and of material not less than nominal 2 in. by 4 in. for ladders not more than 19 ft long and not less than nominal 2 in. by 6 in. for ladders over 19 ft long,
(b) have side rails that are not notched or spliced, and
(c) have cleats or rungs evenly spaced at not more than 12 in. on centres and of material not less than nominal 1 in. by 3 in. with filler blocks between the cleats or rungs.

(4) Site-fabricated wood ladders of double width shall
(a) have 3 rails evenly spaced,
(b) be not less than 5 ft in width,
(c) have cleats or rungs evenly spaced at not more than 12 in. on centres that extend the full width of the ladder, and
(d) have members designed to safely support the loads that may be imposed on the ladder.

(5) The maximum length of every site-fabricated wood ladder measured along the side rail shall be
(a) 16 ft for a trestle ladder or an individual section of an extension trestle ladder,
(b) 20 ft for a step-ladder or platform ladder,
(c) 30 ft for a single ladder or individual section of a ladder,
(d) 48 ft for a 2-section extension ladder, and
(e) 66 ft for an extension ladder having more than 2 sections.

3.8.13.(1) Every ladder shall be placed on a firm footing while being used on a *project*.

(2) Every ladder that is not securely fastened in place shall, while being used, be sloped so that the base of the ladder is not less than ¼ and not more than ⅓ of the length of the ladder from a point directly below the top of the ladder and at the same level as the base. Where such unsecured ladder exceeds 36 ft in length, it shall be held in place by a workman while being used.

(3) Where a ladder is used as a regular means of access between levels, it shall
(a) be securely fastened in place,
(b) extend at least 3 ft above the upper landing, level or floor,
(c) have a clear space of at least 6 in. behind every rung, and
(d) be located so that there are semi-circular landing surfaces at least 2 ft in radius and clear of obstructions at the top and bottom of the ladder.

(4) A ladder shall not be located in an elevator shaft or hoistway when such space is being used for hoisting.

(5) A ladder shall not be lashed to another ladder to increase its length.

(6) A ladder of double width shall be securely fastened in place while being used.

3.8.14.(1) Except as provided in Sentence (2), runs of 2 or more ladders shall have rest platforms with overhead protection at intervals not greater than 20 ft.

(2) Sentence (1) does not apply to permanently installed ladders that are provided with hoop protection or equivalent protection over their entire length.

3.8.15.(1) When a self-supporting step-ladder is being used
(a) the legs shall be fully spread and the spreader shall be locked, and
(b) the top of the step-ladder or pail shelf shall not be used as a step.

3.8.16. Overlaps of sections of extension ladders when fully extended for use shall conform to Table 3.8.A.

Table 3.8.A.

Forming Part of Article 3.8.17

Maximum Fully Extended Ladder Length, ft	Minimum Overlap, ft
38	3
44	4
50	5
Over 50	6
Column 1	2

3.8.17. Metal or wire-bound ladders shall not be used near any exposed electrical circuits or equipment.

SUBSECTION 3.9 SCAFFOLDS

General

3.9.1. Scaffolds constructed in conformance with this Subsection shall be provided for workmen engaged in work that cannot be done safely from the ground or from solid construction, except for work of short duration that can be done safely from ladders.

3.9.2. Barrels, boxes or similar loose objects shall not be used to stand upon while working or to support a scaffold or working platform.

3.9.3. The footings or supports for every scaffold shall be capable of carrying the maximum load without unsafe settlement.

3.9.4. The erection, use, dismantling or removal of a scaffold shall be done under the supervision of a person competent in this type of work.

3.9.5. During the erection, alteration or dismantling of a scaffold, other work shall only be done from the part of the scaffold which conforms with this Subsection and which is not beneath a part of the scaffold being erected, altered or dismantled, unless there is adequate overhead protection.

3.9.6. Every scaffold, including joints and platform planking, shall be capable of supporting at least 4 times the maximum intended load. Uprights shall be adequately braced diagonally and horizontally to prevent lateral movement. Horizontal members shall not be spliced between points of support. The scaffold shall be adequately secured to suitable supports at vertical intervals not exceeding 3 times its least base dimension. (See also Subsection 3.12.)

3.9.7. The material used in the construction of every scaffold shall be suitable for the intended use. Where lumber is used it shall be at least equal in strength to No. 1 spruce.

3.9.8. The platform of every scaffold shall be at least 19 in. wide and shall be securely fastened in place. Wood platforms shall be constructed of planks of the same thickness, not less than nominal 2 in. by 10 in. in size laid tightly together. The span of such planks shall not exceed 8 ft and their ends shall extend at least 6 in. but not more than 12 in. beyond the end supports. The load imposed on nominal 2-in. planking shall not exceed 50 lb/sq ft for spans up to 6 ft and 25 lb/sq ft for spans up to 8 ft.

3.9.9. Except for suspended scaffolds, every scaffold platform more than 5 ft above the level to which a workman may fall shall be provided with a means of access and egress conforming to Section 3.8.

