

PART 14: CRANES AND HOISTS

Definitions	14.1	In this Part:
“critical lift”		means <ul style="list-style-type: none">(a) a lift by a mobile crane or boom truck that exceeds 90% of its rated capacity while it is lifting the load at a load radius of more than 50% of its maximum permitted load radius, taking into account its position and configuration during the lift,(b) a tandem lift if the load on any one crane, hoist or other piece of powered lifting equipment exceeds 75% of the rated capacity of that crane, hoist or other piece of powered lifting equipment,(c) a tandem lift involving the simultaneous use of more than two cranes, hoists or other pieces of powered lifting equipment,(d) a lift of a person in a work platform suspended from or attached to a crane or hoist,(e) a lift in which the centre of gravity of the load changes during the lift,(f) a lift in which the length of one or more sling legs changes during a lift,(g) a lift by a crane, boom truck or hoist, supported on a floating base, that exceeds 90% of rated capacity for the lifting system,(h) a lift of a load over or between energized high voltage electrical conductors, or(i) a lift of a submerged load;
“duty cycle work”		means <ul style="list-style-type: none">(a) the use of a crane to do dragline work, clamshell work, dynamic compaction work or pile driving work, including pile extraction using a vibratory pile extraction device, or(b) the use of a crane with an electromagnet or grapple for the handling of scrap metal and other similar materials;
“load bearing component”		means any component that transfers load through a crane or hoist to the surface supporting the crane or hoist;
“sign truck aerial ladder crane”		means a truck that is unit providing crane capability and aerial ladder capability in one integral unit, which may be used for hoisting loads and for access or as a working platform, and is commonly referred to as a sign truck; <ul style="list-style-type: none">(a) capable of acting as a crane and as an aerial ladder, and(b) used as a work platform or used for hoisting loads or accessing a work location;
“tandem lift”		means a lift using <ul style="list-style-type: none">(a) more than one crane or one hoist, or(b) a crane or hoist and another piece of powered lifting equipment.

Explanatory Note:

New definitions are proposed for “critical lift”, “duty cycle work”, “load bearing component” and “tandem lift”. Defining these terms will add clarity to the *Occupational Health and Safety Regulation* and avoid the need for guidance documents in the future.

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Changes to the public consultation version of the definition for “critical lift” have been made in response to industry submissions regarding the clarity and scope of the items included.

Proposed new section 14.1(a) has been modified to apply only to mobile cranes and boom trucks and to only apply when the lift is being made at a load radius and capacity where the “margin for error” becomes small and thus the potential for an overload and possible failure or upset makes the lift critical. For equipment operating with a straight boom, the load radius will exceed 50% of the maximum permitted load radius if the boom angle is less than 45 degrees above the horizontal. For other boom configurations or equipment with an articulating boom section, factors other than the angle of the boom will affect the load radius. “Errors” might arise if the weight of the load being lifted is a bit higher than expected, or the planning for the lift did not account for the weight of all the rigging being used for the lift. Note this change eliminates application of the term critical lift to a near maximum capacity lift by a tower crane or bridge crane. A tower crane has an overload prevention system that is tested before the crane is used on each work shift. A bridge crane is designed to provide a minimum factor of safety regardless of the position of the hoist on the bridge. These factors lower the likelihood of a failure due to an overload during the use of a tower crane or bridge crane.

Proposed new section 14.1(b) has been modified to reflect the criteria contained in section 14.42(2), which has been the requirement for many years and has not presented a problem as a criteria for when a multi crane lift should be considered a critical lift. Note also the new term “tandem lift” has been proposed and defined to cover a lift using more than one crane or hoist, or a lift using a crane or hoist and another piece of powered lifting equipment. Other powered lifting equipment would typically be a lift truck, front end loader or excavator. The phrase is not intended to include “other equipment” such as rigging, a below the hook lifting device or a reeved-in lifting device, or manually powered devices such as a manually lever operated hoist (commonly referred to as a come-a-long.)

Proposed new section 14.1(c) is to establish that a lift using three or more pieces of powered lifting equipment is a critical lift.

Proposed new section 14.1(e) has been modified to recognize that many standard lifts involve the centre of gravity shifting relative to the rigging or load line and these are not necessarily complex lifts. For example, picking up a pipe or pole at one end, or lifting a gang form from a flat position to a vertical orientation are common lifts and should not be considered a complex or critical lift. Loads where the centre of gravity of the load will change during the lift would include a load with parts that will move relative to one another as the lift takes place or loads where a liquid or other fluid-like substance may or will shift as the lift is made.

Proposed new section 14.1(f) covers complex rigging arrangements where the lengths of various rigging components will need to shift as the lift takes place. The most common example of this is the lifting of a tilt-up panel from a casting bed to stand it up to a near vertical position. The use of rigging arrangements of this type makes a lift a critical lift. Part 20 of the OHSR already requires a written lifting plan for these operations.

Proposed new section 14.1(g) is to clarify that a near capacity lift by a crane, boom truck or hoist on a floating support is to be considered a critical lift, and the capacity criteria is the rating for the crane, boom truck or hoist and the floating support acting together as a lifting system.

Proposed new section 14.1(i) is to include the lifting of a submerged load as a critical lift. This is recognition that often such loads are “stuck” to the silt or sand on the bottom of the body of water, and also that once the load starts to come above the water surface,

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the presence of water in the load may make the load weight difficult to determine and the dynamics of the motion of the load as the water drains from it can cause unexpected load shifting.

A change is proposed to the term describing the equipment used for hoisting and access in the installation and servicing of signs and billboards. This equipment is commonly referred to as a "sign truck", so the proposal is to change the term "aerial ladder crane" to "sign truck" wherever it appears in this Part.

Duty cycle work means repetitive lifts with the same configuration of the crane (same boom length) handling the same types of loads that are known to be well within the rated capacity of the crane.

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| Application | 14.1.1 | <p>(1) This Part applies to a crane or hoist of a type required to meet a standard specified in section 14.2 and to any other equipment with a different primary design function that is being used in a hoisting or lifting application.</p> <p>(2) Except as otherwise specifically provided, this Part applies to logging equipment that uses a load line for lifting.</p> <p>(3) This Part does not apply to a front end loader, an excavator or other earth moving equipment that is being used</p> <p style="padding-left: 40px;">(a) in applications consistent with its primary design purpose, or</p> <p style="padding-left: 40px;">(b) during a lifting task incidental to its primary design purpose if the manuals and operating instructions of the manufacturer of that equipment provide criteria for that lifting task.</p> |
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Explanatory Note:

The proposed new “application” section is intended to clarify what equipment is required to meet Part 14, and what equipment is not intended to be covered by Part 14.

Section 14.1.1 (1) specifies the equipment normally considered a crane or hoist is required to meet and be used as required by Part 14, and also that other equipment, such as an excavator, that is being used primarily as a hoisting device, must meet Part 14.

Section 14.1.1 (2) specifies that logging equipment that is used for lifting must meet Part 14 except as exempted by a specific provision. For example, section 14.9 exempts a logging machine from the provisions of sections 14.5 to 14.8 requiring rated capacity indication, load charts and a boom angle indicator, respectively. However, under section 14.1.1(1) such exemptions would only apply if the logging machine was being used for its primary design purpose, which is handling logs. This section also recognizes that a common incidental lifting task in logging operations is for a log loader to be used to lift a logging truck trailer onto or off of a logging truck. If the machine was to be used in a construction application, the logging exemptions would not apply and the machine would need to be equipped and used in compliance with all the provisions that normally apply to a crane.

Section 14.1.1 (3) is intended to exempt earth moving equipment from Part 14 while it is being used for its primary design purpose, which is moving earth and rock. It is also intended to allow for such equipment to be used for handling loads incidental to its primary design purpose provided the manufacturer’s instructions for the equipment allow for such activity. The manufacturer’s instructions must indicate lifting or hoisting of materials is permitted, and must specify the designated attachment points and allowable load capacity. Typically the loads lifted would be excavation shoring materials and systems, pipe sections and related fixtures such as valves. This is not intended to include lifts beyond the rated capacity or use of more than one machine to execute a lift.

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GENERAL REQUIREMENTS

Standards

- 14.2 (1) Except as otherwise required by this Regulation, a crane or hoist must be designed, constructed, erected, disassembled, inspected, maintained and operated as specified by the manufacturer or a professional engineer, and to meet the requirements of the applicable standard listed in subsections (2) to ~~(12)~~ (15).
- ~~(2) A bridge, jib, monorail, gantry or overhead travelling crane must meet the design requirements of~~
- ~~(a) for electrical components and functions, CSA Standard C22.1-94, Canadian Electrical Code, Part 1, Section 40 and CSA Standard C22.2 No. 33-M1984 (Reaffirmed 1992), Construction and Test of Electric Cranes and Hoists, and~~
 - ~~(b) ANSI Standard MH27.1-1981, Specifications for Underhung Cranes and Monorail Systems, or~~
 - ~~(c) Crane Manufacturers Association of America (CMAA) Specification #70, (Revised 1988) Specifications for Electric Overhead Traveling Cranes, or~~
 - ~~(d) Crane Manufacturers Association of America (CMAA) Specification #74, Specifications for Top Running and Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist.~~
- ~~(3) A bridge, jib, monorail, gantry or overhead travelling crane must meet the safety requirements of~~
- ~~(a) CSA Standard B167-96, Safety Standard for Maintenance and Inspection of Overhead Cranes, Gantry Cranes, Monorails, Hoists, and Trolleys;~~
 - ~~(b) ANSI Standard ANSI/ASME B30.2-1990, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist);~~
 - ~~(c) ANSI Standard ANSI/ASME B30.11-1993, Monorails and Underhung Cranes;~~
 - ~~(d) ANSI Standard ANSI/ASME B30.16-1993, Overhead Hoists (Underhung), or~~
 - ~~(e) ANSI Standard ANSI/ASME B30.17-1992, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).~~
- ~~(4) A mobile crane, telescoping or articulating boom truck or aerial ladder truck must meet the requirements of~~
- ~~(a) CSA Standard Z150-1974, Safety Code for Mobile Cranes;~~
 - ~~(b) ANSI Standard ANSI/ASME B30.5-1994, Mobile and Locomotive Cranes, or~~
 - ~~(c) ANSI Standard ANSI/ASME B30.22-1993, Articulating Boom Cranes.~~
- ~~(5) A tower or hammerhead crane must meet the requirements of CSA Standard Z248-1975, Code for Tower Cranes.~~
- ~~(6) A portal, tower or pillar crane must meet the requirements of ANSI Standard ASME B30.4-1990, Portal, Tower, and Pillar Cranes.~~
- ~~(7) A construction material hoist must meet the requirements of CSA Standard CAN/CSA Z256-M87, Safety Code for Material Hoists.~~

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- ~~(8) A chimney hoist must meet the requirements of ANSI Standard A10.22-1990, Rope-Guided and Nonguided Workers' Hoists—Safety Requirements.~~
- ~~(9) A base-mounted drum hoist must meet the requirements of ANSI Standard ASME B30.7-1994, Base Mounted Drum Hoists.~~
- ~~(10) A guy, stiffleg, basket, breast, gin pole, Chicago boom, shearleg or A-frame derrick must meet the requirements of ANSI Standard ASME B30.6-1990, Derricks.~~
- ~~(11) A side boom tractor used for pipe laying or similar operations must meet the requirements of ANSI Standard ASME B30.14-1991, Side Boom Tractors.~~
- ~~(12) A miscellaneous material hoist must meet the requirements of a standard acceptable to the Board.~~
- (2) A bridge, jib, monorail, gantry or overhead travelling crane must meet the design requirements for electrical components and functions of CSA Standard C22.1-94, Canadian Electrical Code, Part 1, Section 40 and CSA Standard C22.2 No. 33-M1984 (Reaffirmed 1992), Construction and Test of Electric Cranes and Hoists.**
- (3) A bridge, jib, monorail, gantry or overhead travelling crane must meet the design requirements of**
- (a) ANSI Standard MH27.1-2003, Specifications for Patented Track Underhung Cranes and Monorail Systems,**
 - (b) Crane Manufacturers Association of America (CMAA) Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes – No. 70 (2004), or**
 - (c) Crane Manufacturers Association of America (CMAA) Specifications for Top Running and Under Running Single Girder Electric Overhead Cranes Utilizing Under Running Trolley Hoist – No. 74 (2004).**
- (4) A bridge, jib, monorail, gantry or overhead travelling crane must meet the safety requirements of**
- (a) CSA Standard B167-96, Safety Standard for Maintenance and Inspection of Overhead Cranes, Gantry Cranes, Monorails, Hoists, and Trolleys,**
 - (b) ANSI Standard ANSI/ASME B30.2-2005, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist),**
 - (c) ANSI Standard ANSI/ASME B30.11-2004, Monorails and Underhung Cranes,**
 - (d) ANSI Standard ANSI/ASME B30.16-2003, Overhead Hoists (Underhung), or**
 - (e) ANSI Standard ANSI/ASME B30.17-2003, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).**
- (5) A mobile crane, telescoping or articulating boom truck or sign truck must meet the requirements of**
- (a) CSA Standard Z150-1998, Safety Code for Mobile Cranes,**
 - (b) ANSI Standard ANSI/ASME B30.5-2004, Mobile and Locomotive Cranes, or**

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- (c) **ANSI Standard ANSI/ASME B30.22-2005, Articulating Boom Cranes.**
- (6) **A tower, hammerhead crane or self erecting tower crane must meet the requirements of CSA Standard Z248-2004, Code for Tower Cranes.**
- (7) **A portal, tower or pillar crane must meet the requirements of ANSI Standard ASME B30.4-2003, Portal, Tower, and Pillar Cranes.**
- (8) **A construction material hoist must meet the requirements of CSA Standard CAN/CSA-Z256-M87, Safety Code for Material Hoists.**
- (9) **A chimney hoist must meet the requirements of WorkSafeBC Standard 14.116 Chimney Hoists.**
- (10) **A base mounted drum hoist must meet the requirements of ANSI Standard ASME B30.7-2001, Base Mounted Drum Hoists.**
- (11) **A guy, stiffleg, basket, breast, gin pole, Chicago boom, shearleg or A-frame derrick must meet the requirements of ANSI Standard ASME B30.6-2003, Derricks.**
- (12) **A side boom tractor used for pipe laying or similar operations must meet the requirements of ANSI Standard ASME B30.14-2004, Side Boom Tractors.**
- (13) **A manually lever operated hoist must meet the requirements of ANSI Standard B30.21-2005, Manually Lever Operated Hoists.**
- (14) **A patient lift must meet the requirements of CSA Standard CAN/CSA Z10535-03, Hoists for the Transfer of Disabled Persons-Requirements and Test Methods.**
- (15) **A crane or hoist of a type not covered by the standards specified in subsections (2) to (14) must meet good engineering practice and be able to safely perform its function.**
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Explanatory Note:

Regarding proposed section 14.2(9), chimney hoists are rarely used in BC. The standard currently referenced covers some but not all the requirements set out in existing sections 14.116 to 14.132 of the Occupational Health and Safety Regulation. It is proposed that reference to the ANSI Standard be replaced by reference to a new WorkSafeBC standard, *WorkSafeBC Standard 14.116 Chimney Hoists* and only sections 14.116 to 14.119 be retained in the *Occupational Health and Safety Regulation*. The sections proposed for deletion, 14.120 to 14.132 will be incorporated into the new WorkSafeBC standard. This standard will be readily available at no cost from WorkSafeBC. A draft of the proposed standard is included at the end of this package for review and comment.

