CANADIAN CODE

for

CONSTRUCTION SAFETY

1970

(First printing — 1972)

Issued by the

Associate Committee on the National Building Code
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PREFACE

The Canadian Code for Construction Safety 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 the workmen during any construction, alteration or demolition operation. This Code is, therefore, broader in scope than Part 8 of the National Building Code of Canada 1970 which is limited to requirements for the safety of the public in the vicinity of building sites.

The requirements in this Code for the protection of the public are based on Part 8 of the National Building Code but with changes to make them applicable to all types of structures including buildings. These requirements appear in Section 2.1. The requirements which apply to the protection of workmen on a project are in Section 3.1.

This first edition of the Canadian Code for Construction Safety was prepared with the purpose of providing a set of construction safety regulations which may be applied throughout Canada. It is hoped that the document will commend itself to all those responsible for this vital area of safety. It is written in regulatory form to facilitate its direct use through legal adoption or enactment by the appropriate authority. Criticisms and suggestions for its improvement will be welcomed by the Associate Committee on the National Building Code.

All communications with regard to this Code should be addressed to :

The Secretary
Associate Committee on the National Building Code
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Ottawa, Ontario K1A 0R6

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Canadian Code for Construction Safety 1970

SECTION 1.1 GENERAL

SUBSECTION 1.1.1. SCOPE

1.1.1.1.(1) Construction safety regulations issued by the appropriate Provincial authority shall apply in addition to the requirements in this Code.

(2) Section 2.1. of this Code applies to the protection of the public for the duration of a *project*.

(3) Section 3.1. of this Code applies to the protection of the workmen and other persons on a *project*.

SUBSECTION 1.1.2. ADMINISTRATIVE REQUIREMENTS

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

1.1.2.2. 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.

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

1.1.2.4. 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.

1.1.2.5. 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.

1.1.2.6. 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.

1.1.2.7. 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 1.1.2.6.

SUBSECTION 1.1.3. DEFINITIONS

1.1.3.1. The words and terms in italics in this Code shall have the meanings assigned to them in Article 1.1.3.2.

1.1.3.2. In this Code

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.

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

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

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

Caisson (see *pier* or *caisson*).

Combustible (as applying to an elementary building material) means that such material fails to conform to CSA B54.1-1960 (as amended October 1969), "Determination of Noncombustibility in Building Materials" or to ASTM E136-65, "Noncombustibility of Elementary 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 the *owner* of a *project* for the work thereon and includes an *owner* who contracts with more than one person for the work on a *project* or undertakes the work on a *project* or any part thereof.

Design bearing pressure (as applying to foundations) means the maximum allowable net pressure on soil or rock.

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.

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 B54.1-1960 (as amended October 1969), "Determination of Noncombustibility in Building Materials," or to ASTM E136-65, "Noncombustibility of Elementary 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 construction.

Pier or *caisson* (as applying to foundations) means a shaft of concrete or other material formed in the ground by excavation and filling for the purpose of sustaining a load. (An essential feature of a *pier* or *caisson* is that the soil or rock at the bottom can be manually and visually inspected.)

Pile means a slender structural member that is driven, jetted or otherwise embedded in the ground for the purpose of sustaining a load.

Project means any construction, alteration or demolition operation.

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.

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*.)

Tower (as applying to a *construction hoist*) means the structure that forms the hoistway for the travel of the car and provides the support for the top beams, guide rails, and other parts necessary for the operation of the hoist.

User (as applying to a *construction hoist*) means the person in charge of a *construction hoist* as owner, lessee or otherwise, but does not include an operator or attendant.

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

SECTION 2.1. PROTECTION OF THE PUBLIC

SUBSECTION 2.1.1. FENCING AND BARRICADES

2.1.1.1. Except where the work is to be done within a solid enclosure or where the *project* is at a distance of 7 ft or more from a public way used by pedestrians, work shall not commence on the *project* until a covered way has been provided as described in Article 2.1.1.2. to protect the public.

2.1.1.2. 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.

2.1.1.3. 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 when so required by the *appropriate authority having jurisdiction*. Such structures shall have a reasonably smooth surface facing the public way.

2.1.1.4. 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.

SUBSECTION 2.1.2. FIRE PROTECTION

2.1.2.1. Fire extinguishing equipment shall be of an *approved* type.

2.1.2.2. 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.

2.1.2.3. Where a permanent standpipe and hose system are to be installed in a *building*, they shall be installed progressively, so far as is practicable, as the building construction proceeds. Such standpipe and hose system shall be in accordance with the appropriate requirements of Part 6 of the National Building Code of Canada 1970.

2.1.2.4. At least one 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 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.

2.1.2.5. At least one pressurized dry-chemical 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, and

(c) a tar or asphalt kettle is used.

2.1.2.6. 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.

2.1.2.7. 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 2.1.3. EXCAVATION

2.1.3.1. Except as provided in Article 2.1.3.2., 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 and in such a way to afford safety to the public.

2.1.3.2. 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 begins,

(c) a suitable method of excavation is adopted which will ensure that they are not damaged, and

(d) suitable temporary supports are provided.

2.1.3.3. 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.

2.1.3.4. 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 2.1.4. USE OF STREETS OR PUBLIC PROPERTY

2.1.4.1.(1) Except as provided in Article 2.1.4.2., 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.

2.1.4.2. 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.

2.1.4.3. Excavation 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.*

2.1.4.4. 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.

2.1.4.5. Warning lights shall be placed at all obstructions on streets or other public way and shall be in operation at these locations during the hours of darkness.