3.9.10. The open sides and ends of every scaffold platform more than 10 ft above the level to which a workman may fall shall be provided with guardrails conforming to Subsection 3.11.

Outrigger Scaffolds

3.9.11. Outrigger beams for outrigger scaffolds shall extend not more than 6 ft beyond the face of the *building*. The inboard portion from fulcrum point to point of anchorage shall be not less than 1½ times the length of the outboard portion. The beams shall be securely braced at the fulcrum point against upsetting. The inboard end shall be securely anchored against upsetting and horizontal movement. Such beams shall be inspected before each use.

Suspended Scaffolds

3.9.12.(1) Every suspended scaffold shall be attached to a fixed support or outrigger beam designed and constructed to support at least 4 times the intended maximum load.

(2) The hoisting mechanism for suspended scaffolds shall be equipped with a positive device to control the descent of the scaffold.

(3) Fibre rope shall not be used for suspended scaffolds where the distance between pulley blocks exceeds 300 ft, or where corrosive substances are in the vicinity of the rope, or where grinding equipment or heat producing equipment such as gas or arc welding is used in the vicinity of the rope.

(4) Every suspended scaffold shall be anchored to the structure when not being raised or lowered or, where such anchorage is not practicable and where a workman may fall more than 10 ft from the scaffold, the scaffold shall have a guardrail on the structure side.

(5) The points of suspension for suspended scaffolds shall be at least 6 in. but not more than 18 in. from the ends of the platform.

(6) Every suspended scaffold shall have 16-gauge (0.063-in. diam.) 1½-in. wire mesh or equivalent securely fastened in place and extending from the toe-board to the top rail of the guardrail on the side away from the structure.

3.9.13.(1) Except as provided in Sentence (2), every workman or other person on a suspended scaffold shall use a safety belt and lifeline in conformance with Articles 3.1.8. to 3.1.12. Such safety belt shall be attached to an independently suspended lifeline. Such lifeline shall be attached overhead to a suitable support so that it is free from danger of chafing on any sharp edges, and in a manner so that failure of the scaffold support will not cause failure of the lifeline anchor.

(2) Sentence (1) does not apply where the suspended scaffold is designed, constructed and maintained in such a way that the failure of 1 support or 1 suspension will not cause the collapse of the scaffold directly or by progressive collapse of the other supports or suspensions.

Boatswain's Chairs

3.9.14.(1) Every boatswain's chair shall
(a) conform to Sentences 3.9.12.(1) to (3) and Sentence 3.9.13.(1),
(b) be at least 2 ft long and 10 in. wide, and
(c) be suspended from its 4 corners by a sling.

(2) Rope slings for boatswain's chairs shall be crossed diagonally beneath the seat.

(3) Slings for boatswain's chairs shall consist of at least ⅝-in. diam. fibre rope, ⅜-in. diam. wire rope or ⅜-in. diam. steel rod.

Ladder Jack Scaffolds

3.9.15.(1) A ladder jack scaffold shall
(a) have ladder jacks that transmit the load to the rails and not to the rungs of the ladders,
(b) not be used to provide a working platform more than 10 ft above the level to which a workman may fall, and
(c) have ladders that are fixed in position at top and bottom and spaced not more than 10 ft apart.

Mobile Scaffolds

3.9.16.(1) Where the height of a mobile scaffold exceeds 3 times its least lateral dimension at the base, such scaffold shall be equipped with outriggers, guy wires or other positive means to prevent overturning.

(2) The casters or wheels of a mobile scaffold shall be equipped with suitable braking devices which shall be applied when the scaffold is not being moved.

(3) A mobile scaffold shall not be moved when any workman or other person is on the scaffold unless every person on the scaffold is using a safety belt in conformance with Sentence 3.9.13.(1).

Other Scaffolds

3.9.17.(1) Scaffolds or components thereof that do not comply in all respcts with the provisions of this Code shall not be used unless *approved* for such use.

(2) Commercially manufactured scaffolds shall be used in accordance with safe practice.

(The intent of this Sentence may be deemed to be met by following the procedures laid down in the erection manual and instructions of the designer of the equipment, except where otherwise required by the *appropriate authority having jurisdiction.)*

SUBSECTION 3.10 TEMPORARY FLOORING

3.10.1. Every opening in a floor or other surface used by workmen and not protected by a guardrail shall be covered with securely fastened planks or other materials capable of supporting the load likely to be imposed thereon, but not less than 50 lb/sq ft.

3.10.2.(1) Except where suspended scaffolds are used and except as provided in Sentence (2), workmen shall not be permitted to work more than 2 storeys above the highest installed temporary or permanent floor.

(2) Where the vertical distance between adjacent column splices exceeds 2 storeys, workmen shall not be permitted to work more than 3 storeys above the highest installed temporary or permanent floor.

(3) The floors in Sentence (1) shall
(a) extend over the whole working area except for necessary openings which shall be protected by guardrails,
(b) have sufficient strength to support any load likely to be imposed on them and shall be at least equal in strength to No. 1 spruce having a nominal size of 2 in. by 10 in. and a maximum span of 8 ft, and
(c) be securely fastened to and supported on structural members capable of safely supporting the imposed loads.