New section 14.2(13) is proposed to establish a standard for manually lever operated hoists which are common in many industries, and are commonly referred to as a “come-a-long”.

New section 14.2(14) has been proposed but patient lifts may be more properly the jurisdiction of the BC Safety Authority as the person at most risk in the event of a system failure is the patient on the lift, who generally will not be a worker. The attendant health care worker may also be at risk of injury if there is a failure.

New section 14.2(15) has been added to capture “odd hoists” such as a miscellaneous material hoist, a logging truck trailer reload hoist, scaffold mounted hoists and roofer’s hoists. The

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objective is to ensure that while there is no specific design or safety standard referenced for these cranes or hoists, the manufacturer or professional engineer responsible for specifying requirements for the equipment will use good engineering practice to ensure the design, construction, erection, dismantling, inspection, maintenance and operation of the equipment will conform to generally accepted safe practices for this type of equipment.

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- Identification** **14.3**
- (1) A crane or hoist must be permanently identified by the legible display of the manufacturer's name, **year of manufacture**, model and serial number on the structure.
 - (2) Each major interchangeable structural component of a crane or hoist must **be uniquely identified and must** be legibly marked to **enable confirmation that the component is compatible** identify compatibility with the crane or hoist, ~~and be uniquely identified.~~
 - (3) **If a crane or hoist was not commercially manufactured and does not have a model number or serial number, the crane or hoist must not be used unless engineering documentation signed by a professional engineer, including technical specifications and instructions for use, are available at the workplace where the crane or hoist is being used.**
 - (4) **A crane or hoist described in subsection (3) must be identified in a manner that links the engineering documentation referred to in that subsection with that crane or hoist.**
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Explanatory Note:

A wording change is proposed in section 14.3(2) to clarify the application of the provision. The markings generally do not identify compatibility directly. Typically the markings are a part number and/or a serial number, and compatibility is determined by reference to the equipment manuals or other manufacturer's information to establish the component is authorized for use with the particular crane or hoist.

Proposed new sections 14.3(3) and (4) will require that appropriate engineering documentation be available in the workplace when a "one of" or custom built crane or hoist is being used.

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Rated capacity 14.4 ~~The rated capacity of a crane or hoist must not be exceeded.~~

Explanatory Note:

Section 14.4 relates to the use of a crane or hoist. It is proposed this section be relocated to the "Equipment Operation" area of Part 14, and is proposed for incorporation into section 14.38.

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- Rated capacity indication** 14.5 (1) **Subject to subsection (3),** ~~the rated capacity of a crane or hoist system must be permanently indicated on the superstructure, hoist and load block of the equipment except as provided by subsection (3), and must on a crane or hoist manufactured after January 1, 1999, be indicated in SI (metric) units.~~
- (2) The rated capacity of a monorail crane must be permanently marked on the hoist and at **intervals not exceeding 10 m (33 ft) intervals** on the monorail beam.
- (3) ~~Rated capacity indication is not required on a crane or hoist if~~ **If the rated capacity of a crane or hoist is affected by**
- (a) the vertical or horizontal angle of a boom or jib,
 - (b) the length of a boom or jib,
 - (c) the position of a load supporting trolley, or
 - (d) the use or position of outriggers to increase the stability of the structure,
- a load chart must be permanently posted on the crane or hoist or must be issued to the crane or hoist operator who must keep it available at all times when operating the crane or hoist.**
- (4) **A load chart under subsection (3) must indicate the rated capacity for the crane or hoist for the working positions and configurations in use and must be in a legible condition.**
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Explanatory Note:

It is proposed that the requirement in section 14.5 (1) that the rated capacity be marked in SI (metric) units be deleted. During the development work leading up to the 1998 version of the *Occupational Health and Safety Regulation* it was expected industry and commerce would be moving to use of the SI (metric) system of measures. This has not happened, and many equipment manufacturers and many industries still use the imperial system of measure. The *Occupational Health and Safety Regulation* should not require a change to a specific system of measure where there is no overriding safety reason.

It is proposed that section 14.5(3) be modified and a new section 14.5(4) be added to combine the provision in existing section 14.6 into section 14.5. The current requirement under section 14.6 is unnecessarily demanding. Some of the affected equipment has many possible working configurations and working positions. Typically an equipment owner will only purchase the equipment components needed for the tasks the equipment will be used for, or will only configure the equipment for the tasks to be done at a particular workplace. It is pointless to require that load chart information be available at the workplace for configurations that cannot or will not be used. Sometimes load charts for all permitted positions and configurations can amount to a significant volume of charts and paper. The proposal is to adjust the wording to require that only the load charts for the configuration in use need to be available at the workplace.

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- Load charts** **14.6** ~~If the rated capacity is affected by a factor listed in section 14.5 (3), a legible load chart, showing the rated capacity in all permitted working positions and configurations of use, must be~~
- ~~(a) permanently posted on the equipment, or~~
 - ~~(b) issued to the equipment operator, who must have it available at all times when operating the equipment.~~
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Explanatory Note:

It is proposed that the requirements of section 14.6 be incorporated into sections 14.5 (3) and (4). See the Explanatory Note for section 14.5.

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Boom angle indicator	14.7	A crane or hoist with a boom movable in the vertical plane must have a device to indicate the boom angle if the rated capacity is affected by the boom angle, and the device must be readable by the operator at the control station.
Boom extension and load radius indicators	14.8	A crane or hoist must have a means or device to indicate the boom extension or load radius if the rated capacity of the equipment is affected by boom extension or load radius.
Logging exemption	14.9	Sections 14.5 to 14.8 do not apply to logging equipment that is being used to lift logs or to lift a log trailer. Specialized equipment designed and used only for logging operations is exempt from the requirements of sections 14.5 to 14.8.

Explanatory Note:

The “Logging exemption” clause currently provides a broad exemption for logging equipment. It does not limit the exemption to the use of such “specialized equipment” only while engaged in logging operations. If such a piece of equipment is to be used in an application other than handling logs in the manner intended by the manufacturer, it effectively becomes a crane and the devices and load chart information specified by sections 14.5 to 14.8 should be required. The proposed rewording would limit the exemption to use of a piece of logging equipment while lifting logs or for the incidental lifting of a log trailer.

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Reeved-in devices	14.10	The rated capacity of a crane or hoist with reeved-in lifting devices must be the net capacity of the equipment, except for mobile cranes.
Support structure	14.11	<ol style="list-style-type: none">(1) The rated capacity of a hoist must not exceed the capacity of the structure supporting the hoist.(2) Selector switches or other effective means must be provided to ensure that the supporting structure is not overloaded by simultaneous use of multiple hoists installed on the supporting structure.

Explanatory Note:

Some supporting structures are designed to allow for more than one hoist on the structure to be used at one time without overloading the support structure. Some are not. Where the supporting structure is not designed to allow use of multiple hoists mounted on it at one time, there must be selector switches or another means to ensure the combined hoisting capacity that can be used at any time does not exceed the rated capacity of the supporting structure.

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**Manual
Manual and
instructions**

- 14.12 (1) ~~The manufacturer's manual for each crane and hoist must be reasonably available to the workplace where the equipment is being used.~~

In this section:

"manufacturer's manual"

means a manual, prepared by the manufacturer of a crane or hoist, that describes the approved methods of assembly, erection, dismantling, maintenance, inspection and operation of the component parts of the crane or hoist and of the assembled crane or hoist;

"engineer's instructions"

mean instructions, approved in writing by a professional engineer, for the assembly, erection, dismantling, maintenance, inspection and operation of the component parts of a crane or hoist and of the assembled crane or hoist.

- (2) ~~The manual must show the approved methods of erection, dismantling, maintenance and operation of the component parts and of the assembled crane or hoist. A crane or hoist must not be used unless the following is reasonably accessible to the people at the workplace where the crane or hoist is to be used:~~
- (a) **the manufacturer's manual for the crane or hoist;**
 - (b) **if the manufacturer's manual is not available, an engineer's instructions for the crane or hoist.**
- (3) ~~The portions of the manufacturer's manual, or a copy of them, related to safe operation of the crane or hoist must be available at the workplace where the equipment is being used. A crane or hoist must not be used unless the following is readily available at the workplace where the crane or hoist is to be used:~~
- (a) **the portions of the manufacturer's manual related to the assembly, erection, dismantling, inspection, routine maintenance and safe operation of the crane or hoist;**
 - (b) **if the portions of the manufacturer's manual referred to in paragraph (a) are not available, the portions of an engineer's instructions related to the assembly, erection, dismantling, inspection, routine maintenance and safe operation of the crane or hoist.**

Explanatory Note:

The manufacturer's manual is not always available or obtainable and the *Occupational Health and Safety Regulation* needs to make provision for appropriate alternative information to be allowed and required. If the manual is lost or damaged to the point where it is no longer readable, sometimes it cannot be replaced if the manufacturer has gone out of business or if the manufacturer has made a business decision to no longer supply the manual.

The proposed changes to section 14.12 reorders the clauses and provides for the situation where the manufacturer's manual is no longer available. Also, the portion of the manual, or of the equivalent instructions from a professional engineer, required to be available at the workplace is expanded to include the information necessary for workplace personnel to do the tasks normally required to be done by them on site, such as assembly, erection, dismantling, inspection, and routine maintenance, as well as safe use of the equipment.

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~~Inspection and
maintenance~~

Inspection,
maintenance
and repair

- 14.13
- (1) Each crane and hoist must be inspected and maintained at a frequency and to the extent required to ensure that every component is capable of carrying out its original design function with an adequate margin of safety.
 - (2) A crane or hoist must not be used until any condition that could endanger workers is remedied.
 - (3) Any repair to load bearing components of a crane or hoist must be certified by a professional engineer or the original equipment manufacturer as having returned the component to a condition capable of carrying out its original design function with an adequate margin of safety.
 - (4) Maintenance or repair of a crane or hoist must be done by or under the direct supervision of a qualified person.**
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Explanatory Note:

It is proposed to add a new section 14.13 (4) to require that maintenance or repair of a crane or hoist be done by or under the direct supervision of a qualified person.

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**Inspection and
maintenance
records**

- 14.14** Records of inspection and maintenance meeting the requirements of Part 4 (General Conditions) must be kept by the equipment operator and other persons inspecting and maintaining the equipment for
- (a) a crane or hoist with a rated capacity of **900** ~~1 000~~ kg (**2 000** ~~2 200~~ lbs) or more,
 - (b) a crane or hoist used to support a worker,
 - (c) a tower crane,
 - (d) a mobile crane, boom truck or ~~sign truck~~~~aerial ladder crane~~,
 - (e) a side boom tractor or pipe layer,
 - (f) a construction material hoist,
 - (g) a chimney hoist, ~~and~~
(g.1) a logging truck trailer reload hoist, and
 - (h) any other type of hoisting equipment specified by the Board.
-

Explanatory Note:

The capacity of 1000 kg in section 14.14 (a) was chosen as the “cut off” limit for requiring inspection and maintenance records during the development work leading up to the 1998 version of the *Occupational Health and Safety Regulation*. At that time it was believed industry and commerce would be moving to the SI (metric) system of measures, and the common hoist rating for this “level” of hoist capacity would shift, over time, to be 1 000 kg. This has not happened. Many manufacturers and workplaces still use the imperial system of units. The result is hoists with a one ton capacity rating are very common and currently exempt from the requirements for inspection and maintenance records. It was intended hoists in this “range of rated capacity” be included in the scope of equipment requiring such records. The proposal is to change the rated capacity limit to 900 kg or more for the requirement that records be kept.

It is also proposed to specify in section 14.14 a type of hoisting equipment that had not been listed previously as an equipment type requiring records of inspection and maintenance, and that is a logging truck trailer reload hoist, which has been proposed as new section 14.14(g.1).