SUBSECTION 2.1.5. CONTROL OF VEHICULAR TRAFFIC

2.1.5.1. Where a hazard to vehicular traffic on a public way is created by work on the *project*, one or more of the following shall be provided as appropriate to provide adequate control of the traffic :

(a) one or more flagmen,

(b) warning signs,

(c) barriers,

(d) lane control devices,

(e) flashing lights or flares located at a suitable distance from the hazard.

2.1.5.2. A flag used by a flagman for traffic control 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.

2.1.5.3. A sign used by a flagman for traffic control 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 one 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 eight-sided figure, with the word "STOP" or "ARRÊT", as appropriate for the district in which the *project* is located, in clearly distinguishable white letters approximately 6 in. in height located centrally on the sign, and 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, and

(d) maintained in a clean condition when being used.

2.1.5.4. The flagman shall

(a) be equipped as required by Article 2.1.5.5.,

(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 control, and

(d) control traffic by using either a flag or sign.

2.1.5.5. A flagman's clothing, while he is controlling traffic, shall include the following which shall be fluorescent and coloured either blaze orange or red :

(a) a hat, and

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

(c) a vest.

SUBSECTION 2.1.6. DEMOLITION

2.1.6.1. Adequate provisions to prevent damage to adjoining properties shall be made before demolition is begun.

2.1.6.2. All existing gas, electrical, water, steam and other services to the site shall be shut off, capped and labelled at the property line. 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 and in such a way to afford safety to the public.

2.1.6.3. Prior to any demolition all glass throughout the *building* shall be removed or otherwise protected to ensure the safety of the public.

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

2.1.6.5. Except as provided in Article 3.1.13.13., 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.

2.1.6.6. The wrecking of a structure or part thereof with a heavy weight suspended by a cable from a boom or hoist, or by the use of a power shovel, tractor or other mechanical contrivance, shall be permitted only when *approved.*

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

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

2.1.6.9. A structure or part of a structure shall not be left in such a condition that it constitutes a danger to the public.

2.1.6.10. On completion of the demolition work the site shall be left in a condition such that no hazard to safety or health and no fire hazard has been created. Cellars and excavations that are not adequately barricaded shall be backfilled to grade. Sidewalks, roads and other property to which the public has access shall be left free of obstructions and in a safe condition.

SECTION 3.1. PROTECTION OF THE WORKMEN AND OTHER PERSONS ON A PROJECT

SUBSECTION 3.1.1. PROTECTIVE CLOTHING, EQUIPMENT AND DEVICES

General

3.1.1.1.(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 should 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.*)

3.1.1.2. *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.

3.1.1.3. Where workmen or other persons are exposed to electrical hazards they shall wear nonconductive safety hats designed to minimize these hazards.

3.1.1.4. 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 by a suitable device to guard against such injury.

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

3.1.1.6. 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.

3.1.1.7. 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

3.1.1.8. Except as provided in Article 3.1.1.13. 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.

3.1.1.9. 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.

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

3.1.1.11. 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.

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

3.1.1.13. Article 3.1.1.8. does not apply where the work of placing structural members of a skeleton frame structure prevents the use of the protective measures in Article 3.1.1.8.

Work Over Water

3.1.1.14. 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.

3.1.1.15.(1) 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,
  (ii) two life jackets as prescribed in Article 3.1.1.14. but not less than one 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) 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.

(3) Where workmen are exposed to the risk of drowning one 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 3.1.2. HOUSEKEEPING

General

3.1.2.1. 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.

3.1.2.2. 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 3.1.13.

3.1.2.3. 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.

3.1.2.4. 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.

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

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

Smoking

3.1.2.7. 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.

3.1.2.8. 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.

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

Snow and Ice Removal

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

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

Danger Signs

3.1.2.12. 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 3.1.10.1. 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

3.1.2.13. 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 all hazardous obstructions.

3.1.2.14. 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 2.1.5. shall be provided as appropriate to provide adequate protection for the workmen.

SUBSECTION 3.1.3. HANDLING AND STORING MATERIALS

General

3.1.3.1. 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.

3.1.3.2. 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.

3.1.3.3. 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 the National Building Code of Canada 1970.)

3.1.3.4. Except as provided in Articles 3.1.3.5. and 3.1.3.6., 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.

3.1.3.5. Where a *building* or a solidly enclosed part of a *building* is used solely for the storage of materials, the restrictions in Article 3.1.3.4. may be waived.

3.1.3.6. 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.

3.1.3.7. Flammable liquids in excess of one 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*.

3.1.3.8. 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.

3.1.3.9. Liquefied petroleum gas cylinders shall be installed in accordance with CSA B149-2,1969, "Installation Code for Propane Burning Appliances and Equipment."

Lumber

3.1.3.10. 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

3.1.3.11. Masonry units shall be stacked in tiers on level planks or platforms or other suitable base.

3.1.3.12. 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.

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

Pipe and Reinforcing Steel

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

Bagged Material

3.1.3.15. 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.

3.1.3.16. 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 3.1.4. SERVICES

Sanitation

3.1.4.1. At least one toilet shall be provided for each 30 employees or fraction thereof within easy access of their place of work.

3.1.4.2. Toilets shall be enclosed so that the occupants are sheltered from view and protected from the weather and falling objects.

3.1.4.3. Natural or artificial illumination shall be provided in toilet enclosures.

3.1.4.4. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant and toilet paper shall be provided.

3.1.4.5. 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.