SUBSECTION 3.11 GUARDRAILS

3.11.1. Guardrails shall be provided at every open edge of floors, roofs, ramps or other areas to which a workman has access and from which he may fall into water or where the vertical drop exceeds 10 ft, except that where wheelbarrows or other vehicles are used such protection shall be provided where the vertical drop exceeds 4 ft. Such guardrails shall not be removed except where necessary to perform required work. (See also Articles 2.4.3., 3.5.2., 3.5.22., 3.8.5., 3.9.10., 3.9.12. and 3.10.2.)

3.11.2. Every guardrail shall conform to Article 3.11.5., except that where higher than normal loads may be expected, such as may be caused by a group of workmen in a confined area, adequate additional strength shall be provided.

3.11.3. Guardrails shall not be used to prevent material or equipment from falling from one level to another level unless designed for this purpose.

3.11.4. Where required by the *appropriate authority having jurisdiction,* 16-gauge (0.063 in. diam.) 1½-in. wire mesh or equivalent shall be provided on the inner sides of the supporting members extending from the floor or toe-board to the top rail. (See also Article 3.9.12.)

3.11.5.(1) Except as provided in Sentence (4), guardrails shall be at least 36 in. but not more than 42 in. high.

(2) A wooden guardrail shall be free from splinters and protruding nails and shall consist of
(a) a top rail of at least nominal 2-in. by 4-in. securely supported on posts of at least nominal 2-in. by 4-in. spaced at intervals of not more than 8 ft,
(b) an intermediate rail of at least nominal 3-in. width securely fastened to the inner side of the post midway between the top rail and the toe-board, and
(c) a toe-board securely fastened to the posts and extending from the surface of the working area to a height of at least 5 in.

(3) A wire cable guardrail shall
(a) have a top cable and an intermediate cable of at least ½-in. diameter wire cable with vertical separators at least 2 in. wide spaced at intervals of not more than 8 ft,
(b) have a toe-board securely fastened to the inner side of the vertical separators and extending from the surface of the working area to a height of at least 5 in., and
(c) shall be kept taut by turnbuckles.

(4) Snow fencing may be used in lieu of a guardrail provided
(a) it consists of vertical wood strips, 4 ft long, at least 1½ in. wide and ⅜ in. thick, spaced at not more than 3½ in. on centres,

(b) the vertical wood strips are tied together with at least 5 double strands of 13-gauge (0.090 in. diam.) steel wire evenly spaced 10 in. apart, with each double strand twisted at least 3 times in each space between the wood strips so that the strips are tight between the wires, and
(c) adequately supported in a vertical position and kept taut.

(5) Where the *appropriate authority having jurisdiction* is of the opinion that a wire cable or snow fencing guardrail is not satisfactory, the guardrail shall be constructed in conformance with Sentence (2).

SUBSECTION 3.12 TEMPORARY WORKS

Bracing

3.12.1. Every structure shall be adequately braced to resist all expected loads during construction or alteration or where necessary for safety during demolition.

Falsework

3.12.2.(1) All falsework constructed for the purpose of supporting a part of a permanent concrete structure until that part of the structure becomes self supporting shall be designed, constructed, supported and braced to withstand safely all loads likely to be applied to it before, during and after the placing of concrete.

(2) Where the *authority having jurisdiction* requires falsework to be designed by a professional engineer
(a) the drawings shall
  (i) specify the dimensions of the falsework, size, type, grade and location of all components and the loads which the structure is intended to withstand,
  (ii) bear the signature and the seal of a designer competent in this type of work, and
  (iii) be kept on the job site at all times during the construction and the use of the falsework,
(b) the falsework shall be constructed in accordance with the design, and
(c) the falsework shall be inspected and accepted by a professional engineer before concrete is placed.

(3) Shores shall be erected upon adequate sills or pads which rest on properly compacted and stable bases. Care shall be taken to prevent deterioration in soil loadbearing capacity through weather or other causes.

(4) Individual vertical members of falsework placed on soil or resting on a slab shall be braced horizontally in 2 directions at right angles.

(5) Diagonal bracing from the top to bottom at 45 deg. shall be provided in 2 directions at right angles at every 4 rows of jacks.

(6) Where shoring is more than 1 tier in height, each tier shall be braced separately to prevent any lateral movement.

(7) Falsework supporting concrete shall not be removed until concrete has attained sufficient strength to support its own weight and the weight of all superimposed loads.

(8) Stripping of formwork from concrete shall be conducted in a manner designed to minimize risk of injury to workmen.

Design

3.12.3.(1) Temporary works shall be designed by a professional engineer competent and experienced in this type of work where required by the *appropriate authority having jurisdiction* or where such support or structure is
(a) shoring for an excavation over 20 ft in depth,
(b) scaffolding over 30 ft in height,

(c) falsework other than falsework that is 1 tier in height and in which the vertical loads from the deck are carried only by vertical members that do not require bracing against buckling at intermediate points in their height and in which diagonal members are required only to serve as bracing against unbalanced loads and inadvertent horizontal forces, or
(d) a cofferdam constructed in a location where its failure would endanger workmen.