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Modifications 14.15**
- (1) Each crane or hoist must be erected, dismantled, operated, adjusted, inspected and maintained as specified by the manufacturer's manual unless otherwise approved by the original equipment manufacturer or a professional engineer.
 - (2) ~~Modifications~~ **If a modification that affects the rated capacity or safe operation of a crane or hoist is made to its structure, to one of its mechanical components or to its control system, the crane or hoist must**
 - (a) be assessed ~~and the,~~
 - (b) **have its** rated capacity adjusted **as necessary, and** ~~by the original equipment manufacturer or a professional engineer.~~
 - (c) **be certified as safe for use.**
 - (2.1) **The assessment, rated capacity adjustment and certification under subsection (2) must be carried out**
 - (a) **in accordance with the applicable design or safety standard specified in section 14.2, and**
 - (b) **by the original equipment manufacturer or a professional engineer.**
 - (3) Modifications to a crane or hoist must be recorded in the inspection and maintenance records system and the equipment **operation and maintenance** manuals must be revised as necessary to ensure that adequate and appropriate information is available for safe use and maintenance of the equipment.
-

Explanatory Note:

The current provision allows the equipment manufacturer or an engineer to assess a modification and adjust the rated capacity as they see fit. The proposed change is to ensure the safety factor contemplated by the applicable design or safety standard is not reduced, and this would be consistent with good engineering practice. The potential detrimental effects of modifications to electrical and mechanical components and the effect any changes may have on operating and maintenance requirements were not previously addressed by the regulation. New requirements are proposed to ensure these important considerations are not overlooked.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Certification** **14.16** A person must not use a crane or hoist unless a professional engineer has certified the rated capacity of the crane or hoist in accordance with criteria from the applicable design or safety standard specified in section 14.2 if
- (a) the origin or rated capacity of the equipment is not available cannot be determined,
 - (b) the continued safe use of the equipment cannot be assured because of its condition, age or history, or
 - (c) repairs or modifications have been made to load carrying components,
 - (d) modifications referred to in section 14.15 that affect the rated capacity have been made to the crane or hoist. have been made which affect the rated capacity, or
 - (e) the crane or hoist has been in contact with an electric arc or current.
- Certification following misadventure** **14.16.1** (1) In this section, “misadventure” means
- (a) a contact with a high voltage electrical source,
 - (b) a shock load,
 - (c) a loss of a load,
 - (d) a brake failure,
 - (e) a collision or upset, or
 - (f) any other circumstance that may impair the safe operation of the crane or hoist.
- (2) If a crane or hoist has been subject to a misadventure, it must be removed from service until a professional engineer has
- (a) supervised an inspection of, and supervised any necessary repairs to, the equipment, and
 - (b) certified the equipment as safe for use at the manufacturer’s rated capacity for the equipment or as provided by section 14.16 if the manufacturer’s rated capacity is not available.
-

Explanatory Note:

The considerations under section 14.16(b), related to “age” or “history”, reflect that if the age of the equipment is not known or its history (established by records of its use and maintenance) is not available, the safety of the machine for continued operation is questionable regardless of the apparent condition of the machine to be safe for use. The effect of this clause is to require that a professional engineer oversee the assessment of the machine and certify the safe operating parameters for the machine before it is used.

A modification that affects the rated capacity is regulated by section 14.15 (2) so similar provisions need not be repeated in section 14.16, and section 14.16(c) is proposed for deletion.

Proposed new section 14.16.1 is intended to establish that the purpose of the inspection, repair and certification of a crane or hoist following misadventure is to return the equipment to its original operating condition, not to allow it to be partially repaired and down rated to a lesser rated capacity. Down rating affects the accuracy of manufacturer’s information and may have negative implications on continued use when the equipment changes ownership. A crane’s characteristics and ratings are defined by its serial number and future safety issues may reasonably result if future users are not aware of the down-rating.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

Access and egress	14.17	<p>(1) There must be a safe means of access and egress to the operator's position and to maintenance locations on a crane or hoist. A crane or hoist must have a safe means of access to and egress from</p> <p>(a) the operator's position, and</p> <p>(b) all maintenance and inspection locations on the crane and hoist.</p> <p>(2) If the normal safe means of egress is not always available to the operator during crane operations, an alternative safe means must be provided for the operator to get from the operating position to a safe area in the event of a power failure or other emergency.</p>
Audible warning	14.18	<p>(1) An effective audible warning device must be installed on a crane or hoist, unless the hoisting equipment is operated using a pendant or remote control and the operator walks in a safe position near the load.</p> <p>(2) The operator of a crane or hoist must sound a warning signal when it is necessary to alert workers to hoisting operations.</p>
Drop stops	14.19	<p>(1) Each A top-running crane, under-running crane, wheel- or rail-mounted gantry crane, tower crane and monorail hoist must have a means to limit the drop of the crane, trolley and bridge truck frames to 25 mm (1 in) if a tire, wheel or axle fails.</p> <p>(2) Drop stops must be able to support the trolley, and bridge and gantry with the crane or hoist loaded up to its rated capacity and must be so certified to be able to do so by the original equipment manufacturer or a professional engineer by January 1, 1999.</p>

Explanatory Note:

The proposed change to section 14.17(1) is to add reference to requiring safe access to locations where maintenance and inspections must be routinely done. Generally, the expectation is there will be adequate footholds and handholds to allow the operator to safely get from ground or grade level into and out of the operator's position. For maintenance and inspection locations, there must be appropriate means of access and where necessary, provision of suitable work platforms and fall protection. For some types of equipment, such as a mobile crane, access to the boom and the tip sheave can be achieved by lowering the boom to or near grade level, so climbing the boom should not generally be required or permitted.

The proposed change to section 14.18(1) is to add reference to a remote control. Remote controls are common and not covered by the term "pendant control". Also, the last part of this section is proposed for rewording to require the operator only walks in a safe position when walking near the load.

The proposed change to section 14.19 (1) is to ensure wheel-mounted gantry cranes are understood to be included in the types of equipment that must have drop stops, as a tire, wheel or axle failure on this type of equipment is a danger and can be controlled through having adequate drop stops installed.

It is proposed to delete the reference to the date of January 1, 1999 from section 14.19 (2). This date was originally placed in the section to provide an effective date by which existing equipment had to meet this provision when it was placed in the *Occupational Health and Safety Regulation* in April 1998.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

Rail end stops	14.20	(1) End stops must be provided on crane and hoist tracks and rails to prevent the equipment running off the end of the rail or track. (2) The stops must contact the truck frame or be of a height of at least $\frac{1}{2}$ the diameter of the wheels if the wheels contact the stops.
Fenders	14.21	(1) Fenders must be provided on a crane or hoist which operates on rails if there is a possibility of injury to workers from contact with the equipment wheels moving along the rail. (2) Fenders required by subsection (1) must effectively deflect any object from the path of the wheel.
Securing pins	14.22	Heel-pins A heel-pin, sheave-pins, shackle-pins or and similar devices must be secured against inadvertent dislodgment, in the manner specified by the equipment manufacturer or by the professional engineer who designed and certified the equipment.

Explanatory Note:

A common question related to section 14.22 is what constitutes adequate securing of pins. Generally heel-pins, sheave-pins and similar devices are critical to the safe operation of the equipment and the equipment manufacturer specifies the means to secure these pins. Make-shift securing means or devices should not be substituted for the equipment designer's prescribed method.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

- (b) if the control signal for any crane or hoist motion becomes ineffective, the crane or hoist motion stops,**
 - (c) the remote control panel has an operator controlled emergency stop feature that**
 - (i) permits the operator to stop all crane or hoist movement regardless of a malfunction within the remote control system, and**
 - (ii) requires resetting of the emergency stop feature before equipment operation can resume.**
 - (9) A remote control panel for a crane or hoist must be marked to identify the corresponding base control unit to be used with it.**
 - (10) The maximum distance between a remote control panel and the crane or hoist being operated by the remote control system must**
 - (a) not exceed the limit specified by the control system manufacturer, and**
 - (b) be communicated to the operator before the operator uses the crane or hoist.**
-

Explanatory Note:

Remote control panels, both “wired” and “wireless” (sometimes referred to as “belly boxes”) are common for controlling crane and hoist equipment. If the control panel ends up “face down” on a surface or if the user bends over or reaches for something and contacts a control on the panel, the crane or hoist may unexpectedly activate. Proposed new section 14.28 (6) will require these remote panels be of a design that will minimize the risk of unintended activation of a control function during the normal use and handling of the panel. This could be accomplished by having a shield or guard preventing unintended access to the controls or by having some form of interlock system that disables control functions unless a prescribed sequence of control motions are made by the operator.

Proposed new sections 14.28 (6) to (10) establish operational characteristics needed to ensure the integrity of a remote control system. Some of these provisions are similar to sections 19.38 to 19.40 of the *Occupational Health and Safety Regulation*.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

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| Operator protection | 14.29 | The operator of a crane or hoist must be protected against hazardous conditions such as falling or flying objects and excessive heat or cold that could adversely affect the health or safety of the operator. |
| Cab windows | 14.30 | <p>(1) Cab windows on a mobile crane must be made of safety glazing materials meeting the requirements of <i>ANSI/SAE Z26.1-1990, American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways—Safety Code</i>.</p> <p>(2) Cab windows on a crane, other than a mobile crane, or hoist which is not a mobile crane must be laminated glass, tempered glass, wired glass or clear polycarbonate plastic.</p> <p>(3) Operator cab windows on a crane or hoist must</p> <ul style="list-style-type: none">(a) be kept clear, and(b) must provide an unobstructed field of vision toward the load hook, and(c) have window wipers, if necessary to maintain a clear view through the window must be functional. |
-

Explanatory Note:

It is proposed to reword section 14.30(3) for clarity.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Operator's seat** **14.31** The operator's seat on a crane or hoist must be of a design that allows the operator to safely operate the equipment and the seat must be kept in good condition.
- Storage** **14.32** (1) The operator's cab of a crane or hoist must be kept free of unnecessary tools, material or equipment.
- (2) Adequate storage facilities must be provided if it is necessary to keep tools or equipment in the operator's cab of a crane or hoist.
- Fire extinguisher** **14.33** A fire extinguisher having at least a 10 BC rating must be immediately available in the cab of each crane.

EQUIPMENT OPERATION

- Operator qualifications** **14.34** (1) A crane or hoist must only be operated by a qualified person who has been instructed to operate the equipment.
- (2) A person must demonstrate competency, including familiarity with the operating instructions for the crane or hoist and the code of signals for hoisting operations authorized by the Board before operating the equipment.
- (3) Repealed [B.C. Reg. 243/2006.]
- Operator certification** **14.34.1** On and after July 1, 2007, a mobile crane, tower crane or boom truck must be operated only
- (a) by a person with a valid operator's certificate issued by a person acceptable to the Board, and
- (b) in accordance with any conditions stipulated on the certificate.
-

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

**Start-of-shift
inspection
Pre-use
inspection**

- 14.35 (1) **Before an operator uses a crane or hoist, the**~~The operator must ensure that~~~~inspect the crane or hoist at the beginning of each shift and must test as specified by the manufacturer and the applicable safety code and regulations.~~
- (a) **the crane or hoist was inspected for that work shift, and**
 - (b) **the control and safety devices were tested for that work shift.**
- (1.1) **The inspection and testing in subsection (1) must be carried out in the manner specified**
- (a) **by the manufacturer,**
 - (b) **in the applicable design or safety standards set out in section 14.2, and**
 - (c) **in this Regulation.**
- (2) Any defects found during inspection or use of a crane or hoist must be recorded in the inspection and maintenance record system and be reported immediately to the supervisor, who must determine the course of action to be taken.
- (3) If a defect affects the safe operation of the crane or hoist, the equipment must not be used until the defect has been remedied.

Explanatory Note:

The proposed changes to section 14.35 (1) recognize that a crane or hoist operator may not be the person responsible for doing the inspection of the crane or hoist and testing the control and safety devices on each shift. In these cases the operator needs to look in the equipment records (log book or equivalent system) to determine if the required inspection and testing has been done for the work shift before operating the crane or hoist. Also, the phrase "at the beginning of each shift" is proposed for deletion to recognize that a crane or hoist may not be used on every shift, or it may not always be required for use in the early stages of a shift. There is no reason to require an inspection and testing of control and safety devices be done at the beginning of the shift if the crane will not be used on the shift or if it will not be used until later in the shift. The proposed change does not mandate unnecessary inspection and testing and provides flexibility on when the inspection and testing can be done.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Load weight** **14.36** (1) The weight of each load to be hoisted by a crane or hoist must be determined and communicated to the equipment operator and to any **person rigging the load** ~~other worker involved in the hoisting operation.~~
- (2) If the weight of a load to be lifted cannot be **accurately** determined, the crane or hoist to be used for the lift must have a load weight indicator, or an **overload prevention system** ~~a load limiting device.~~
- (3) ~~Equipment specifically designed and used for logging operations is exempt from the requirements of subsections (1) and (2).~~
Subsections (1) and (2) do not apply to logging equipment that is being used to lift logs or to lift a log trailer.
-

Explanatory Note:

The proposed changes to sections 14.36(1) and (2) clarify the requirements and use contemporary language. Safe lifting practice requires the operator and the rigger to know the weight of a load before attempting to rig and handle the load. The employer or prime contractor is responsible for ensuring the weights of loads are accurately determined and communicated to the equipment operator and the riggers. A load indicating device or an overload prevention system is not intended to replace or allow bypassing this safe practice. The load indicating device or overload prevention system is intended as a back-up to safe lifting practice. It is recognized there are some situations where the load weight cannot be accurately determined prior to attempting a lift. For example, lifting a submerged load resting on silt or mud, lifting a natural object such as a large boulder, lifting a “garbage box” containing a mix of materials or lifts related to demolition work are some situations where it may not be possible to accurately determine the load for a particular lift. In such circumstances, the “expected load” for the lift should always be well below the rated capacity of the lifting equipment.