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

Electrical Wiring and Lighting

3.1.4.7. 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 C22.1-1969, "Canadian Electrical Code, Part 1," and to the requirements in Articles 3.1.4.8. to 3.1.4.13.

3.1.4.8. 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.

3.1.4.9. 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.

3.1.4.10. Switches described in Article 3.1.4.9. shall

(a) not be locked in the closed position,

(b) be capable of being locked in the open position, and

(c) have a cover over any uninsulated current-carrying part and which cover is locked when the switch is in the closed position.

3.1.4.11. 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.

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

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

Temporary Heat and Steam Supply

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

3.1.4.15. Heating *appliances* using gasoline or naptha-type fuels are prohibited.

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

3.1.4.17. 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.

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

3.1.4.19. Electric heaters shall be designed and installed in accordance with CSA C22.1-1969, "Canadian Electrical Code, Part 1."

3.1.4.20. 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.

3.1.4.21. Natural-gas-fired heating *appliances* shall be installed in accordance with CSA B149.1-1971, "Installation Code for Natural Gas Burning Appliances and Equipment."

3.1.4.22. Propane-fired heating *appliances* shall be installed in accordance with CSA B149.2-1969, "Installation Code for Propane Burning Appliances and Equipment."

3.1.4.23. 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 Part 6 of the National Building Code of Canada 1970.

3.1.4.24. The clearances for flue pipes shall conform to Part 6 of the National Building Code of Canada 1970.

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

Fire Protection

3.1.4.26. The requirements in Subsection 2.1.2. for the safety of the public shall apply for the safety of the workmen.

SUBSECTION 3.1.5. EXCAVATION

General

3.1.5.1. Requirements in Subsection 2.1.3. for safety of the public during excavation shall apply for the safety of the workmen and other persons on a *project.*

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

3.1.5.3. When workmen are working near any excavation which is not required to be protected by a barricade as prescribed in Article 3.1.5.2., 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.

3.1.5.4. Except as provided in Article 3.1.5.5., the sides of every excavation shall be securely shored and timbered 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.

3.1.5.5. Shoring and timbering 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 hard firm 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° to the horizontal, or

(e) where the depth of excavation below the sloped sides in (d) does not exceed 4 ft.

3.1.5.6. Where the depth of excavation below the sloped sides in Clause 3.1.5.5.(d) exceeds 4 ft, the shoring and timbering shall extend at least 1 ft above the bottom of the sloped sides and shall be fitted with toe-boards to prevent material from falling into the bottom of the excavation.

3.1.5.7. Shoring and timbering shall be installed as excavation proceeds or before excavation begins.

3.1.5.8. Removal of shoring and timbering shall be supervised by a person experienced in such work.

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

3.1.5.10. 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.

3.1.5.11. 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.

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

3.1.5.13. 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.

3.1.5.14. 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

3.1.5.15. In trench excavations deeper than 5 ft, ladders or other *approved* means of egress shall be installed.

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

Explosives

3.1.5.17. The use of explosives on a *project,* including handling, storing, drilling, placing, blasting cover, warnings and signals shall conform to the appropriate federal and provincial regulations.

Ventilation

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

Caisson, Shaft and Tunnel Excavations

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

3.1.5.20. 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 1.1.2.7.)

3.1.5.21. Except for drilled *piles* and *caissons,* 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.

3.1.5.22. Except for drilled *piles* and *caissons,* 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.

3.1.5.23. Except for drilled *piles* and *caissons,* 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.

3.1.5.24. 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.

3.1.5.25. Adequate illumination including emergency lighting in the event of power failure shall be provided in all *caissons,* shafts and tunnels.

3.1.5.26. 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.

3.1.5.27. Except as provided in Article 3.1.5.28, internal combustion engines shall not be operated in any underground work areas or near the entrance to underground work areas.

3.1.5.28. When *approved*, diesel engines may be used in underground work areas provided

(a) effective ventilation is provided in the amount of at least 75 cu ft/min of air for each brake horsepower of all such engines in all areas where they are operated,

(b) each diesel engine is equipped with a properly maintained and regularly serviced *approved* exhaust gas conditioner,

(c) all diesel 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.

Drilled or Bored Piles and Caissons

3.1.5.29. Workmen or other persons entering a drilled or bored *pile* or *caisson* 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.

3.1.5.30. A workman or other person in a drilled or bored *pile* or *caisson* 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 workman is in the *pile* or *caisson.*

SUBSECTION 3.1.6. CONSTRUCTION EQUIPMENT

General

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

3.1.6.2. 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.

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

3.1.6.4. 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.

3.1.6.5. 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

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

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

3.1.6.8. 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.

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

3.1.6.10. 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

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

3.1.6.12. 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

3.1.6.13. Power-driven equipment such as cranes and shovels shall conform to the appropriate provincial or municipal regulations.

3.1.6.14. Every operator of power-driven equipment such as cranes and shovels shall be protected by a cab, screen or other adequate protection. Safe access shall be provided to such equipment such as by a ladder, or steps and hand-holds.

3.1.6.15. Persons other than the operators shall not be allowed on the operating platform of power-driven equipment such as a crane or shovel when the equipment is in operation, nor within the radius of the swing of the shovel or cab.

3.1.6.16. When not in use, the scoop or dipper of power-driven equipment such as a shovel or crane shall rest on the ground or other support.

3.1.6.17. The operator of power-driven equipment such as a shovel or crane shall not leave the cab while the master clutch is engaged.