(2) The temporary works in Sentence (1) shall be constructed in accordance with drawings that
(a) show the dimensions and specifications of the temporary supports or structures including type and grade of all materials, and
(b) bear the seal and signature of the designer.

(3) The drawings in Sentence (2) shall be kept at the *project* at all times while the temporary works are being constructed or used.

(4) All revisions to the design of the temporary works in Sentence (1) shall be made by a professional engineer competent and experienced in this type of work, and such revisions shall be shown on the drawings required in Sentence (2).

SUBSECTION 3.13 DEMOLITION

3.13.1. Requirements in Subsection 2.6 for the safety of the public shall apply to the safety of the workmen and other persons on a *project.*

3.13.2. A competent foreman shall be in charge of the demolition work at all times while work is in progress.

3.13.3. Where a structure to be demolished has been partially wrecked or damaged by any cause, shoring, bracing or other measures shall be provided to prevent accidental collapse of any part.

3.13.4. Demolition shall proceed in the reverse order to that used in the construction. Attention shall be paid to the principles of structural design to determine which parts of the structure depend on each other to maintain overall stability. Temporary supports to individual elements of the structure shall be provided where necessary to maintain safe conditions during demolition. All work above each level or floor shall be completed before the strength of the supporting members is impaired. In frame structures the frame may be left in place during demolition of other components provided all masonry or loose material is removed from the frame as work progresses.

3.13.5. Trusses, girders, beams or other structural members shall not be disconnected or cut until they have been relieved of all loads except their own weights and given temporary support.

3.13.6. Adequate support for the remaining structure shall be provided during the removal of masonry or concrete floors, and planking or walkways shall be provided for the workmen. The area below such work shall be closed to workmen and other persons while the work is in progress.

3.13.7. Masonry walls shall be removed in reasonably level courses. Masonry shall neither be loosened in large masses nor permitted to fall in large masses from one level to another where adjoining structures or property may be endangered. All cornices, string courses and other projections shall be supported until removed. Workmen shall not stand on any wall, pier or chimney to remove material therefrom unless safe flooring or scaffolding is provided on all sides at a distance not more than 10 ft below the level at which the work is being done.

3.13.8.(1) In *buildings* more than 25 ft high all exterior window and door openings within 20 ft of chutes or shafts used for removal of debris shall be solidly boarded up.

(2) Openings in floors below the level of demolition not used for removal of material or debris shall be covered by planking or barricaded.

3.13.9. Dust shall be controlled by suitable means to prevent harm to the workmen and other persons on the *project.*

3.13.10. Where a structure being demolished is required to support a gin pole, derrick or other similar equipment, adequate supports shall be provided to prevent overloading of any part of the supporting structure.

3.13.11. All scaffolding required for demolition work shall be self-supporting and shall conform to Subsection 3.9.

3.13.12. During demolition all old material and debris shall be removed as fast as practicable and shall not be allowed to overload any part of the existing structure.

3.13.13. Where the requirement of Article 2.6.5. is not practicable, the debris shall be controlled by means of a chute or enclosed shaft or shall be lowered in suitable containers. Where a chute is inclined at more than 45 deg. to the horizontal, it shall be completely enclosed. Large objects which cannot be controlled by means of a chute or shaft or which might jamb in a chute or shaft shall be lowered by means of adequate hoisting gear. Where wheelbarrows are used a block or cleat shall be securely fastened to the floor at the opening of the chute or shaft.

3.13.14. Entrances to chutes or shafts not in use shall be covered.

3.13.15. Debris that is not used for on-site fill shall be removed from the site. Such material shall be assembled in piles on the site pending removal therefrom. Material such as lumber, bricks, blocks, stone and steel beams shall be stacked in an orderly manner in conformance with Subsection 3.3.

3.13.16. No debris or other material shall be burned on a site unless *approved.*

3.13.17. When used to fill a cellar or basement, debris shall be covered with at least 1 ft of earth or sand.

3.13.18.(1) When mechanical methods of demolition are being used, workmen performing demolition operations or other persons authorized by the *constructor* may enter *buildings* or spaces within the areas affected by demolition, but such persons shall not be permitted on or within the structure being demolished, nor shall such persons, except the operating crew, be permitted within the areas affected by demolition while a mechanical demolition device described in Article 2.6.6. is in operation.

(2) The controls of mechanical devices used in mechanical methods of demolition shall be located and operated at a safe and reasonable distance from the point of demolition.

SUBSECTION 3.14 PREVENTION OF CONTACT WITH OVERHEAD POWER LINES

3.14.1. Backhoes, shovels, cranes or similar lifting devices shall not be operated closer than the length of their booms to an electric power line of more than 750 volts unless there is a workman stationed within view of the operator to warn him when any part of the machine or its load is approaching the minimum safe distance from the power line as prescribed in Article 3.14.2.