The proposed change to section 14.36 (3) will update this section to be consistent with the changes to the scope and wording proposed for section 14.9.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Calibration** **14.37** (1) ~~Load weighing devices, including a load moment indicators on a crane or hoist must be calibrated as specified by the manufacturer or at more frequent intervals, as required and.~~ **The following devices or systems on a crane or hoist must be calibrated at the intervals specified by the manufacturer and whenever there is an indication the device or system is not functioning correctly:**
- (a) a load weighing device;
 - (b) a load moment indicator;
 - (c) an overload prevention system.
- (2) ~~The~~ **dates of calibration under subsection (1) must be recorded in the inspection and maintenance records system for the crane or hoist.**
-

Explanatory Note:

It is proposed to reword section 14.37 to include reference to overload prevention systems, and to clarify when it would be “required” to calibrate the device or system at an interval that is less than the manufacturer’s recommended interval for calibration.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

**Unsafe lift
Safe lifting**

- 14.38** ~~The operator of a crane or hoist must not attempt to move a load if there is any doubt the load can be safely handled.~~
- (1) The rated capacity of a crane or hoist must not be exceeded.**
 - (2) The operator of a crane or hoist must not move a load unless the operator is satisfied that the load can be handled safely.**
 - (3) A load must be secured during a lift to ensure that all or any part of the load cannot be dislodged.**
 - (4) A load line on a crane or hoist must not contact anything other than the load block or hook and the sheaves and hoist drum.**
 - (5) Tag lines or other effective means must be used to control hazardous movement of a load or to assist with positioning a load.**
 - (6) If a crane or hoist is being operated at the same time and in the same location as other work activity, the employer or the prime contractor must provide effective supervision of any persons who are not involved in that operation to ensure that the operation can be carried out safely.**
-

Explanatory Note:

The proposal is to modify this section by the relocation of section 14.4 to the equipment operation area of Part 14 (as it pertains to equipment operation) as a new section 14.38 (1).

The existing section 14.38 is renumbered as section 14.38 (2) and reworded slightly.

A proposed new section 14.38(3) would require that a load be secured to prevent all or part of the load from dislodging. For example, when lifting a load comprised of sheets of wallboard or plywood, the load needs to be rigged and handled so the individual sheets will not separate from the load, and so the whole load will remain fixed to the load handling attachment or rigging being used.

A proposed new section 14.38(4) is to stipulate that the load line for a crane or hoist must not be allowed to contact or rub against a structure or other obstacle during hoisting operations.

A proposed new section 14.38 (5) is added to provide for the use of tag lines or other means or techniques where it is necessary to control the rotation of a load due to wind or other factors and to allow for one or more workers to assist with controlling or aligning a load from a safe position. It is recognized that use of tag lines will not always be practicable, or safe. "Other effective means", besides tag lines, to assist with positioning a load could be the use of a pry bar or spud wrench to assist with the final alignment of a load. The important thing is to keep fingers, hands and arms clear of pinch points in case the load shifts unexpectedly.

A proposed new section 14.38 (6) is added to require that supervision be provided during crane or hoist operation to ensure people affected are aware of the operation and the work is arranged to be done safely with due consideration of other activity taking place in the workplace. The objective is to ensure there is effective overall supervision of the site activities, so the crane or hoist operator can focus on the operator's primary responsibility, which is the safe operation of the crane or hoist. The operator should not be responsible for general supervision of other people on site, and should thus be able to focus on operating the crane and working with the riggers and signalers assigned to the operator. Supervision is also addressed in the proposed changes to sections 14.42 related to a critical lift or a tandem lift.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Contact with loads and structures**
- 14.39**
- (1) A load must not contact ~~the boom~~ **a structural member** of a crane or hoist and **a structural member of a crane or hoist** ~~the boom~~ must not contact ~~a~~ **any building, bridge, other crane or any other** structure, **fixture or improvement**.
 - (2) If contact as described in subsection (1) occurs, a qualified person must inspect the point of contact, and visible damage such as a cracked weld or a bent or dented member must be assessed, repaired as necessary, and the damaged or repaired area certified by a professional engineer as safe for use.
 - (3) Equipment used for handling logs and specifically designed for the logs to contact the boom **or other structural member** is exempt from the requirements of subsections (1) and (2), provided workers are kept out of the hazard area created by the loads being handled.
-

Explanatory Note:

It is proposed to change the term "boom" to "structural member" in section 14.39 (1) as the term "boom" is too limiting in this section. It is particularly critical that a load not be allowed to contact the mast of a tower crane.

It is proposed to insert the phrase "or other structural member" in section 14.39 (3) as the designed contact point for a log being handled may not be the boom, but may be another structural member such as a heel bar fixed to the boom.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Swing hazards** 14.40 (1) **If a hazard is created by the swing or shearing movement of a load, cab, counterweight or any other part of a crane or hoist, the operator of the crane or hoist must not move the equipment when a person is within range of the swing or shearing movement of the load or equipment. A worker must not remain within range of the swing of the load or equipment when a hazard is created by the swing movement of the load, cab, counterweight or any other part of the crane or hoist, and the operator must not move the equipment when any worker is so exposed.**
- Swing and shear hazards**
- (2) **If a hazard is created by the swing or shearing movement of a load, cab, counterweight or any other part of a crane or hoist, a person must not remain within the range of the swing or shearing movement of the load or equipment.**
-

Explanatory Note:

The proposed change breaks section 14.40 into two sections as there are two distinct issues addressed, one being the operator's responsibility, and the other being the responsibility of any other person who is working in the area of the operation. Note the term "worker" is replaced with "person", as there may be a person at a workplace who is not a worker as defined in the *Workers Compensation Act* but is required to comply with the *Act* and the *Occupational Health and Safety Regulation*.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

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| Position of equipment | 14.41 | (1) Equipment must be positioned so that no moving part of the equipment will come within 60 cm (2 ft) of any obstruction in any area accessible to workers.

(2) If the clearance required by subsection (1) cannot be provided, entry to such areas must be prevented by barriers or other effective means. |
| Multiple crane lift | 14.42 | (1) Each multiple crane lift must be under the direction of a qualified supervisor who is responsible for the safe conduct of the operation.
(2) A written procedure must be prepared for any multiple mobile crane lift if the load on any one crane will exceed 75% of its rated capacity, or where other factors make the lift complex.
(3) A written procedure must be prepared for any lift in which 3 or more cranes are used at one time to hoist a load.
(4) Multiple crane lift procedures must address rigging details, wind speed, hoist line speed, crane travel speed, load distribution and other considerations as necessary.
(5) The procedures for a multiple crane lift must be communicated to all persons involved before commencing hoisting operations.
(6) Effective communication must be established and maintained between all persons involved during a multiple crane lifting operation. |
| Tandem lift | | (1) A tandem lift must be carried out under the direction of a qualified supervisor who
(a) is not operating a crane, hoist or other piece of powered lifting equipment, and
(b) is responsible for the safe conduct of the operation.
(2) A written lift plan must be prepared for every tandem lift and must be available at the worksite during the lift.
(3) The lift plan required in subsection (2) must include the following:
(a) rigging details;
(b) wind speed limitations;
(c) maximum hoist line speed;
(d) maximum crane travel speed, if applicable;
(e) load distribution;
(f) the need for and position of signallers.
(4) If a tandem lift involves the use of a tower crane, the lift plan required in subsection (2) must be certified by a professional engineer.
(5) At a pre-job meeting held immediately before commencing hoisting operations for a tandem lift, the lift plan required in subsection (2) must be communicated to all people involved and the supervisor must document the meeting.
(6) The pre-job meeting required under subsection (5) must be repeated whenever there is a change in the people or equipment involved in the tandem lift.
(7) Effective communication must be established and maintained between all people involved in a tandem lift. |

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Critical lift** **14.42.1** **(1) A written lift plan must be prepared for every critical lift and must be available at the worksite during the lift.**
- (2) The written lift plan required in subsection (1) must include the following:**
- (a) rigging details;**
 - (b) wind speed limitations;**
 - (c) maximum hoist line speed;**
 - (d) maximum crane travel speed, if applicable;**
 - (e) load distribution;**
 - (f) the need for and position of signallers.**
- (3) At a pre-job meeting held immediately before commencing hoisting operations for a critical lift, the lift plan required in subsection (1) must be communicated to all people involved and the supervisor must document the meeting.**
- (4) The pre-job meeting required under subsection (3) must be repeated whenever there is a change in the people or equipment involved in the critical lift.**
- (5) Effective communication must be established and maintained between all people involved in a critical lift.**
-

Explanatory Note:

It is proposed to rewrite section 14.42 as these provisions should apply to any critical lift, not just when a multiple crane lift is being done. The terms “critical lift” and “tandem lift” are proposed for definition in section 14.1.

For sections 14.42(2) and 14.42.1(1), it may be possible for a generic procedure to be developed and implemented for some lifting operations. For example, this may be an option if a repetitive lift is required in a plant as part of a standard production process, or for the use of a particular suspended work platform with a particular crane.

Proposed section 14.42(3) is a requirement in the *CSA Standard Z248 Safety Code for Tower Cranes* and is added here as the provision would not likely to be known to industry people who are not directly involved with the use of that code.

Proposed sections 14.42(5) and 14.42.1(4) are intended to recognize that the pre-job meeting requirement at a workplace where a series of repetitive or similar tandem or critical lifts are to be done can be met with one meeting unless the crew or equipment changes in the course of the work.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Travelling with a load** **14.43** (1) **When a crane or hoist is travelling** ~~If travelling with a load, the operator~~ **of the crane or hoist** must ensure that the load is carried as close to the ground or grade as possible and rigged to control load swing.
- (2) ~~If necessary, a worker, designated as the signaller, must walk ahead of a moving load and warn workers to keep clear.~~ **When a crane or hoist is travelling with a load, adequate safety measures must be taken to ensure people are not endangered by the movement of the crane, hoist or load.**
-

Explanatory Note:

It is proposed that section 14.43 (1) be reworded for clarity.

It is proposed that section 14.43 (2) be reworded to allow flexibility for ensuring people are made aware of a load being travelled by a crane or hoist and that people must be in a safe position when this activity is occurring.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

**Loads over
work areas**

- 14.44** (1) **If practicable,** ~~Work~~ must be arranged to prevent passing loads ~~a load~~ over **any person** ~~workers~~ wherever possible.
- (2) A crane or hoist operator must not pass a load over **a person** ~~workers~~, unless no practicable alternative exists and then only **after the person has** ~~when the workers have~~ been warned of the danger by an audible alarm **or other effective means**.
- (3) A **person working at a workplace** ~~worker~~ must not stand **under** or pass beneath a suspended load ~~except as permitted by subsection (2)~~.
-

Explanatory Note:

It is proposed to reword section 14.44 for clarity and to replace the term “worker” with the term “person”, as there may be a person at a workplace who is not a worker as defined in the *Workers Compensation Act* but is working in or contributing to the work taking place and thus required to comply with the *Occupational Health and Safety Regulation*.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

Unattended loads	14.45	A load must not be left suspended from or supported by the load hook of a crane or hoist when an operator is not at the controls.
Vertical load line Hook position	14.46	The load line above the load hook or the load block of a crane or hoist must be kept vertical when lifting a load in order The hook or load block of a crane or hoist must be positioned over the load to prevent side loading of the crane or the load swinging when a load is hoisted.

Explanatory Note:

It is proposed to modify section 14.45 to recognize that not all loads handled by cranes or hoists are suspended from a load hook or a load block. On some equipment the loads may be supported by a load handling attachment, such as forks, attached to the crane or hoist structure and on some equipment loads are connected directly to the crane or hoist structure using a shackle. In these cases there is no load line or load hook involved in the lift. However, the intent of this section is the operator must not leave the equipment controls while the crane or hoist is supporting the load.

It is proposed to reword section 14.46. A crane or hoist designed for lifting loads is not designed or intended to be used for dragging loads, or designed to allow for excessive amounts of load swing relative to the crane structure.

The objective of section 14.46 is to prevent side loading on the crane or hoist. This is achieved when the portion of the load line immediately above the load is maintained vertical or as near vertical as is practicable during lifting operations. When a suspended load is being repositioned laterally, it is important for the operator to make such movements slowly and steadily to limit pendulous movement of the load. Note a suspended load swinging from side to side relative to the crane structure will cause side loading on the crane structure. A suspended load swinging away from the crane boom or mast will result in an uncontrolled increase in the load radius and may result in the lift exceeding the rated capacity.

Many common lifts involve the centre of gravity of a load shifting relative to the load line and these are not necessarily complex lifts. For example, picking up a pipe or pole at one end, or lifting a gang form from a flat position to a vertical orientation are common lifts (and the reverse process of laying one of these objects down on to the ground from a vertical orientation is also a common hoisting operation.) During these operations the operator needs to manipulate the crane or hoist functions to keep the load line as close to vertical as possible to minimize the chance of uncontrolled load movement.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

Signals

- 14.47** (1) ~~The operator of a crane or hoist must act only on directions from a designated and competent signaller whenever the operator does not have a clear and unobstructed view of the load hook and load throughout the whole range of the hoisting operation.~~ **When the operator of a crane or hoist does not have a clear and unobstructed view of the boom, jib, load line, load hook and load throughout the whole range of the hoisting operation, the operator must act only on the directions of a qualified signaller who has a clear view of the things the operator cannot see.**
- (2) Repealed. [B.C. Reg. 312/2003.]
- (3) The operator of the crane or hoist must stop the operation of the equipment on receiving a stop signal from any person.**
-

Explanatory Note:

The proposed changes to section 14.47 are intended to ensure the movement of all crane components can and will be visually monitored at all times. And the section is modified by adding section 14.47(3) to ensure the crane or hoist operator must heed a signal to stop hoisting operations upon receiving a stop signal from anyone, not just the designated signaller.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

Alternative to hand signals	14.48	(1) Two-way radio or other audio or video systems acceptable to the Board must be used if distance, atmospheric conditions or other circumstances make the use of hand signals hazardous or impracticable. (2) Audio and video communication systems used in a hoisting operation must be designed, installed, operated and maintained according to a standard acceptable to the Board.
Dedicated radio system	14.49	(1) A two-way radio system, used to direct for communications between the operator of a tower crane or a self erecting tower crane hoist movement and the riggers and signallers working with that operator , must operate on an ultra-high a frequency , and at a transmitter power assigned and coordinated by the Board or by a person acceptable to the Board . (2) Multi-channel radios are not permitted for use to direct crane or hoist movement. (3) Only the operator of the crane and the riggers and signallers working with the operator may have the capability to transmit on the radio frequency assigned under subsection (1).
Communication between equipment operators	14.49.1	If, during the operation of a crane or hoist, another piece of equipment is operating in the vicinity and has the reach to interfere with the movement of the crane or hoist, or the load being handled, (a) each operator must have effective voice communication with every other operator, and (b) written procedures must be developed and implemented to ensure coordination of the operation of the equipment to prevent any physical contact.