3.1.6.18. The wheels or treads of power-driven equipment such as shovels and cranes shall be blocked when operating at or near an excavation or on sloping ground.

3.1.6.19. Every hoisting hook shall be equipped with a safety catch except that such catch may be omitted when placing structural members provided the workmen are not endangered thereby.

3.1.6.20. Helicopters or other airborne lifting devices shall not be used for hoisting unless written permission is obtained from the *appropriate authority having jurisdiction.*

3.1.6.21. Except as provided in Article 3.1.6.22., persons shall not be permitted on a moving support that is carried by the boom of a crane or other similar hoisting machine, or a front end loader or other similar machine except when *approved.*

3.1.6.22. Persons may be carried by

(a) a bucket or basket attached to a hydraulic-powered machine equipped with a fail-safe device which automatically locks the boom in position,

(b) a platform of a suspended scaffold, or

(c) a platform of an *approved* device for hoisting persons.

3.1.6.23. Cranes, shovels, backhoes or similar hoisting or excavating equipment shall not be operated in such a way that any part of such equipment or its load passes above a person.

3.1.6.24. One or more guide ropes or tag lines shall be used to prevent the rotation or other uncontrolled movement of a load being hoisted where such movement may endanger workmen.

3.1.6.25. A competent signal man shall assist the operator of every crane, shovel or similar machine when the operator is unable to see the path of travel of any part of the machine or its load.

3.1.6.26. Where the boom of a crane is not fabricated in accordance with the requirements of the designer of the equipment, the boom shall be designed by a professional engineer competent and experienced in this type of work and fabricated in accordance with the requirements of his design.

3.1.6.27. Load-rating plates based on the design specified in Article 3.1.6.26. shall be attached to all cranes in clear view of the operator, and shall contain sufficient information to enable the operator to determine the safe load which can be hoisted by the crane under any condition for the particular boom being used.

3.1.6.28. All cranes and other hoisting machines shall be erected, maintained and dismantled under the direct supervision of experienced workmen and in accordance with safe practice.

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

Pile Driving Equipment

3.1.6.29. 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.

3.1.6.30. 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.

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

3.1.6.32. 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.

3.1.6.33. 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

3.1.6.34. 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."

3.1.6.35. 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."

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

3.1.6.37. Compressed-gas cylinders shall

(a) not be dropped or subjected to blows,

(b) not be hoisted by slings,

(c) be secured in an upright position at all times.

3.1.6.38. 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.

3.1.6.39.(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

3.1.6.40. Every explosive-actuated fastening tool shall be designed so that the tool will not fire while being loaded, during preparation to fire, or if dropped.

3.1.6.41. Every explosive-actuated fastening tool of the high velocity type shall be equipped with a suitable protective guard or shield at least 3 in. in diameter mounted at right angles to the barrel and centrally positioned on the muzzle end of the tool except when such guard cannot be used because of the proximity of an adjacent obstruction. Such tools shall be stored in a locked container and shall not be left unattended when they are not in such a container.

3.1.6.42. Explosive charges for explosive-actuated fastening tools shall be suitably identified to indicate their strength and stored in containers so that charges of different strengths are not in the same container. Such containers shall be locked when unattended.

3.1.6.43. The operator of an explosive-actuated fastening tool shall have been instructed in the proper and safe use of the tool and shall have an *approved* certificate of qualification to this effect.

3.1.6.44. The *approved* certificate of qualification in Article 3.1.6.43. shall bear a statement signed and dated by an *approved* instructor certifying that the operator has received training in the operation of the particular explosive-actuated fastening tool to be used by the operator and is deemed competent to operate it. Such certificate shall also bear a statement signed and dated by the operator certifying that he has received such instructions.

3.1.6.45. An explosive-actuated fastening tool shall not be used until it has been inspected by the operator to ensure that all moving parts operate freely, the barrel is free from obstruction, and the tool is in safe working condition.

3.1.6.46. The operator of an explosive-actuated fastening tool shall

(a) not point the tool at any person at any time,

(b) use the tool in accordance with safe practice,

(c) not load the tool unless it is being prepared for immediate use,

(d) not use an explosive charge of greater strength than required for the desired work,

(e) use fastening devices designed for use in the specific tool,

(f) not use the tool where flammable gases or dusts are present,

(g) be protected against eye injury by suitable equipment in addition to the shield or guard specified in Article 3.1.6.41., and

(h) place any misfired cartridge in water until the cartridge can be suitably disposed of

(The intent of Clause (b) 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.*)

SUBSECTION 3.1.7. CONSTRUCTION HOISTS

General

3.1.7.1. Every *construction hoist* shall be operated in a safe condition, in a safe manner, and except for test purposes shall not be loaded in excess of its maximum capacity.

Hoist Operators and Hoist Attendants

3.1.7.2. The operator of every *construction hoist* shall have attained the age of 19 years and shall have had sufficient experience to operate the hoist in a safe manner with respect to persons and materials being carried by the hoist.

3.1.7.3. A person training on a *project* to be a hoist operator may obtain the experience required by Article 3.1.7.2. only under the personal supervision of an experienced hoist operator who shall be present at all times and ready to take over the hoist control until the trainee has obtained the required experience.

3.1.7.4. A hoist operator shall

(a) be stationed at the driving unit of a *construction hoist,*

(b) be solely responsible for the safe operation of *construction hoists* that are not controlled from the hoist car or landings,

(c) not raise or lower the hoist car when a landing or car gate is open,

(d) inspect the hoist each day before the hoist is used to ensure that the hoist is in a safe operating condition, and

(e) not leave the hoist unattended while the car is in a raised position nor without taking measures to prevent the unauthorized use of the hoist.