3.14.2. Parts of equipment including booms, cables, loads or other objects shall not be brought closer to an electric power line of more than 750 volts than the minimum safe distances as specified in Table 3.14.A. unless such line has been electrically insulated or disconnected from the electrical supply.

Table 3.14.A

Forming Part of Article 3.14.2

TABLE OF MINIMUM SAFE DISTANCES FROM ELECTRIC POWER LINES	
Maximum Voltage of Live Power Line, volts	Minimum Safe Distance, ft
150,000	10
250,000	15
550,000	20

3.14.3. Before work is begun in the vicinity of an overhead electric power line of over 750 volts, the authority controlling the electric power line shall be notified.

SUBSECTION 3.15 EXPLOSIVES

Workmen

3.15.1.(1) Blasting operations shall be conducted and directed by a workman competent in the use of explosives.

(2) All workmen engaged in storage, transportation and handling of explosives shall be adequately trained and shall observe all precautions for the prevention of accidents by fire or explosion.

(3) Workmen assisting in blasting operations shall be under constant supervision and direction of a workman competent in the use of explosives.

Storage

3.15.2.(1) Explosives shall be stored in conformity with the Canada Explosives Act and Regulations.

(2) A supply of explosives or *detonators* required for use in 1 day may be stored on site in a locked fire-resistant receptacle of substantial construction.

(3) Explosives storage receptacles shall be
(a) located a safe distance from any potential fire hazard,
(b) located a safe distance from roads or occupied *buildings*,
(c) used exclusively for the purpose of keeping explosives, and
(d) kept clean with any metal parts effectively covered.

(4) A distance of at least 150 ft shall be maintained between *detonator* storage receptacles and explosives storage receptacles unless shorter distances have been *approved.*

(5) Explosives storage receptacles shall be identified by the use of suitable "EXPLOSIVES" signs, located in the immediate vicinity of the storage receptacle.

(6) Detonating cord shall not be stored with *detonators.*

(7) Detonating relays shall be stored separately or with *detonators* only.

(8) Blasting explosives and *detonators* shall be kept and handled separately until the last most practicable moment before bringing them together.

Transportation

3.15.3.(1) Explosives shall be transported in accordance with the provisions of the Canada Explosives Act and Regulations.

(2) *Detonators* shall be transported in a properly identified crush-resistant box equipped with handles and containing no other articles or equipment.

(3) Materials likely to cause fire or explosion shall not be transported with explosives.

(4) Not more than 2 workmen in addition to the driver shall be permitted in vehicles transporting explosives.

(5) Vehicles used for transporting explosives shall be mechanically sound. The carrying compartment shall have a closed body or be provided with sides and ends of sufficient height to prevent the explosives from falling from the vehicle. Explosives transported in an open bodied vehicle shall be tightly covered with a tarpaulin having a resistance to fire conforming to NFPA 701-1969, "Standard Methods of Fire Tests for Flame-Resistant Textiles and Films."

(6) Metal in explosive-carrying conveyances shall be effectively covered to prevent contact with explosives packages.

(7) Vehicles carrying explosives shall
(a) be attended at all times by a competent person at least 18 years of age,
(b) display "EXPLOSIVES" signs visible from all sides of the vehicle, and
(c) be equipped with a fire extinguisher not less than 10-lb capacity suitable for Type B and C fires.

(8) Vehicles to be used for transporting explosives shall be fueled prior to loading of explosives and shall be refueled only when necessary thereafter.

(9) Explosives and *detonators* shall not be transported on the same vehicle unless they are separated by a solid 6-in. wooden bulkhead or material which provides equivalent protection.

Drilling

3.15.4.(1) No drilling of holes for explosives shall be carried out
(a) in a previously drilled hole or within 6 in. of any part of a previously drilled hole,
(b) except as provided in Sentence (2), within 25 ft of a hole that has been loaded with explosives, or
(c) within 2 ft of a hole that has been loaded but has misfired.

(2) A drill hole may be drilled within 25 ft but not less than 3 ft from a hole being loaded with or containing explosives provided that
(a) an *approved* specification has been prepared by a designer competent in this area of work,
(i) describing the precautions to be taken to prevent the accidental detonation of the explosives in a loaded hole by the drilling of another hole, and
(ii) bearing the signature and seal of the designer, and
(b) a copy of the specification referred to in Clause (a) is kept at the *project* while the drilling and blasting to which the specification refers are being carried out.

(3) All drillholes for explosives shall be of sufficient size to permit the free entry of the explosives to the bottom of the hole without ramming, pounding, cutting or the application of pressure.

Deteriorated Explosives

3.15.5. Deteriorated, defective or otherwise unserviceable explosives shall not be used in a blasting operation, but shall be destroyed in accordance with safe practice.

Fire Hazard

3.15.6. Materials of a highly flammable nature and open flames, including ignited tobacco products, shall not be or permitted to be in the vicinity of explosives storage or handling facilities.

Safety Fuse

3.15.7.(1) Where a safety fuse is used as a means of initiating a *detonator,* the fuse shall
(a) be capped or crimped with a suitable tool at a controlled place other than where explosives are stored,

(b) be cut squarely prior to insertion into the cap, and
(c) be of adequate length to permit the lighter of the fuse to reach a place of safety prior to the explosives detonation, but in no case shall the fuse length be shorter than 3 ft.