Explanatory Note:

The proposed changes to section 14.49 (1) are to allow flexibility around the radio frequencies that may be available for use and to allow WorkSafeBC to outsource the function of assigning and coordinating radio frequencies to another agency, if an acceptable one is found and agrees to take on the role. Also, the provision requiring use of an assigned frequency has been narrowed to apply to only tower cranes and self erecting tower cranes, as those are the only types of cranes or hoists being coordinated for a radio frequency assignment. One frequency in the available UHF band has been designated for use by mobile cranes and boom trucks, but the current program does not coordinate the use of that frequency in any particular area.

Proposed new section 14.49 (3) is intended to ensure only the crane operator and the people directly involved with rigging loads for that operator or designated to be a signaller as required by section 14.47 are able to transmit on the assigned frequency. This is to prevent other people from interrupting or interfering with the communications between the crane operator and the riggers and signallers. The provision does not limit the ability of others to have the capability to receive (or monitor) the communication between the operator and the rigger(s).

Proposed new section 14.49.1 is intended to require that where a crane or hoist and another piece of equipment, such as another crane, a pile driver or a concrete pump boom, are operating close enough to one another such that the operation of one unit may intrude into the operating space of the other unit, the operators of the equipment must be able to communicate with each other and procedures must be implemented to minimize the likelihood of contact.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

Unhooking loads	14.50	A load on a crane or hoist load hook must be safely landed and supported, before being unhooked.
Riding hook or load	14.51	A worker must not ride on a load, sling, hook or any other rigging equipment.
Induced voltage	14.52	(1) Before a crane or hoist is operated near a source such as a radio transmitter or energized high voltage electrical equipment which may induce an electric charge which could pose a hazard to workers, the following precautions must be implemented: (a) the crane or hoist must be effectively grounded; (b) any induced electric charge on the load must be dissipated by applying grounding cables or by other effective means before workers contact the load; (c) flammable materials must be removed from the immediate work area. (2) Subsection (1)(a) and (b) does not apply if work is being performed on a power system in accordance with the requirements of Part 19 (Electrical Safety).
Work near high voltage	14.52.1	A crane or hoist must be operated in a manner that prevents any part of the crane or hoist, load line, rigging or load from coming within the minimum distance of energized high voltage electrical conductors or equipment as specified in Part 19.
High voltage electrical conductors	14.53	Repealed. [B.C. Reg. 312/2003.]

Explanatory note:

It is proposed to reinsert a specific section to draw attention to the requirements for keeping a safe distance from energized high voltage electrical lines and related electrical gear. Contact with high voltage powerlines during crane and hoist operations continues to be a problem, and due to the extreme hazard from such contacts it is felt a specific provision should be placed back in Part 14. This provision (formerly section 14.53) was repealed as part of the consolidation to reduce the "regulatory count" by eliminating "cross references" from the *Occupational Health and Safety Regulation*.

BRIDGE, GANTRY AND OVERHEAD TRAVELLING CRANES

**Load testing
Operational
and running
tests**

- 14.54** ~~(1) A bridge, gantry or overhead travelling crane installed after January 1, 1999, or such a crane or its runway which has been significantly modified, must be load tested before being put into service as follows:~~
- ~~(a) all crane motions must be tested under loads of 100% and 125% of the rated capacity for each hoist on the crane, and the crane must be able to safely handle a load equal to 125% of the rated capacity;~~
 - ~~(b) all limit switches, brakes and other protective devices must be tested when the crane is carrying 100% of the rated capacity;~~
 - ~~(c) structural deflections must be measured with loads of 100% and 125% of the rated capacity and must not exceed the allowable deflections specified by the applicable design standard;~~
 - ~~(d) the load must be travelled over the full length of the bridge and trolley runways during the 100% and 125% load tests, and only the parts of runways that have been successfully load tested may be placed into service.~~
- (1) This section applies to**
- (a) a bridge crane, gantry crane or overhead travelling crane that was installed after January 1, 1999, and**
 - (b) a crane referred to in paragraph (a) or its runway that has been reinstalled, modified or rebuilt.**
- (1.1) The following tests must be performed before the equipment described in subsection (1) is used for the first time after it has been installed, reinstalled, modified or rebuilt, as applicable:**
- (a) all crane motions, holding brakes and travel brakes must be tested to meet the manufacturer's specifications and the requirements of the applicable design or safety standard for when the hook is carrying a load at rated capacity;**
 - (b) all circuits, controls, interlocks and sequences of operation of the equipment must be tested to ensure they are functioning properly;**
 - (c) all crane motions, holding brakes and travel brakes must be tested to prove the crane's ability to safely handle a load of 125% of the crane's rated capacity;**
 - (d) all limit switches, brakes and other protective devices must be tested to ensure they function properly when the crane is carrying a load of 100% of the rated capacity;**
 - (e) structural deflection must be measured with a load of 100% of the rated capacity and must not exceed the allowable deflection specified by the applicable design standard;**
 - (f) the load must be travelled over the full length of the bridge and trolley runways during the load tests at 100% and 125% of rated capacity, and only the parts of runways that have been successfully load tested may be placed into service.**
- (2) A record of all load tests must be included in the equipment record system giving details of the tests and verification of the loads used, and be signed by the person conducting the tests.**

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

- (3) A replacement crane or hoist to be installed on an existing runway may be load tested in the manufacturer's facility and installed on ~~the an~~ existing runway provided ~~that the~~ **rated capacity of the replacement crane or hoist and the loads imposed on the runway by the replacement crane or hoist** ~~unit has a rated capacity and gross weight are equal to or less than the previously tested load rating for the runway, and the runway need not be load tested unless it has been modified since it was previously load tested.~~
- (4) **In the circumstances set out in subsection (3), the existing runway is not required to be load tested as required in subsection (1.1) unless the runway has been modified since it was previously load tested.**

Detailed
inspection

- 14.54.1 A bridge crane, gantry crane or overhead crane must be inspected by a qualified person in accordance with**
- (a) the inspection criteria specified by the manufacturer of the crane,**
 - (b) the applicable design or safety standard specified in section 14.2, and**
 - (c) the requirements of this Regulation.**

Explanatory Note:

The proposal is to modify section 14.54(1) to make the requirements consistent with the operational and running test criteria in the referenced standards. The deflection test should only be required at 100% of rated load, which is the requirement in the CSA Standard B167.

The proposal to modify section 14.54(3) is to more precisely describe the factors that must be considered when installing a replacement crane.

The proposal to add a new section 14.54.1 is to establish awareness of existing requirements in the referenced standards for a detailed inspection of a bridge, gantry or overhead crane by a qualified person, who need not be professional engineer. The interval specified by the manufacturer or the applicable code for a detailed general inspection of these types of cranes varies with the class of service for the crane. For example, it would be annually for a standard duty crane and once every six months or even quarterly for cranes subjected to severe duty service or to frequent loading near maximum rated capacity.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

Electric hoists **14.60** Repealed. [B.C. Reg. 312/2003.]

MANUALLY POWERED HOISTS

Brakes **14.61** A manually powered hoist must have a ratchet and pawl, load brake, or other mechanism to hold the load at any height.

Crank handles **14.62** The crank handle for a crank operated winch without automatic load brakes must be

- (a) prevented from slipping off the crankshaft while hoisting, and
- (b) removed from the crankshaft before the load is lowered.

~~**MOBILE CRANES, BOOM TRUCKS AND AERIAL LADDER CRANES**~~
MOBILE CRANES, BOOM TRUCKS AND SIGN TRUCKS

Carrier vehicle **14.63** Repealed. [B.C. Reg. 312/2003.]

<See Part 16 (Mobile Equipment) of the OHS Regulation.>

- Load weight indicators** **14.64**
- (1) ~~After January 1, 2000, a~~ A mobile crane or boom truck with a rated capacity of 10 tonnes (11 tons) or more must have a device that measures and indicates the weight of the load on the load hook or disengages crane functions whose movement can cause the mobile crane or boom truck to lift beyond the rated capacity.
 - (2) A load indicating device **required by subsection (1)** must meet the requirements of *ANSI/SAE Recommended Practice J376-APR85, Load Indicating Devices in Lifting Crane Service*.
 - (3) A crane being used for duty cycle work is exempt from the requirements of subsection (1) if the load applied to the crane is safely below the rated capacity of the crane and if the possibility of an unexpected overload does not exist.

Explanatory Note:

The proposal is to delete the reference to the now past implementation date for the requirement in section 14.64(1), and modify section 14.64(2) to clarify the requirement applies to a device required by section 14.64(1).

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

**Cranes on
floating
supports**

- 14.65** ~~(1) The rated capacity and allowable operating radii of a crane or boom truck designed for use on land must be modified when it is used on a floating support, considering list and trim for each installation as specified by the crane manufacturer or a professional engineer.~~
- ~~(2) A mobile crane or boom truck equipped with outriggers, operating on a floating support, must be supported on its outriggers during lifting operations unless the instructions required by subsection (1) specifically allow otherwise.~~
- ~~(3) If a crane or boom truck is used on a floating support a device to measure the list of the floating equipment must be provided and be readable by the operator while in the operating position.~~
- ~~(4) A mobile crane or boom truck being used on a floating support must be blocked and secured as necessary to prevent it shifting relative to the bearing surface of the floating support.~~
-

Explanatory Note:

It is proposed to delete section 14.65 and incorporate its provisions into section 14.66.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Level turntable 14.66**
- (1) A mobile crane or boom truck must be operated with the **crane turntable or boom truck frame level**, ~~except as permitted by~~ **unless the manufacturer provides that it may be operated otherwise.**
 - (2) Level indicating devices must be provided to permit the operator **of a mobile crane or boom truck** to determine whether the crane turntable or boom truck frame is level within the limits specified by the manufacturer.
 - (3) **When a mobile crane or boom truck is operating on a floating support, the rated capacity must be determined by a professional engineer or the manufacturer of the crane or boom truck, taking into account the list and trim characteristics of the floating support and the mobile crane or boom truck operating together as a system.**
 - (4) **When a mobile crane or boom truck is used on a floating support, a device to measure the list of the floating support must be provided and located so it can be read by the operator from the operator's position for the mobile crane or boom truck.**
 - (5) **A mobile crane or boom truck being used on a floating support must be blocked and secured as necessary to prevent it from shifting relative to the bearing surface of the floating support.**
-

Explanatory Note:

The proposal is to revise section 14.66 to incorporate the provisions related to operating the equipment with the crane turntable or boom truck frame level, or within the tolerance off of level permitted by the equipment manufacturer, and to include the requirements for when a mobile crane or boom truck is used on a floating support. In the latter case, the crane or boom truck and the floating support form a "system", and engineering is required to determine how the system will react during lifting operations, and the rated capacity for the system must be determined for each installation.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

Outriggers Outriggers and stabilizers	14.67	(1) Repealed. [B.C. Reg. 312/2003.] (2) Outrigger beams and stabilizers on a crane or boom truck must be marked to indicate when the necessary extension has been achieved. (3) Repealed. [B.C. Reg. 312/2003.] (4) Floats must be secured to the outrigger jacks of a crane or boom truck when outriggers are used. <p style="text-align: center;">[Amended by B.C. Reg. 312/2003.]</p>
Tires	14.68	Mobile crane or boom truck tire type, condition and inflation must be as specified by the manufacturer when lifting on rubber.
Supporting surface	14.69	(1) A mobile crane or boom truck must only be used on a surface capable of supporting the equipment and any hoisted load without failure. (1.1) In subsection (2), “adjacent to an excavation” has the same meaning as in section 20.1. (2) If a mobile crane or boom truck crane or hoist will be used adjacent to an excavation, slope or backfilled area, a qualified person must determine the location for the equipment for hoisting operations. (3) Blocking, shoring or cribbing must be sized and used as necessary to ensure the load from a mobile crane or boom truck support does not exceed the bearing capacity of the supporting surface.
Travelling with a load	14.70	A mobile crane or boom truck may travel with a suspended load only if (a) the crane manufacturer specifies load ratings for this operation, and (b) the operation is carried out in accordance with the manufacturer’s instructions for this operation.

Explanatory Note:

The phrase “adjacent to an excavation” is defined in Part 20. Its use in section 14.69 (2) is intended to have the same meaning and new section 14.69(1.1) is proposed to establish this as a requirement.

The proposal is to add a new section 14.69 (3) to require the use of blocking, shoring or cribbing where necessary to prevent a localized bearing failure in the supporting surface from the load of a tire, stabilizer or outrigger. The operator must know the tire, outrigger or stabilizer loads and be able to select the proper pad size and any necessary blocking or cribbing once the operator knows the bearing capacity of the supporting surface where the machine is being set up. Blocking or cribbing may not be required if the machine pads are of adequate size to spread the outrigger or stabilizer load to the supporting surface. If the machine is being set up adjacent to an excavation, a qualified person to determine the bearing capacity of the ground would be a professional engineer. In a workplace involving workers from more than one employer, the prime contractor would have responsibility to coordinate the work to ensure the appropriate determinations have been done.