3.1.7.5. The attendant for a *construction hoist* shall have attained the age of 19 years and shall have had sufficient experience to perform his duties in a safe manner with respect to all persons using the hoist or to any materials being carried by the hoist.

3.1.7.6. A person training on a *project* to be a hoist attendant may obtain the experience required by Article 3.1.7.5. only under the personal supervision of an experienced hoist attendant who shall be present at all times and ready to take over the attendant's duties until the trainee has obtained the required experience.

3.1.7.7. A hoist attendant shall

(a) be stationed in the car of a *workmen's hoist* while carrying workmen or other persons except where the movement of the car is controlled from every landing and from the car,

(b) be stationed at a landing of a hoist while materials are being loaded or unloaded at such landing,

(c) ensure that persons and materials move with safety from or to a hoist car at a landing under his supervision,

(d) ensure that all gates or doors under his supervision are fully closed before the car is moved from a landing, and

(e) signal the hoist operator when the car may be moved safely.

Conduct of Persons

3.1.7.8. Every person in or near a *construction hoist* shall conduct himself in such a manner as not to impair the safe operation of the hoist nor to endanger himself or any other person.

3.1.7.9. No safety device on a *construction hoist* shall be removed, displaced, interfered with or damaged except by a person making an inspection under an appropriate provincial regulation or by a *user* or his mechanic for the purpose of making a test or repair.

3.1.7.10. Where a safety device on a *construction hoist* has been removed, displaced, interfered with or damaged, provisions shall be made by the persons controlling the operation of the hoist to prevent its operation for any purpose other than inspection, testing or repair, until the safety device has been restored to good working order.

Design, Construction and Maintenance

3.1.7.11. Every *construction hoist* and all equipment used in connection therewith shall be designed, constructed and maintained so that it will carry its maximum capacity without

(a) endangering persons in or near the hoist, and

(b) travelling outside its intended limits.

3.1.7.12. Every *construction hoist* shall be erected, maintained and dismantled under the direct supervision of a workman experienced in such work.

3.1.7.13. Where the maximum capacity of a *construction hoist* is limited by the strength of the hoisting cable, the maximum capacity shall be equal to

$$\frac{S \times N}{f} - W_C$$

where

S = the breaking strength of one cable in pounds,

N = the number of runs of cable under load,

W_C = the static load in pounds equal to the weight of the empty car plus the maximum weight of hoisting cable between the car and the overhead beam,

f = the design factor given in Table 3.1.7. A.

TABLE 3.1.7. A.

Forming Part of Article 3.1.7.13.

Design Factors for Hoisting Cables		
Maximum Cable Speed, feet per minute	Minimum Design Factor, f	
	Workmen's Hoist	*Materials Hoist*
50	7.60	6.65
75	7.75	6.85
100	7.95	7.00
125	8.10	7.15
150	8.25	7.30
175	8.40	7.45
200	8.60	7.65
225	8.75	7.75
250	8.90	7.90
300	9.20	8.20
350	9.50	8.45
400	9.75	8.70
450	10.00	8.90
500	10.25	9.15
550	10.45	9.30
600	10.70	9.50
650	10.85	9.65
700	11.00	9.80

3.1.7.14. The maximum capacity of a *construction hoist* in terms of persons shall be the lesser number determined by

(a) dividing the maximum capacity in pounds by 175, or

(b) dividing the net floor area of the car in square feet by 2.

3.1.7.15. A metal plate shall be securely fastened in clear view in the car of every *construction hoist* or as close as possible to the car and shall bear in letters and numerals not less than 2 in. high the words "MAXIMUM CAPACITY," the maximum capacity in pounds, followed by the word "POUNDS" except that in the case of a *workmen's hoist* the maximum capacity may be expressed as the number of persons determined in accordance with Article 3.1.7.14. in which case the number of persons shall be followed by the word "PERSONS."

3.1.7.16.(1) Where a *construction hoist* is not designed as a *workmen's hoist,* a notice shall be securely fastened in clear view in the car of the *construction hoist* and such notice shall bear in letters not less than 2 in. high the words "NO PERSON SHALL RIDE ON THIS HOIST."

(2) The prohibition contained in the notice prescribed in Sentence (1) shall apply to every person except a person engaged in the lubrication, repair, erection or maintenance of a *construction hoist.*

3.1.7.17. The machine area of every *construction hoist* shall be

(a) provided with a solid roof or ceiling to protect the operator and machine against falling objects and such protection shall have a clearance of at least 6 ft 8 in. from the floor level,

(b) enclosed on all sides with walls or guardrails to a height of at least 3 ft 6 in. above the floor level,

(c) large enough to provide adequate clearances for the safe operation and maintenance of all equipment located therein,

(d) located to provide the hoist operator of a *materials hoist* an adequate view of the hoistway, and

(e) adequately lighted.

3.1.7.18. The machine of every *construction hoist* shall be securely fastened in place and shall be

(a) capable of lifting the car at rated speed when loaded to its maximum capacity,

(b) equipped with a brake that will stop and hold the car in any position when loaded to 150 per cent of its maximum capacity, and in the case of a *workmen's hoist* the brake shall be of a type that is mechanically applied and electrically released,

(c) designed so that the brake will be applied automatically in case of power failure where driven by electric power,

(d) equipped with a pawl or equivalent device where the hoisting drum of a *materials hoist* is of the free-running type (such device shall hold the car in any position when loaded to its maximum capacity),

(e) arranged to discharge the exhaust vertically to the outdoors where powered by an internal combustion engine,

(f) guarded where necessary to prevent injury to persons from gears, shafts, cables and other hazardous equipment,

(g) equipped with a device to indicate the position of the car to the hoist operator where he does not have a clear view of the hoistway, and

(h) equipped with a cable drum having flanges.