(2) Before igniting a safety fuse a workman shall ensure that
(a) all access areas into the blast site are effectively guarded, and
(b) all other workmen are clear of the blast site and every reasonable precaution has been taken for protection of the public and property.

(3) Safety fuse spitters shall be no longer than ½ the length of the shortest fuse to be lit, and shall in all cases be at least 3 ft shorter than the shortest fuse to be lit.

Electric Blasting

3.15.8.(1) Where explosives are detonated by the use of electric blasting caps
(a) each circuit shall be tested with an *approved* device prior to firing,
(b) blasting cap leg wires and circuit lead wires shall be short circuited
  (i) until the last practicable moment prior to firing, and
  (ii) before the blaster returns to the blast site,
(c) the entry of extraneous electricity capable of initiating any part of the blasting circuit shall be prevented,
(d) all electrical equipment used as part of a system to detonate explosives shall be maintained in good mechanical condition, and
(e) caps of different manufacture shall not be mixed in the same blast.

3.15.9.(1) Accidental detonation caused by radio transmission signals shall be prevented by
(a) the prohibition of mobile transmitters from the *blasting area,* or
(b) warning signs posted to prohibit the use of transmitters and where necessary the employment of flagmen, and
(c) keeping blasting circuits on the ground, with bare connections elevated only sufficiently to prevent current leakage.

3.15.10.(1) Transportation of electric blasting caps in radio transmitter equipped vehicles shall be permitted only under the following conditions:
(a) the caps are transported in resilient rubber or felt lined, closed metal containers, electrically grounded to the vehicle,
(b) the caps are contained in their original containers with their leg wires folded and shunted, and
(c) the radio transmitter is switched off whenever the cap container is open.

Pneumatic Loading

3.15.11.(1) Pneumatic explosives loading machines shall
(a) be equipped with a semi-conductive hose designed for this purpose, and
(b) be effectively grounded before and during the loading operation.

(2) Pneumatically loaded holes for explosives shall not be bottom primed if electric blasting caps are used unless *approved.*

Stripping of Cartridges

3.15.12. Explosives cartridges shall not be stripped.

Primed Charge Limitation

3.15.13. The number of *primed charges* to be made up shall not exceed the number of charges to be fired, and in a *primed charge* the *detonator* shall be securely attached to the explosives cartridge.

Loading

3.15.14.(1) Metallic loading rods or rods with metallic fittings shall not be used for loading holes with explosives.

(2) Loading operations shall be so organized that loading takes place at the farthest practicable point from drilling operations. A distance of at least 25 ft shall be maintained between drilling and loading operations.

(3) Vehicles or other mechanical equipment shall not be driven over holes loaded with explosives.

(4) All holes loaded with explosives in a *blasting area* shall be fired at the same time.

(5) Holes loaded with explosives shall not be left unattended.

Detonating

3.15.15.(1) Where detonating cords are used, the cords shall not be interconnected or attached to trunk cords until all holes are loaded with explosives.

(2) Detonating relays used as a means to provide firing sequence shall be attached close to the holes in which detonation is to be delayed to minimize misfires by cutting off holes.

Hole Springing

3.15.16. Adequate time for the hole to cool shall be maintained between the time that a hole is enlarged by explosives and is reloaded.

Precautions Before Blasting

3.15.17.(1) Blasting shall not take place until
(a) All persons are removed from the blast site and are in a position of safety,
(b) the access areas to the blast site are effectively guarded by trained workmen, and
(c) a clear and distinct signal, the details of which have been posted at the site, is sounded to give warning of the impending blast.

Firing

3.15.18.(1) When conducting blasting operations in proximity to *buildings,* railways, roads or inhabited areas, precautions shall be taken to protect against injury to persons or property by
(a) limiting the explosive charge to the necessary minimum,
(b) the use of blasting mats or other devices or techniques to minimize flying rock,
(c) closing approaches and thoroughfares to the *blasting area,* and
(d) ensuring that no person remains within the area made potentially dangerous by the blasting operation.

Misfiring

3.15.19.(1) Where there is evidence of a possible misfire, no person shall enter the *blasting area* until
(a) a period of 30 min. has elapsed if the explosives were detonated electrically, or
(b) after the lighting of the last fuse if the explosives were initiated by safety fuse.

(2) Misfired holes shall be
(a) clearly marked by the insertion of a wooden marker, and
(b) reprimed where required with a new *primed charge* and reblasted, except that where the explosive is a bottom-primed nitro carbo-nitrate mixture, such holes shall be washed with water, reprimed with a new *primed charge* and reblasted.

(3) When the location of misfired holes may be obstructed by broken rock
(a) hand removal of as much rock as practicable shall be undertaken, and
(b) where deemed necessary, metallic equipment may be used for removal of broken rock under direct supervision and control of a workman competent in the use of explosives.