It is proposed to add wording to section 14.70 to require that any operation involving travelling with a suspended load is done in the manner specified by the equipment manufacturer.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE *OCCUPATIONAL HEALTH AND SAFETY REGULATION*

**Annual
inspection**

- 14.71** (1) A mobile crane or boom truck must be inspected **at least once a year** in accordance with good engineering practice ~~at intervals not exceeding 12 months~~, **to ensure it meets**
- (a) the crane or boom truck manufacturer's specifications,**
 - (b) the requirements of the applicable design or safety standard specified in section 14.2, and**
 - (c) the requirements of this Regulation** ~~and certified as safe for use by a professional engineer, the crane manufacturer or the crane manufacturer's authorized representative.~~
- (2) **A mobile crane or boom truck must not be used after an inspection under subsection (1) unless a professional engineer certifies it is safe for use on the basis of that inspection.** ~~A mobile crane or boom truck temporarily located at a remote workplace may have the annual inspection and certification required by subsection (1) delayed up to 3 months after its due date, but the next annual inspection and certification must be done within 12 months of the due date.~~

Explanatory Note:

The proposed change to section 14.71 (1) is to establish what the certifying engineer can reasonably do to reach a decision on certification of a particular crane or boom truck. The objective of the annual inspection is to ensure the equipment is safe for use, which means it is in compliance with the manufacturer's specifications, the applicable design or safety code and the *Occupational Health and Safety Regulation*. A proposed new guideline has been developed to set out what is intended by the term "good engineering practice". The proposed guideline is similar to the guideline on this topic related to section 13.23 (1), "*G13.23(1) Inspection and certification of elevating work platforms*". The proposed guideline is included at the end of this Part for review and comment.

The requirement for certification following the inspection has been spilt off from section 14.71(1) as a new section 14.71 (2). Reference to the crane manufacturer or the crane manufacturer's authorized representative as a party authorized to certify a crane or boom truck is proposed for deletion, as in practice, the inspection and certification is conducted by a professional engineer. A manufacturer usually only gets involved if the equipment is returned back to their facility for "remanufacture".

The proposal is to delete existing section 14.71 (2) as this provision is very rarely used, and with reasonable planning it is not needed.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE *OCCUPATIONAL HEALTH AND SAFETY REGULATION*

**Boom
inspection**

- 14.72** (1) A crane boom used for driving piles with a vibratory hammer **for driving piles** must be inspected **at least once every 3 months** in accordance with good engineering practice **to ensure it meets**
- (a) the crane boom manufacturer's specifications,**
 - (b) the requirements of the applicable design or safety standard specified in section 14.2, and**
 - (c) the requirements of this Regulation,** and certified safe for continued use by a professional engineer at least every 3 months, and before being returned to lifting service.
- (2) A crane boom used with a vibratory pile extractor or **with a drop hammer or used** for dynamic compaction must be inspected **at least once a month** in accordance with good engineering practice **to ensure it meets**
- (a) the crane boom manufacturer's specifications,**
 - (b) the requirements of the applicable design or safety standard specified in section 14.2, and**
 - (c) the requirements of this Regulation,** and certified safe for continued use by a professional engineer at least monthly, and before being returned to lifting service.
- (3) A telescopic boom on a mobile crane or boom truck must be completely disassembled and inspected in accordance with good engineering practice at the intervals specified in a standard acceptable to the Board, and certified safe for use by a professional engineer or the manufacturer. **A boom must not be used after an inspection under subsection (1) or (2) unless a professional engineer certifies it is safe for use on the basis of that inspection.**
- (4) **A crane used in any operation described in subsection (1) or (2) must not be returned to lifting service unless a professional engineer inspects the crane and certifies that it is safe for such use.**

Explanatory Note:

The proposed changes to sections 14.72 (1) and (2) add language to establish what can reasonably be done to allow the professional engineer to reach a decision on certification of a boom. The objective of the inspection and certification is to ensure the equipment is safe for use, which means it is in compliance with the manufacturer's specifications, the applicable design or safety code and the *Occupational Health and Safety Regulation*. A new guideline may be needed to set out what is intended by the term "good engineering practice". Such a guideline would be similar to the guideline on this topic related to section 13.23 (1), "*G13.23(1) Inspection and certification of elevating work platforms*", and to the one proposed for section 14.71 as the same phrase is used there.

The proposal is to delete existing section 14.72 (3). The integrity of these booms is being assessed on an annual basis through the inspection and certification required by section 14.71. Also, the applicable CSA standard, Z150, is currently being revised and this provision is proposed for deletion from that CSA standard. Generally a telescopic boom needs to be disassembled after about seven years of service to fix hydraulic leaks, so a thorough inspection and certification of the boom can and should be routinely done at that time.

The proposed new section 14.72 (4) is added to ensure an inspection and certification of the whole crane, not just the boom, is done before the crane is returned to lifting service.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

**Sign
trucksAerial
ladder cranes**

- 14.73** (1) ~~An aerial ladder crane~~ **A sign truck** must be inspected, maintained and operated according to the requirements for mobile cranes, and for elevating work platforms in Part 13 (Ladders, Scaffolds and Temporary Work Platforms).
- (2) **When a sign truck is being used, the** ~~Load rating charts for all permitted the configurations of in use must be~~ **available at the workplace** ~~provided for an aerial ladder crane when it is used as a personnel carrying device and when it is used as a personnel carrying and material handling device.~~

Explanatory Note:

The current requirement in section 14.73 (2) is unnecessarily demanding. Some of the affected equipment has a number of possible configurations. Typically an equipment owner will only purchase the equipment components needed for the tasks the equipment will be used for, or will only configure the equipment for the tasks to be done at a particular workplace. It is pointless to require the load chart information to be available for configurations that will not be used. The proposal is to adjust the wording to require that only the load charts for the configuration in use need to be available at the workplace.

TOWER CRANES

Definition	14.73.1	In sections 14.73.2 to 14.93, “tower crane” means a tower crane erected on site from component parts or that is self erecting.
Tower crane erection	14.73.2	The erection, climbing and dismantling of a tower crane must be done by qualified persons and in accordance with the instructions of (a) the crane manufacturer, or (b) a professional engineer, if the installation varies from the crane manufacturer’s instructions.

Explanatory Note:

The proposal is to add a new section 14.73.1 to clarify that a self erecting tower crane is considered to be a tower crane and that all the provisions for tower cranes apply to self erecting tower cranes except where a specific provision is made for a self erecting tower crane.

The proposal is to add a new section 14.73.2 to require the tasks of erecting, dismantling or climbing of a tower crane be done by qualified persons, and that these tasks be done in accordance with the manufacturer’s instructions, or the instructions of a professional engineer. Note this provision is intended to apply to the erection and lowering (standing up and folding down) of a self-erecting tower crane, as this type of equipment is a tower crane.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

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| Tower crane support | 14.74 | <ol style="list-style-type: none">(1) The foundation for support of a tower crane must be certified by a professional engineer.(2) The design of shoring and bracing to support a tower crane must be certified by a professional engineer, and the shoring and bracing must be constructed as specified by the design.(3) If a tower crane is supported partially or fully by, or connected to, a building or structure, the connections to and any bracing or shoring of the building or structure necessary to support the tower crane must be certified by a professional engineer.(4) The bearing capacity of the supporting surface for a tower crane must be determined by a professional engineer.(5) The loads from a tower crane must be distributed onto its supporting surface to prevent the bearing capacity of the supporting surface being exceeded. |
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Explanatory Note:

While there is no change proposed to section 14.74 (1), it may be necessary to develop a guideline explaining how this provision applies to a tower crane set up or supported on outriggers, for soil bearing capacity, pad size and location of the crane on site.

It is proposed to add new sections 14.74 (4) and (5) as often a self erecting tower crane is set up on the ground rather than on a custom designed and certified base or pad. In such cases the bearing capacity of the ground where the crane will be situated must be properly determined and where necessary, adequate blocking or pads must be used to distribute the loads from the crane to the ground surface so the bearing capacity of the surface is not exceeded.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

- Before use** **14.75** (1) ~~The tower crane erector must verify that the crane has been erected according to the manufacturer's specifications before the crane is put in service.~~
- Before a tower crane is put in service, the erector of the tower crane must verify that the crane has been erected according to**
- (a) the manufacturer's specifications, or**
 - (b) the specifications of a professional engineer, if the engineer has authorized the crane to be erected otherwise.**
- (2) ~~If a tower crane is not erected according to the manufacturer's specifications, a professional engineer must certify that it is safe for use before the crane is put in service that that~~
- (a) the variations from the manufacturer's specifications meet the requirements of the applicable design or safety standard,**
 - (b) the load charts are adjusted as necessary, and**
 - (c) the crane is safe for use.**
- (3) ~~Before a tower crane is used following repositioning of the mast, a professional engineer must certify that the parts of the crane affected by the climbing process have been properly installed and any required reshoring for and bracing to the supporting structure is in place.~~
- The erector of a tower crane must adjust the overload prevention system as necessary to meet the load chart for the crane as erected.**
- (4) **Before a tower crane, other than a self erecting tower crane, is put in service after its mast has been repositioned, a professional engineer must certify that the parts of the crane affected by the climbing process have been properly installed and any required reshoring for, and bracing to, the supporting structure is in place.**
- (5) **Before a tower crane is put in service following its erection or the repositioning of its mast, the person responsible for the erection of the crane or the repositioning of its mast must make available at the workplace where the crane is installed a report verifying that**
- (a) the certification documents required by section 14.74 and subsections (2) and (4) of this section are available at the workplace, and**
 - (b) the overload prevention system of the crane has been adjusted as required in subsection (3), including specifying the load limits set for the various devices.**
-

Explanatory Note:

Section 14.75 applies to all tower cranes, including self erecting tower cranes. If the crane is being used in a workplace involving workers from more than one employer, the prime contractor has a responsibility to ensure the crane is erected and operated in compliance with the provisions of the *OHSR*.

The proposal is to modify section 14.75 (1) to recognize that tower cranes are often erected with variations from the manufacturer's specifications, and where this is done, the variations must be authorized by a professional engineer.

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The proposal is to modify section 14.75 (2) to require that a variation from the manufacturer's specification is properly evaluated and is done in a manner consistent with the applicable design or safety standard.

Proposed new section 14.75 (3) is intended to ensure the overload protection system is adjusted by the erector to meet the manufacturer's specifications except for any variations specified by a professional engineer under section 14.75 (2).

Proposed new section 14.75 (4) is existing section 14.75 (3) with a minor amendment to the wording. Section 14.75(4) is applicable to a "conventional" tower crane being "climbed" with the upward progress of the structure under construction, and supported by wedging or other connection to the permanent structure, and usually requires reshoring of the permanent structure. These conditions do not apply to a self erecting tower crane so an exemption clause for this type of tower crane is proposed for this section.

Proposed new section 14.75 (5) is intended to ensure a crane does not go into service until the person responsible for supervising the erection of the crane, or the repositioning of the crane, has provided a report, commonly referred to as "the erector's checklist", to the workplace where the crane is installed, indicating the crane has been installed in accordance with the manufacturer's manual except as otherwise authorized by an engineer, and the crane is safe for use.

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- Identification** **14.76** The **interchangeable** structural components of tower cranes must be uniquely identified and that unique identification must be used when referring to structural components in reports for inspection and testing, and certifications for repairs and modifications.
- Structural inspection** **14.77** (1) ~~Before~~ **Subject to subsection (4), before the** erection of a tower crane, the structural components of the crane must be
- (a) inspected to determine their integrity by a qualified person using non-destructive testing (NDT) methods meeting the requirements of the Canadian General Standards Board (CGSB), and
 - (b) ~~repaired as necessary and such repairs certified by a professional engineer as safe for use.~~ **certified by a professional engineer as safe for use after the inspection in paragraph (a) and any necessary repairs.**
- (2) If a tower crane remains erected at a workplace for more than 12 months,
- (a) its structural components must be inspected to determine their integrity by a qualified person using NDT methods meeting the requirements of the CGSB, and
 - (b) after the inspection required by paragraph (a), the crane, including any necessary repairs, must be certified by a professional engineer as safe for use.
- (3) ~~The inspection and certification of~~ **If a tower crane is scheduled to be dismantled within 15 months of its being erected, subsection (2) does not apply provided that a visual inspection conducted 12 months after erection of the crane and supervised by a professional engineer shows no evidence of cracking or other structural weakness** ~~erection may be delayed until prior to the next erection of the crane.~~
- (4) **A self erecting tower crane must be**
- (a) inspected visually by a qualified person each time it is erected, and
 - (b) inspected and certified under subsection (1) after each third erection cycle and in any event at least once every 12 months.
- (5) **Subsection (3) does not apply to a self erecting tower crane.**

Explanatory Note:

The proposed change to section 14.76 is to recognize that only the interchangeable parts of tower cranes need to be uniquely identified. A tower crane erected using component parts has interchangeable structural parts, and these structural components are intended to be covered by section 14.76. Self erecting tower cranes generally do not have major structural parts such as mast or jib sections that are interchanged, but structural subcomponents such as trolleys, pendants, baskets and load blocks may be interchanged and if this is the case, these parts need to be uniquely identified.

The proposed change to section 14.77 (1) (b) is to require that a professional engineer take overall responsibility for the inspection, and be aware of and endorse the technician's report, even if no defects are reported. This is important as the engineer will be concerned that all the critical areas have been inspected using the correct techniques.

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The proposed change to section 14.77 (3) is to ensure that if the structural inspection is going to be delayed beyond 12 months after the crane was erected at least a visual inspection of the structure is done by a qualified person at the 12-month point.

The proposed new section 14.77 (4) recognizes a self-erecting tower crane may be erected numerous times in a one year time period. There is no need to have the structural components nondestructively inspected each time the self-erecting crane is "erected". However, this equipment needs to be structurally inspected and certified at reasonable intervals. The current industry practice in BC is to do an engineer supervised inspection, including NDT inspection of structural components, and certification of the equipment on an annual basis. Generally the NDT inspections being done on an annual basis are not finding defects frequently enough to warrant mandating NDT inspection and certification, based only on time in service, more frequent than once a year. However, self erecting tower cranes are frequently relocated and the erection and lowering process for these cranes subjects them to significant stress, so it is felt an engineer supervised inspection, NDT, and engineering certification should be done after three erection cycles if the crane is raised and lowered that many times in less than a one year period. Normally these cranes are erected and used at one location for periods of four to six months or more, so generally the "once each year" criteria will govern the frequency of structural NDT inspection and engineering certification. Dates of use and cycles of erection and lowering of the self-erecting tower crane must be recorded in the equipment records.