3.1.7.19. The horsepower rating of the machine of every *construction hoist* shall be legibly shown on the power unit.

3.1.7.20.(1) The *tower* of every *construction hoist* including connections, the main overhead beams and their supports shall be of steel and designed to support

(a) twice the maximum load carried by the cables,

(b) the appropriate loads due to the weight of all equipment and dead loads other than as provided in (a), and

(c) the appropriate live loads including wind, snow and ice.

(2) The *tower* of every *construction hoist* shall be supported on a foundation designed so that

(a) the *tower* will remain plumb,

(b) the *design bearing pressure* of the soil and the design stresses in the foundation materials are not exceeded at the most critical loading conditions, and

(c) any space beneath the foundation is enclosed to prevent persons from entering.

(3) When the car of a *materials hoist* is at the top landing there shall be an overhead clearance of at least 10 ft between the top of the car and the supporting beams or machinery over the hoistway.

(4) *Construction hoists* shall not be located in front of entrances or exits of a *building.*

(5) The *tower* of every *construction hoist* shall be securely braced or guyed to the *building* or to other adequate anchorage at vertical spacings of not over 40 ft; such guys shall be steel wire at least ¼ in. in diam and provided with turnbuckles.

(6) Safe means of access to the overhead sheaves shall be provided by a ladder from the highest landing of a *construction hoist.*

(7) In assembling the structural members of a *tower,* every connection shall be made with bolts, pins or special devices to prevent the connections from accidentally disengaging.

3.1.7.21.(1) The hoistway of every exterior *construction hoist* shall have 16-gauge 1½-in. wire mesh or equivalent securely fastened to the hoistway

(a) on all sides at the lowest landing level except hoistway entrance sides and extending at least 6 ft above the landing level, and

(b) except as provided in Sentence (2), on the hoistway entrance sides at all landing levels and extending from the top of each hoistway entrance to the underside of the next landing above or to the top of the hoistway.

(2) The protection specified in clause (1)(b) may be omitted where the car is equipped on its entrance sides with gates of the vertically-sliding or horizontally-swinging type

(a) extending from within 2 in. of the car floor to a height of at least 60 in.,

(b) consisting of a metal frame and 16-gauge 1½-in. wire mesh or equivalent, and

(c) equipped with a positive locking device.

(3) The hoistway of every *construction hoist* within a *building* shall be fully enclosed, except at hoistway entrances with 16-gauge 1½-in. wire mesh or equivalent.

3.1.7.22.(1) A vertically lifting or horizontally swinging type hoistway gate shall be provided at every hoistway entrance and shall

(a) extend from within 2 in. of the landing level to a height at least 6 ft above the landing level,

(b) not contain openings of a size that will allow the passage of a spherical object of 1½ in. diam or greater,

(c) be located not more than 6 in. from the edge of the landing platform in the case of *materials hoists*, and 4 in. in the case of *workmen's hoists*.

(2) A headroom clearance of at least 6 ft 6 in. shall be provided for every hoistway entrance when the gate is in the open position.

(3) Every counterweight for hoistway gates shall be enclosed so that it will be retained if its means of suspension fails.

(4) Every hoistway gate shall be equipped with a latch designed to hold the gate closed (see also Article 3.1.7.28.).

3.1.7.23.(1) A landing platform shall be provided at every hoistway entrance and shall

(a) be designed and constructed to support all loads that may be imposed upon it, and

(b) be at least equal in width to the width of the hoistway entrance.

(2) Where there is a danger of a workman falling more than 10 ft from a landing platform, a guardrail at least 42 in. in height shall be installed along the open sides of the platform.

(3) Protection consisting of 16-gauge 1½-in. wire mesh or equivalent shall be installed between the top rail and toe-board of the guardrail in Sentence (2) and where a hoist entrance or entrance to a landing platform meets a building face required to have guardrails, such protection shall extend along the guardrails at least 5 ft from each side of such entrances.

Hoist Cars, Cables and Signal Systems

3.1.7.24.(1) Every construction hoist car shall

(a) be designed and constructed using a factor of safety of at least 5 based upon static loads and ultimate stresses of the materials,

(b) be designed for an assumed static load of at least 50 lb/sq ft on the car floor,

(c) operate in steel guides designed and constructed to withstand the application of the safety device required in clause (e),

(d) be equipped with guide shoes or rollers adjusted to provide the minimum clearance suitable for the guide rails,

(e) be equipped with a safety device that will stop and hold the car loaded to its maximum capacity if the means of suspension of the car fails (see also Article 3.1.7.28.),

(f) be located so that the clearance between the car platform and the landing platform is at least ¾ in. but not more than 2 in.,

(g) be enclosed on all sides except entrance sides with at least 16-gauge wire mesh having openings not greater than 1½ in. or equivalent protection for at least 6 ft above the car floor ; such enclosure shall include a toe-board at least 5 in. in height, and

(h) have a top, part of which may be hinged, composed of at least 10-gauge wire mesh having openings not greater than 1½ in. or equivalent protection.

(2) Where a wheelbarrow or other rolling equipment is to be transported on a *construction hoist,* it shall be held securely in place such as by cleats or blocks.