(4) A thorough examination shall be made of the blast site to ensure that no undetonated charges remain in the blast holes. No drilling or other work shall be undertaken in the *blasting area* until all misfired charges have been detonated.

(5) Where an additional hole and charge is essential for blasting a misfired hole

(a) a distance of at least 2 ft shall be maintained from the misfired hole,
(b) the hole shall be drilled in a direction which shall not approach the hole in which the misfire occured, and
(c) the drilling shall be strictly supervised by a workman competent in the use of explosives.

Log Book

3.15.20. Each blast shall be recorded in a log book to the satisfaction of the *appropriate authority having jurisdiction.*

SUBSECTION 3.16 WORK IN COMPRESSED AIR

3.16.1. Work in compressed air shall conform to CSA Z275.3-1974, "Occupational Safety Code for Construction Work in Compressed Air."

SUBSECTION 3.17 TRENCH EXCAVATIONS

3.17.1. This Subsection applies to all trench excavations.

3.17.2.(1) Except as provided in Sentences (2) and (3), a wall of a trench shall be adequately supported by a *support system* that
(a) is of sound material, and
(b) extends at least 1 ft above the top of the trench.

(2) Where a trench is covered to permit the movement of vehicular traffic when work on a trench is not in progress, the *support system* shall extend at least to the top of the trench.

(3) Sentence (1) does not apply to a part of a trench that
(a) is 4 ft or less in depth,
(b) no workman is required to enter for any purpose,
(c) is cut in solid rock,
(d) has walls that are sloped to within 4 ft of the bottom of the trench such that the slope does not exceed 45 deg., or
(e) has walls that are sloped to within a distance that is more than 4 ft from the bottom of the trench such that the slope does not exceed 45 deg., and the unsloped portions of the walls are supported by a *support system* that
(i) is of sound material,
(ii) extends at least 1 ft above the bottom line of the slope, and
(iii) has toe-boards to prevent material from falling into the trench.

3.17.3.(1) A *support system* shall be installed during the excavation of a trench, except that a *support system* may be installed before excavation.

(2) A *support system* shall be removed from a trench only by a competent person or under the personal supervision of a competent person.

3.17.4.(1) Every trench shall be provided with a ladder or other equally effective means of access and egress, and where a ladder is used it shall extend at least 3 ft above the top of the trench.

(2) In a trench a workman shall not be
(a) more than 50 ft from a means of egress required under Sentence (1), and
(b) required to pass along a path of a trench that is not supported in accordance with Article 3.17.2. in order to reach a means of egress required under Sentence (1).

3.17.5. Trenches shall be kept free of tools, machinery, timber or other objects that may endanger a workman in the trench.

3.17.6.(1) Where a trench is in or adjacent to a *public way* or a private way
(a) an adequate fence, guard or barricade shall be provided at the top of the trench at all times, except when it is necessary to remove the fence, guard or barricade to permit work to be done, and

(b) during the hours of darkness all tools, machinery and excavated or other material that might interfere with vehicular or pedestrian traffic on the private or *public way* shall be marked by flashing devices or flares.

3.17.7. The applicable requirements in Subsection 3.5 shall apply to trench excavations.

3.17.8.(1) The type of soil in which a trench is excavated shall be determined by the type of soil at the walls of the trench and within a horizontal distance from each wall equal to the depth of the trench.

(2) Where soil is made up of more than 1 type of soil, it shall be deemed to be that type of soil which is the least solid of the soils it comprises.

3.17.9.(1) Except as provided in Articles 3.17.10. and 3.17.11., *support systems* shall be
(a) designed by a professional engineer in accordance with good engineering practice, and
(b) constructed in accordance with the design under the supervision of a professional engineer.

(2) Drawings and specifications of the *support system* designed under Sentence (1) shall
(a) show the size and specifications of the *support system* including the type and grade of all materials to be used in its construction,
(b) state the maximum depth of the trench and the types of soil for which the *support system* is designed,
(c) bear the signature and seal of the professional engineer referred to in Sentence (1), and
(d) be kept at the *project* at all times that the shoring is in position or the *prefabricated support system* is on the *project.*

(3) Two copies of the drawings and specifications referred to in Sentence (2) shall be sent to the *appropriate authority having jurisdiction* before the commencement of work on a trench.

3.17.10. Where a trench is not more than 25 ft in depth and is not more than 12 ft in width, shoring shall be in accordance with Articles 3.17.12. to 3.17.16.

3.17.11.(1) Article 3.17.9. does not apply to a *prefabricated support system* when the size, spacing and composition of the members are identical to those of the shoring prescribed under Article 3.17.12. to 3.17.16. for the trench in which the *prefabricated support system* is used.

(2) Where a *prefabricated support system* is used in a trench, its capacity shall be at least equal to the capacity of the shoring described in Articles 3.17.12. to 3.17.16.

3.17.12.(1) Shoring for the *support system* of Article 3.17.10. shall consist of *sheathing, struts* and *wales,* except that *wales* need not be used where a trench does not exceed 10 ft in depth and is in *Type 1 soil.*

3.17.13.(1) *Sheathing* shall consist of planks at least equal in strength to No. 1 spruce.