Self-erecting tower cranes may be damaged during transport between locations, or during the erection/lowering process but the damage occurring at these times is generally bent or dented members and such damage is visible without the use of NDT techniques. Damage of this type requires immediate repair and certification under the direction of a professional engineer. Therefore it is recommended that a provision be included to require a visual inspection each time the crane is erected, which is the intent of proposed section 14.77(4)(a).

Proposed new section 14.77 (5) is provided to exempt a self-erecting tower crane from the provisions of section 14.77(3).

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Structures kept clean	14.78	Tower crane structures must be kept clean and free of concrete and other debris that can hinder inspection and the base area must be clear of debris and the accumulation of water.
Manual and records	14.79	<p>The manufacturer's manual and current records pertaining to operation, inspection and repair of a tower crane must be kept at the workplace while the crane is erected. The following documents respecting operation, inspection, maintenance and repair of a tower crane must be kept at the workplace where and while the crane is erected:</p> <ul style="list-style-type: none">(a) the portions of the manufacturer's manual or engineer's instructions required by section 14.12 (3);(b) all records dated from the date of structural certification under section 14.77, including those specified in section 14.75 (5);(c) in the case of a self-erecting tower crane, all records dated from the date of the last certification of the crane.

Explanatory Note:

The proposed change to section 14.79 is to ensure that documentation not needed at the workplace is not required to be kept there. A tower crane that is assembled on site from component parts will have undergone an inspection and certification just before erection, so the only records needed at the site are the ones related to the most recent pre-erection certification and activity, the erector's records and anything required to be recorded since the erection of the crane. For a self-erecting tower crane, only records since the last inspection and certification required by 14.77 (4) (b) are needed at the workplace. This proposal allows the employer or crane owner the option to keep records of repairs, modifications, inspections and certifications for the crane from prior periods at some alternative location, such as their head office.

If the crane is being used in a workplace involving workers from more than one employer, the prime contractor has a responsibility to ensure the crane is erected and operated in compliance with the provisions of the *OHSR*, including ensuring the required documentation is available to the workplace. But the crane owner is the party who has to provide and maintain the documentation.

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- Counterweights
Counterweights
or ballasts** **14.80**
- (1) Counterweights **and ballasts** used on a tower crane must be as specified by the original equipment manufacturer or by a professional engineer.
 - (2) **Each c**Counterweight **and ballast** elements must be accurately weighed and the weight **of the element must be** clearly and durably marked on ~~iteach~~ element.
 - (3) The weight of ~~the~~ counterweights **and any ballast** installed on a tower crane must be **recorded in the report required by section 14.75 (5)** ~~entered in the equipment record system, or on the erector's checklist which must then be available at the workplace.~~
-

Explanatory Note:

It is proposed to reword section 14.80 to include reference to “ballast” in all the subsections, as ballast is used at the base of many tower cranes to ensure stability and it is crucial that the right amount and configuration of ballast is used.

It is proposed to reword section 14.80 (3) to eliminate reference to “erector’s checklist”. The information is required to be recorded in the report required by section 14.75 (5).

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- Limit devices** **14.81**
- (1) A tower crane must have automatic travel limit switches and automatic overload ~~prevention~~^{protection} devices that prevent overloading at any trolley position, the load block from travelling beyond the highest allowable position specified by the manufacturer and the trolley from travelling beyond the allowable limit specified by the manufacturer.
 - (2) **Subject to subsection (4),** ~~Limit devices on a tower crane must be tested at the beginning of~~ **before the crane is first used** on each work shift ~~or more frequently if specified by the crane manufacturer.~~
 - (3) Any malfunction of an automatic limit or safety device on a tower crane must be remedied before the crane is used.
 - (4) **If it is not practicable, due to the configuration of the workplace, to position sufficient test weights to test the maximum load limit switch before the crane is first used on each work shift, the maximum load limit switch must**
 - (a) **be set to activate at a load of less than 80% of the maximum rated capacity for the crane and tested using test blocks, and**
 - (b) **be reset to the maximum load limit for the crane and tested using test blocks before making any lift that is greater than 80% of the maximum allowable load for the crane.**
 - (5) **A tower crane with a luffing boom must have an automatic limit device that prevents the boom being raised beyond the maximum permitted boom angle.**
 - (6) **In subsection (5), “luffing boom” means a boom that is raised and lowered about a pivot point to change the load radius.**
-

Explanatory Note:

The proposed change to section 14.81(2) is to provide flexibility for when the tower crane limit devices need to be tested on each work shift. If the crane is not going to be used at the start of the shift, the testing can be delayed until the crane will be used.

The purpose of the proposed “subject clause” in section 14.81(2) is to eliminate the need for a variance when the circumstances specified in proposed new section 14.81(4) exist.

A new section 14.81 (4) is proposed to recognize that once building construction progresses above the foundation level, if the crane is located in the central part of the building, it is generally not practicable to maintain sufficient test weights close enough to the mast to allow for the maximum load to be the governing overload protective device for a test lift. The generally accepted practice is to set the maximum load limit switch to activate well below the maximum allowable load setting. Most lifting operations will be with loads much less than the maximum load limit, and the crane will be serviceable as the loads are generally limited by the load moment limiting devices which govern capacity at the required operating radius for the crane. The proposed limit of 80% is in line with industry practice currently accepted as a condition of granting a variance. However, if the tower crane is erected adjacent the side of the structure, sufficient test weights can usually be maintained near the base of the crane to allow for the maximum load limit test to be performed regularly.

When section 14.81(4) applies, a daily test of the line pull limit switch is not required. A test of this switch is only required when the conditions specified in section 14.81(4) apply.

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A new section 14.81(5) is proposed to require there be a safety device on a tower crane with a luffing boom that will automatically prevent the boom being raised beyond the maximum permitted boom angle.

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- Test blocks** **14.82** (1) ~~Blocks~~ **Test blocks** for testing overload protection ~~prevention~~ devices on a tower crane must be available at the tower crane site.
- (2) The weights of test blocks required by subsection (1) must be as specified by ~~the crane manufacturer, and the weight accurately determined and durably and legibly marked on each block.~~
- (a) the crane manufacturer if the crane is erected in accordance with the manufacturer's instructions, or**
- (b) a professional engineer if the crane has been erected other than in accordance with the manufacturer's instructions.**
- (2.1) The weight of each test block required by subsection (1) must be accurately determined and durably and legibly marked on that block.**
- (3) ~~Lifting eyes in test blocks for a tower crane must conform to the requirements of Part 15 (Rigging).~~ **Test blocks, including the lifting point, must be designed by the crane manufacturer or a professional engineer.**
-

Explanatory Note:

The proposed change to section 14.82 (2) allows for a professional engineer to specify the weights for test blocks for situations where the rated capacity has been altered from the manufacturer's rating, and the proposed rewording of section 14.82(3) is to ensure test blocks, including the lifting point, are properly designed.

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Operator's cab	14.83	(1) The design, location and method of attaching a tower crane operator's cab must be approved by the crane manufacturer or by a professional engineer. (2) The rated capacity of a tower crane must be adjusted as necessary if using a cab type and location not approved by the crane manufacturer.
Jib swing Monitoring jib swing	14.84	(1) The jib of a tower crane must not be capable of passing over the operator's cab of another tower crane. The operator of a tower crane must have a clear view of the jib of the crane whenever the jib is being slewed. (2) Subsection (1) does not apply if a signaller or a rigger who is able to see the jib of the crane is in communication with the operator of the crane and provides directions to the operator.

Explanatory Note:

The proposed change to section 14.84 is to ensure the operator is in a position to see the path of travel of the jib whenever the crane is being slewed, or that a signaller is employed to watch the jib and provide the operator with directions if a hazard is developing regarding the movement of the jib. The intent is to ensure the operation of the crane can and will be stopped if the jib, or the rigging or load, is going to make contact with something. This is an issue particularly for self erecting tower cranes, when the operator is at ground level and swings the jib over the roof, in which case the operator cannot see the jib or the load unless the operator stops the crane motion until the operator can relocate to the roof level.

The issue of the jib of a tower crane passing over the cab of another tower crane is covered in the proposed new section 14.84.1.

Overlapping
operating
zones

*“operating
zone”*

*“overlapping
operating
zone”*

14.84.1 (1) In this section:

means,

- (a) in the case of a tower crane, the complete circular area covered by the swing of the tower crane’s jib as it rotates, and
- (b) in the case of any other equipment, the area covered by the swing or movement of the equipment;

means the area where the operating zone of a tower crane intersects the operating zone of another tower crane or other piece of equipment.

- (2) If practicable, tower cranes must be erected to avoid the overlapping of their operating zones.
- (3) If it is not practicable to comply with subsection (2), the following procedures apply:
 - (a) the cranes must be erected and maintained so that the underside of the jib of the higher crane is at least 3 m (10 ft.) above the highest component of the lower crane that crosses into the overlapping operating zone;
 - (b) the boundaries of the overlapping operating zone must be marked in a manner acceptable to the Board to ensure that the boundaries are visible to the operators of all the affected cranes;
 - (c) any load suspended by the higher crane must be positioned at a location that ensures at least 3 m (10 ft.) lateral clearance between it and an operator’s cab on the jib of the lower crane;
 - (d) written operating procedures must be developed and implemented to coordinate lifting tasks in the overlapping operating zone to prevent collision or interference between a component or suspended load of one crane with a component or suspended load of another crane.
- (4) The procedures required in subsection (3)(d) must do the following:
 - (a) minimize the time each crane spends in the overlapping operating zone;
 - (b) establish that the lower crane has priority for working in the overlapping operating zone;
 - (c) establish that the operator of the lower crane must give temporary permission to the operator of the higher crane for each lifting sequence in the overlapping operating zone;
 - (d) establish a means and protocol for communication between the crane operators when a crane operates in the overlapping zone, including a requirement for the operator of the higher crane to contact the operator of the lower crane when the higher crane is required to enter the overlapping operating zone;
 - (e) establish that the lateral clearance of the load of the higher crane will be at least 3 m (10 ft.) from

- (i) the occupied cab of the lower crane, and
 - (ii) the space above it;
 - (f) establish that when the lower crane is being operated or when a person is on the lower crane, the higher crane will not pass a load over the lower crane unless
 - (i) the activity follows work procedures acceptable to the Board and
 - (ii) either
 - (A) the higher crane is being used to erect, service or dismantle the lower crane, or
 - (B) there is a minimum of 18 m (60 ft.) clearance between the underside of the jib of the higher crane and the highest point on the lower crane that is within the tip radius of the higher crane.
 - (5) If the operating zone of a tower crane overlaps the operating zone of another piece of equipment with a reach capable of interfering with the movement of the crane or hoist, or the load being lifted
 - (a) written operating procedures must be developed and implemented to coordinate lifting tasks in the overlapping operating zone to prevent collision or interference between a component or suspended load of the tower crane with a component or suspended load of the other equipment, and
 - (b) the boundaries of the overlapping operating zone must be marked in a manner acceptable to the Board to ensure that the boundaries are visible to the operators of all affected cranes and equipment.
-

Explanatory Note:

It is proposed to create a new section 14.84.1 setting out requirements for operation of tower cranes where it is necessary for the operating zones of two or more cranes to overlap, or where the operating zone of a tower crane will overlap with the operating zone of another piece of equipment that has the reach to interfere with the movement of the crane or the load being handled. The proposed requirements are, for the most part, currently contained in *OHS Guideline "G14.84 Overlapping tower cranes-jib swing."*

Proposed section 14.84.1 (3) increases the vertical clearance requirements between overlapping tower cranes from one metre to three metres. It is difficult to ensure that clearance under all loading conditions will be possible when one metre separation is required. It is unreasonable to check all the load combinations that may result in contact between the two cranes and the one metre current requirement did not always ensure adequate clearance between operating cranes. The proposed section also envisages markings on the ground or on the structure as necessary to adequately mark the overlapping operating zone. Markings will use both colour and shape, as there may be markings required for different hazards, such as for zones where limits of approach to energized high voltage electrical lines are required to be delineated. It is anticipated a guideline will be required to set out the marking standard acceptable to WorkSafeBC.

Proposed section 14.84.1 (4) (e) means that when the load is at the height of the cab or above it, the load must be kept far enough away so that no part of the load can intrude inside the vertical

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column of space that is established at a distance 3 metres (10 feet) away from the outside of the cab.

Proposed section 14.84.1 (5) is to create requirements to ensure that if the operating zone of a tower crane overlaps with the operating zone of another piece of equipment such as a mobile crane or concrete pump boom, all the equipment is operated in a manner so they do not come into contact with each other.

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- Clearance and freedom to slew** **14.85** (1) **Except as otherwise required by this Regulation, at all times and under all load conditions, a tower crane must have vertical and lateral clearances, between any component of the tower crane jib and counter jib and any obstruction, that are the greater of** ~~at all times~~
- (a) ~~have a minimum vertical clearance of 1 m (3.3 ft) and lateral clearance of 30 cm (1 ft) between any component of the tower crane and any obstruction, under all load conditions, and the~~ **vertical and lateral clearances specified by the crane manufacturer, and**
 - (b) ~~be able to slew 360 degrees, unless otherwise specified by the crane manufacturer.~~ **a vertical clearance of 1 m (3.3 ft.) and a lateral clearance of 30 cm (1 ft.).**
- (2) **At all times and unless otherwise specified by the crane manufacturer, a tower crane must be able to slew 360 degrees.**
-

Explanatory Note:

The proposal to modify section 14.85 is to ensure the clearances between the crane jib and any obstruction are as specified by the crane manufacturer or the alternative minimum clearances specified in this section, whichever is greater. This proposed change is necessary as some tower crane manufacturers specify greater minimum clearances than the current provision in the *Occupational Health and Safety Regulation*.