3.1.7.25.(1) Every hoisting cable for *construction hoists* shall

(a) be designed in conformance with Article 3.1.7.13. to support the maximum load to be imposed upon it,

(b) be constructed of at least 6 strands of 19 wires each of plow steel or stronger, for elevator use,

(c) be at least ½ in. in diameter,

(d) be securely fastened at each end by tapered babbitted sockets or clips,

(e) have at least 3 turns of cable remaining on the drum when the car is at its lowest position, and

(f) not be spliced.

(2) Where clips are used to fasten cables of *construction hoists*

(a) the cable shall be bent around a heart-shaped thimble or similar device,

(b) at least 3 clips shall be used at each connection,

(c) the clips shall be spaced apart, approximately 6 times the cable diameter, and

(d) the U side of each clip shall be placed on the dead end of the cable.

(3) Where tapered babbitted sockets are used to fasten cables of *construction hoists,* they shall be installed in conformance with good practice.

(4) Cable shall not be used on *construction hoists* where more than 10 per cent of the number of wires in any one lay of the cable are broken, or where visual inspection shows signs of severe wear, corrosion, kinks or other possible causes of cable failure.

(5) Preformed cables shall be identified by an attached metal tag.

(6) Sheaves or drums for construction hoist cables shall have diameters at least 24 times the cable diameter.

(7) Where a cable for a *construction hoist* is not made of readily-identifiable steel, the cable shall be deemed to have an ultimate strength not greater than iron cable of the same size, type and condition.

3.1.7.26.(1) Electrical or mechanical means of signalling the hoist operator shall be provided at each landing where

(a) the travel of the car is more than 35 ft, or

(b) the hoist operator does not have a clear view of the landing.

(2) The signals to a hoist operator shall conform to the appropriate provincial regulations or in the absence of such regulations shall be clearly specified before the hoist is put into use. Copies of the signal code shall be conspicuously posted near the hoist operating controls and at each landing.

(3) Every hoistway gate shall be equipped with an electric contact switch that will turn on a light to indicate to the hoist operator when the gate is fully closed.

3.1.7.27.(1) The pit of a *materials hoist* shall be deep enough to allow the car platform to descend to the level of the lowest landing.

(2) The machine area, landing platforms and pit shall be kept free of building materials, debris and equipment not required for the hoist.

(3) Flammable fuel shall not be stored near the hoist.

3.1.7.28.(1) In addition to the requirements in Articles 3.1.7.17. to 3.1.7.27., the requirements in Sentences (2) to (13) shall apply to *workmen's hoists.*

(2) The power unit of a *workmen's hoist* shall drive the hoisting drum when the car is being lowered or raised and there shall be no mechanism for disconnecting the hoisting drum from the power unit except for maintenance.

(3) Every hoistway gate shall be equipped with an electro-mechanical interlock except that a mechanical locking device is permitted provided the gate cannot be opened from the landing side other than at the lowest landing where means of unlocking the gate from the landing side shall be provided.

(4) The clearance between the car crosshead of a *workmen's hoist* and the lowest obstruction above it shall be at least 24 in. when the counterweight has fully compressed its buffer or, if there is no counterweight, when the car has been stopped by the top final limit switch (see Sentence (12)).

(5) The clearance between the underside of the car platform frame of a *workmen's hoist* and the pit floor shall be at least 24 in. when the car rests on the fully compressed buffers.

(6) Buffers for the car shall be provided in the pit of every *workmen's hoist.*

(7) Where a counterweight is used on a *workmen's hoist,* a guard and buffer shall be provided for it at the bottom of the hoistway.

(8) The movement of the car of every *workmen's hoist* shall be controlled by a car-switch or a push-button located in the car with or without a push-button at each landing.

(9) The car of every *workmen's hoist* shall be provided with a gate at each entrance. Such gate shall

(a) be at least 6 ft in height,

(b) not be of the vertically collapsible type,

(c) have no opening that would permit the passage of a 3½-in. spherical object in the case of horizontally collapsing gates and a 2-in. spherical object for all other types, and

(d) be provided with an electrical contact switch or a mechanical locking device.

(10) At least 2 hoisting cables shall be used to hoist the car of a *workmen's hoist.*

(11) For a *workmen's hoist* the safety device required by Clause 3.1.7.24.(1)(e) shall be operated by an overspeed governor.

(12) Terminal and final limit switches shall be provided at the top and bottom of every hoistway of a *workmen's hoist.*

(13) Where a *workmen's hoist* is of the winding drum type, a slack cable device, a reverse phase relay and a stop motion switch shall be provided.

Concrete Bucket Hoists

3.1.7.29.(1) Except for Clauses 3.1.7.24.(1)(b), (e), (g) and (h), the requirements for *material hoists* shall apply to concrete bucket hoists.

(2) Every hopper and chute of a concrete bucket hoist shall be designed and constructed to support all loads that may be imposed on it.

(3) No person shall ride in a concrete bucket.

Booms

3.1.7.30.(1) Where a boom is attached to a *construction hoist,* the boom and its associated equipment shall be designed and constructed in accordance with good engineering practice and operated in a safe manner by a competent person.

(2) Tower guy cables fastened at horizontal girts shall be provided at the top and bottom attachment of every boom supported on a *construction hoist.* The upper attachment for such booms shall be at least one-half the length of the boom above the bottom attachment.

Use and Operation of Construction Hoists

3.1.7.31.(1) The *user* shall make or cause to be made inspections and tests of every *construction hoist* before such hoist is used and periodically thereafter to ensure that it is in safe operating condition.