(2) The planks required under Sentence (1) shall
(a) be vertical,
(b) be securely held in place against *wales* or, where *wales* are not used, be securely held in place against *struts,*
(c) except as provided in Sentence (3), be at least 2 in. thick and 8 in. wide, and
(d) except as provided in Sentence (4), be not more than ½ in. apart.

(3) Where a trench is in *Type 4 soil* and exceeds 10 ft in depth, the planks required under Sentence (1) shall be at least 3 in. thick and 8 in. wide.

(4) The maximum spacing measured centre to centre for the planks required under Sentence (1) shall, where a trench is in *Type 1* or *Type 2 soil,* be that spacing set out in Table 3.17.A.

Table 3.17.A.

Forming Part of Article 3.17.13.

Trench Depth, ft	Maximum Spacing of Planks, ft	
	Type 1 Soil	*Type 2 Soil*
Over 4 and not over 10	4	4
Over 10 and not over 15	4	4
Over 15 and not over 20	2	0
Column 1	2	3

3.17.14.(1) *Wales* shall
(a) be each composed of a solid piece at least equal in strength to No. 1 spruce,
(b) be parallel to the bottom or proposed bottom of the trench,
(c) be supported
  (i) on *cleats* spiked to the *sheathing,*
  (ii) by *posts* set on the *wale* immediately below, or
  (iii) in the case of the lowest *wale,* by *posts* set on the bottom of the trench, and
(d) be spaced at a maximum of 4 ft centres.

(2) The minimum size of a *wale* shall conform to Table 3.17.B.

Table 3.17.B.

Forming Part of Article 3.17.14.

Trench Depth, ft	Minimum Size of *Wale,* in.	
	Types 1, 2 and *3 Soil*	*Type 4 Soil*
Over 4 and not over 10	6 x 6	8 x 8
Over 10 and not over 15	8 x 8	10 x 10
Over 15 and not over 20	8 x 8	12 x 12
Over 20 and not over 25	10 x 10	14 x 14
Column 1	2	3

3.17.15.(1) Except as provided in Article 3.17.16., *struts* shall
(a) each be composed of a solid piece at least equal in strength to No. 1 spruce,
(b) be horizontal and at right angles to the *wales* or, where *wales* are not used, to the *sheathing,*
(c) fit tightly between the *wales* or, where *wales* are not used, between the *sheathing,*

(d) be adequately supported by *cleats,* and
(e) be spaced at a maximum of 4 ft centres vertically and at a maximum of 8 ft centres horizontally.

(2) Where a trench is not more than 6 ft in width, the minimum size of a *strut* shall conform to Table 3.17.C.

Table 3.17.C.

Forming Part of Sentence 3.17.15.(2)

Trench Depth, ft	Minimum Size of *Strut,* in.		
	Type 1 and *2 Soil*	*Type 3 Soil*	*Type 4 Soil*
Over 4 and not over 10	4 x 4	6 x 6	6 x 6
Over 10 and not over 15	6 x 6	6 x 6	8 x 8
Over 15 and not over 20	6 x 6	6 x 6	10 x 10
Over 20 and not over 25	8 x 8	8 x 8	12 x 12
Column 1	2	3	4

(3) Except as provided in Sentence (4), where a trench is more than 6 ft in width but not greater than 12 ft in width, the minimum size of a *strut* shall be 8 in. by 8 in.

(4) Where a trench as described in Sentence (3) is in *Type 4 soil,* the minimum size of a *strut* shall conform to Table 3.1.17.D.

Table 3.17.D.

Forming Part of Sentence 3.17.15.(4)

Trench Depth, ft	Minimum Size of *Strut,* in.
Over 10 and not over 15	10 x 10
Over 15 and not over 20	12 x 12
Over 20 and not over 25	12 x 12
Column 1	2

3.17.16.(1) A metal trench-jack or trench-brace may be substituted for a *strut* prescribed by Article 3.17.15. where the strength of the trench-jack or trench-brace is at least equal to the strength of the *strut.*

(2) A rating indicating the strength of a trench-jack or trench-brace in pounds shall
(a) be established by a professional engineer,

(b) not exceed the ultimate capacity of the trench-jack or trench-brace when it is tested by an axial load in a testing machine at the maximum length at which the trench-jack or trench-brace is designed to be extended, and
(c) be legibly cast or stamped in plain view on the trench-jack or trench-brace.

SUBSECTION 3.18 FIRST AID

3.18.1. Where required by the *appropriate authority having jurisdiction,* a person qualified in first aid shall be appointed to direct first aid work on a *project.* Such person shall maintain a list of employees qualified to serve in first aid work as assistants.

3.18.2. A complete first aid kit shall be maintained on every *project.* Where required by the *appropriate authority having jurisdiction,* a standard stretcher and cot bed shall be provided on a *project.*

3.18.3. A complete report of all accidents and treatments shall be sent to the Workmen's Compensation Board and other appropriate authorities when required by the *appropriate authority having jurisdiction.*

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