(2) A *construction hoist* shall not be operated unless every plate, label and notice is installed and maintained in conformance with Articles 3.1.7.15. and 3.1.7.16.

(3) Every hoistway gate shall be kept closed except when the car is being loaded or unloaded.

(4) No person shall be transported on a *workmen's hoist* while material, other than hand tools or similar small objects, is being transported.

SUBSECTION 3.1.8. ACCESS TO AND EGRESS FROM WORK AREAS

General

3.1.8.1. Except for suspended scaffolds (Article 3.1.9.12.) 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.

3.1.8.2. Every means of access and egress prescribed by Article 3.1.8.1. 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 suitable abrasive material.

3.1.8.3.(1) Except for the erection of structural framing and 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.

Temporary Stairs

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

3.1.8.6. Temporary stairs shall have

(a) treads and risers uniform in width, length and height in any one flight,

(b) a slope not exceeding 50°,

(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 3.1.11).

3.1.8.7. 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.

3.1.8.8. 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

3.1.8.9. 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.

3.1.8.10.(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

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

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

3.1.8.13.(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 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, and

(b) 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 wooden 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.

3.1.8.14.(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 one quarter and not more than one third 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.

3.1.8.15.(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.

3.1.8.16. 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.

3.1.8.17. Overlaps of sections of extension ladders when fully extended for use shall conform to Table 3.1.8.A.

TABLE 3.1.8.A.

Forming Part of Article 3.1.8.17.

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

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

SUBSECTION 3.1.9. SCAFFOLDS

General

3.1.9.1. 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.

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

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

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

3.1.9.5. 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.

3.1.9.6. 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 3.1.12.)

3.1.9.7. 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.

3.1.9.8. 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.

3.1.9.9. 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 3.1.8.

3.1.9.10. 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 3.1.11.

Outrigger Scaffolds

3.1.9.11. 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

3.1.9.12.(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 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.

3.1.9.13.(1) Except as provided in Sentence (2), every workman or other person on a suspended scaffold (or a boatswain's chair) shall use a safety belt and lifeline in conformance with Articles 3.1.1.8. to 3.1.1.12. 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 one support or one suspension will not cause the collapse of the scaffold directly or by progressive collapse of the other supports or suspensions.

Boatswain's Chairs

3.1.9.14.(1) Every boatswain's chair shall

(a) conform to Sentences 3.1.9.12.(1) to (3),

(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) Fibre rope shall not be used 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) 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

3.1.9.15. 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

3.1.9.16.(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 3.1.9.13.(1).

Other Scaffolds

3.1.9.17.(1) Scaffolds or components thereof that do not comply in all respects 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 3.1.10. TEMPORARY FLOORING

3.1.10.1. 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.

3.1.10.2.(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 it 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 3.1.11. GUARDRAILS

3.1.11.1. 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 2.1.4.3., 3.1.5.2., 3.1.5.22., 3.1.7.23., 3.1.8.6., 3.1.9.10., 3.1.9.12. and 3.1.10.2.)

3.1.11.2. Every guardrail shall conform to Article 3.1.11.5. 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.

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

3.1.11.4. Where required by the *appropriate authority having jurisdiction,* 16-gauge, 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 Articles 3.1.7.23. and 3.1.9.12.)

3.1.11.5.(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 No. 13 Imperial Standard Wire Gauge 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 3.1.12. TEMPORARY WORKS

Bracing

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

Falsework

3.1.12.2.(1) All falsework constructed for the purpose of supporting a part of a permanent structure until that part of the permanent structure becomes self-supporting shall be designed, constructed, supported and braced to withstand all loads likely to be imposed on it.

(2) Shoring shall be adequately braced in the vertical and horizontal planes, including splices, to prevent lateral movement of the falsework and buckling of the shores.

(3) Footings for shores shall be sound and capable of carrying the maximum intended load without excessive settlement.

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

Design

3.1.12.3.(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 one 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 3.1.13. DEMOLITION

3.1.13.1. Requirements in Subsection 2.1.6. for the safety of the public shall apply to the safety of the workmen and other persons on a *project*.

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

3.1.13.3. 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.

3.1.13.4. Demolition shall proceed in a systematic manner from the top down to the ground. 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.

3.1.13.5. 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.

3.1.13.6. 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.

3.1.13.7. 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.

3.1.13.8.(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.

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

3.1.13.10. 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.

3.1.13.11. All scaffolding required for demolition work shall be self-supporting and shall conform to Subsection 3.1.9.

3.1.13.12. 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.

3.1.13.13. Where the requirement of Article 2.1.6.5. 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° 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.

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

3.1.13.15. 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 3.1.3.

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

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

3.1.13.18.(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 2.1.6.6. 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 3.1.14. PREVENTION OF CONTACT WITH OVERHEAD POWER LINES

3.1.14.1. Backhoes, shovels, cranes or similar lifting devices shall not be operated closer than the length of its boom 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 3.1.14.2.

3.1.14.2. Parts of equipment including booms, cables, loads or other objects shall not be brought closer than the minimum safe distances as specified in Table 3.1.14.A. to an electric power line of more than 750 volts unless such line has been electrically insulated or disconnected from the electrical supply.

TABLE 3.1.14.A.

Forming Part of Article 3.1.14.2.

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

3.1.14.3. 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 3.1.15. FIRST AID

3.1.15.1. 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.

3.1.15.2. 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.*

3.1.15.3. 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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