Section 14.85 (2) continues the provision of current section 14.85 (1)(b).

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Freedom to slew	14.86	Repealed. [B.C. Reg. 312/2003.]
Communication	14.87	Each tower crane operator must have effective two-way voice communication with any other tower crane or equipment operator if contact between the tower crane and any other tower crane or equipment could occur.

Explanatory Note:

It is proposed to delete section 14.87 as the issue is to be included under the general provision set out in proposed new section 14.49.1.

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Access ladders 14.88
Access

- (1) ~~An access ladder must be provided and fixed in position on the mast and crown of a tower crane.~~

A tower crane must have a fixed ladder installed in or on the mast to provide access to the jib and crown of the crane.

- (2) ~~An access ladder on a tower crane must be able to support two 1.1 kN (250 lbs) point loads between any two consecutive attachment points, and there must be a minimum horizontal distance of 15 cm (6 in) between the rungs and the object to which the ladder is attached.~~

The ladder under subsection (1) must meet the following requirements:

- (a) **the ladder must be able to support two 1.1 kN (250 lbs.) point loads between any two consecutive points where the ladder is attached to the crane;**
- (b) **there must be a minimum horizontal distance of 15 cm (6 in.) between the rungs and the object to which the ladder is attached;**
- (c) **landing platforms must be provided at least every 9 m (30 ft.) on the ladder;**
- (d) **each section of the ladder must be offset horizontally from adjacent sections or the landing platforms must have trap doors;**
- (e) **if a section of the ladder has a climb exceeding 6 m (20 ft.) in length, that section of ladder must have a ladder safety cage 68 cm to 76 cm (27 in. to 30 in.) in diameter or a ladder safety device must be used.**

- (3) ~~Landing platforms must be provided at least every 9 m (30 ft) on the access ladder of a tower crane.~~

Each tower crane jib must have a continuous walkway from the mast to the tip.

- (4) ~~Each section of access ladder on a tower crane must be offset horizontally from adjacent sections or the landing platforms must have trap doors.~~

The walkway referred to in subsection (3) must meet the following requirements:

- (a) **the walkway must be at least 30 cm (12 in.) wide and constructed with a non-skid surface;**
- (b) **a handline, which is approximately 1 m (39 in.) above the level of the walkway, and a midline must be provided on both sides of the walkway not more than 30 cm (12 in.) out from the edge of the walkway and supported at intervals not exceeding 3 m (10 ft.);**
- (c) **the handline and midline referred to in paragraph (b) must be wire rope of at least 1 cm (3/8 in.) diameter;**
- (d) **if it is not practicable to provide handlines in accordance with paragraph (b), alternative means of fall protection, such as a horizontal lifeline system, must be provided in accordance with the requirements of Part 11 (Fall Protection) and must be set out in the fall protection plan.**

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- (5) ~~If a section of ladder on a tower crane has a climb exceeding 6 m (20 ft) in length, that section of ladder must have a ladder safety cage 68 cm to 76 cm (27 in to 30 in) in diameter or a ladder safety device must be used.~~

If, due to the design or size of the tower crane, it is not practicable to meet the requirements set out in subsections (1) to (4), alternative safe means of access acceptable to the Board must be provided.

- (6) **The climbing space of a tower crane mast must be clear of protruding objects and must provide a safe and unobstructed passage.**
- (7) **A written fall protection plan, which addresses the requirements of fall protection when a person is operating, inspecting, servicing and maintaining the tower crane, must be developed and implemented.**

Jib access	14.89	Each tower crane jib must have a continuous catwalk from the mast to the tip, meeting the following requirements: <ul style="list-style-type: none">(a) the catwalk must be at least 30 cm (12 in) wide and constructed with a non-skid surface;(b) a handline approximately 1 m (39 in) high and a midline must be provided on both sides of the catwalk not more than 30 cm (12 in) from the outside edge of the catwalk and supported at intervals not exceeding 3 m (10 ft);(c) the handline and midline must be wire rope of at least 1 cm (³/₈ in) diameter;(d) if adequate handlines are not provided, alternative means of fall protection, such as a horizontal lifeline system, must be provided in accordance with the requirements of Part 11 (Fall Protection).
Unobstructed passage	14.90	The climbing space of a tower crane mast must be clear of protruding objects and provide a safe and unobstructed passage.

Explanatory Note:

It is proposed to combine sections 14.88, 14.89 and 14.90 into one section addressing access for the operation, inspection and routine servicing of the crane.

Proposed new section 14.88 (5) is intended to recognize that many self erecting tower cranes do not have sufficient space to provide an access ladder meeting the specifications outlined in section 14.88(2), nor for the provision of jib access as required by section 14.88(4). Some small tower cranes erected from component parts do not have a jib configuration that permits a walkway to be installed. Also, some cranes of European design and manufacture come supplied with fixed ladders for the mast and jib access provisions which meet the European standards but do not necessarily meet the specifications of sections 14.88(2) and (4). A proposal for a guideline has been developed to assist with the application of section 14.88(5), and that proposed guideline is included at the end of this Part for review and comment.

Proposed new section 14.88 (6) is a repositioning of existing section 14.90 to be part of the overall section on access.

Proposed new section 14.88 (7) establishes the requirement for a fall protection plan to be developed and implemented. A site specific fall protection plan would likely be required by section 11.3 as generally accessing and servicing a tower crane would require a person to get

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
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into positions where permanent guardrails are not in place and from which a fall of 7.5 metres (25 feet) or more might occur.

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- Hoisting ropes 14.91**
- (1) A rotation resistant hoisting rope on a tower crane must be shortened by the removal of 3 m (10 ft) of rope at the dead end after every 500 hours of use unless
 - (a) otherwise specified by the rope manufacturer,
 - (b) the rope has 14 or more outer strands, or
 - (c) the rope has a plastic coated inner core.
 - (2) The hoisting rope on a tower crane must be properly seized before cutting.
 - (3) **The equipment records for a tower crane must contain the following information about the hoisting rope installed on the crane:**
 - (a) **the name of the manufacturer or supplier of the rope;**
 - (b) **the type of rope installed as described by the rope construction, number of outer strands, type of lay, direction of lay and type of core;**
 - (c) **the diameter and the length of the rope;**
 - (d) **the nominal or minimum rated breaking strength of the rope;**
 - (e) **the rated working load limit for the rope;**
 - (f) **the date the rope was installed;**
 - (g) **if the rope was not new at the time of installation, the name of the qualified person who inspected the rope before installation on the crane to ensure that the rope was in a suitable condition for use as the hoist line on the crane;**
 - (h) **the name of the qualified person who installed the rope.**
-

Explanatory Note:

It is proposed to add a new section 14.91 (3) to ensure that information on the hoisting rope installed on a tower crane is readily available at the workplace where the crane is being used.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

**Wind
limitations**

- 14.92**
- (1) An anemometer must be mounted on the crown, apex or operator's cab of each tower crane.
 - (2) The readout for the anemometer required by subsection (1) must be readable by the operator while at the crane controls.
 - (3) Tower crane operations must stop when a load cannot be handled safely because of wind.
 - (4) In the absence of the manufacturer's specifications for maximum permitted wind speed during crane operation, the maximum allowable wind speed in which a tower crane may be used is 50 km/h (30 mph), or less if a load cannot be handled safely because of wind.
 - (5) A sign or other item that would increase the surface area of a crane structure exposed to wind must not be installed unless authorized by the crane manufacturer or a professional engineer.**
 - (6) A tower crane must not be erected, operated or dismantled when the wind speed exceeds the upper limit specified by the crane manufacturer for erection, operation or dismantling of the crane.**
-

Explanatory Note:

The application of section 14.92 (2) to a self erecting tower crane is a concern. These cranes generally do not have an "operator's cab". Most of these cranes are operated using a remote control panel, which allows the operator to move around the site. However, it is necessary for the operator to always be in a position to see and read the "readout" from the anemometer. The anemometer readout is generally located at the base of the self-erecting tower crane. This would have the effect of requiring the operator to remain close to the machine base while operating the crane.

A new section 14.92 (5) is proposed to address the issue of increased wind load on the tower crane structure from the installation of signs or other similar items that increase the face (or sail) area of the tower crane structure. These should only be fitted after a proper engineering assessment of the wind load effects. The proposed wording is similar to the parallel provision in the *CSA Standard Z248*. Note the addition of a sign or similar item is a modification and is subject to the provisions of section 14.15.

A new section 14.92 (6) is proposed to address the erection, operation and lowering of a self erecting tower crane and a tower crane assembled from component parts. Wind loads can significantly affect the safe erection, operation or lowering of these cranes and it is necessary the wind speed limit specified by the crane manufacturer for such activity be respected.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

Temperature limitations	14.93	Tower crane operations must stop when the ambient temperature drops below -18°C (0°F) or as otherwise specified by the crane manufacturer or a professional engineer.
Counter jib	14.94	A tower crane counterjib must not be used for any purpose other than that for which it was designed.

Explanatory Note:

It is proposed to delete section 14.94. This provision was originally implemented to prevent the installation of a secondary hoist on the counter jib which was often done to assist with crane maintenance tasks, and to prevent the counter jib from being used as a storage area for tools, spare parts and supplies such as lubricants. Some tower cranes now come equipped with a secondary or service hoist installed on the counter jib by the crane manufacturer. If an owner or user wants to add such a hoist to a crane that was not equipped with one by the crane manufacturer, it is a modification to the equipment and must be engineered. The practice of keeping a few tools and reasonable quantities of supplies necessary for the daily maintenance of the crane on the jib or counter jib is not considered to be a big issue. Thus it is proposed to delete this provision as any house keeping or modification issues can be addressed by the application of other provisions in the *Occupational Health and Safety Regulation*.

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION

MISCELLANEOUS MATERIAL HOISTS

Standards	14.95	A miscellaneous material hoist must be designed, constructed, maintained and operated according to a standard acceptable to the Board.
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Explanatory Note:

It is proposed to delete section 14.95. Miscellaneous material hoists are not common and the requirement is reasonably covered by proposed section 14.2 (15).

DRAFT

CONSTRUCTION MATERIAL HOISTS

**Installation
certification
Certifications
and
instructions**

- 14.96** (1) **Before a construction material hoist is put into use, a** professional engineer must certify that ~~a construction material hoist has been properly installed before its first use and before continued use after support sections or other devices are added or removed.~~
- (a) the hoist is safe for use, and**
 - (b) the installation of the hoist complies with**
 - (i) the design criteria for that installation,**
 - (ii) the hoist manufacturer's specifications,**
 - (iii) the requirements of *CSA Standard CAN/CSA-Z256-M87, Safety Code for Material Hoists,* and**
 - (iv) the requirements of this Regulation.**
- (2) ~~Subsection (1) does not apply to light duty portable material hoists installed and operated in accordance with the manufacturer's instructions.~~
If, after certification under subsection (1), a modification is made to the structure, mechanical components or control system of a construction material hoist or it is changed through the addition or removal of a support section of the hoist, the hoist must not be used until it is recertified as safe for use by a professional engineer.
- (3) ~~Subsections (1) and (2) do not apply to a light duty portable material hoist installed and operated in accordance with the hoist manufacturer's instructions.~~
- (4) **A copy of the certifications required in subsections (1) and (2) or the manufacturer's instructions referred to in subsection (3) must be available at the workplace where the hoist is installed.**

**Rider
restriction**

- 14.97** A worker must not ride on a construction material hoist unless **it is necessary to do so** required for inspection and maintenance of the hoist.

Notices

- 14.98** (1) The net rated capacity of each construction material hoist must be clearly and durably marked upon the hoist structure in letters or figures at least 5 cm (2 in) high in a location which is visible to persons involved with operation of the hoist.
- (2) Each construction material hoist must prominently display a notice stating that no person may ride on the equipment.

**Gate interlock
systems**

- 14.99** ~~A construction material hoist more than 21 m (70 ft) in height must have an interlock system which~~
- ~~(a) prevents movement of the hoist platform when a gate is open at any landing, and~~
 - ~~(b) prevents all gates from opening, except the gate of the landing where the platform is located.~~

**Hoistway
entrances**

- 14.100** ~~A substantial covering must be provided over a construction material hoist platform entrance if there is a possibility of material falling into the platform entrance area.~~

Hoist platform

- 14.101** ~~A construction material hoist platform must have guardrails and toeboards, meeting the requirements of Part 4 (General Conditions), on all sides.~~

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

Hoist runway	14.102	A runway to a construction material hoist must have a substantial floor at least equal in width to the loading side of the hoist platform, curbs and have guardrails meeting the requirements of Part 4 (General Conditions) if 1.2 m (4 ft) or more above grade.
Ratchets and pawls	14.103	If a construction material hoist winch drum is fitted with a ratchet and pawl mechanism, the mechanism must be clearly visible and accessible to the operator.
Electric brakes	14.104	Electrically operated brakes on a construction material hoist must apply automatically if there is a power failure.
Emergency devices	14.105	A construction material hoist must have devices to prevent the platform, loaded up to rated capacity, from falling if the hoisting rope fails.
Travel and load limit switches	14.106	(1) A construction material hoist must have devices which will automatically stop the platform at the upper and lower limits of travel and will effectively prevent platform motion under overload conditions. (2) Motor thermal overload protection devices are not acceptable for meeting the requirements of subsection (1).
Erection and maintenance	14.107	A construction material hoist tower must be erected, maintained and dismantled by or under the direct supervision of qualified personnel.
Operator qualifications	14.108	A construction material hoist operator must demonstrate competency to the supervisor, including familiarity with the operating instructions and signal codes used with the equipment. [Amended by B.C. Reg. 312/2003.] <See also section 4.10 of the OHS Regulation.>
Operator responsibilities	14.109	(1) A construction material hoist operator must ensure that safety devices are working properly before operating the hoist and must keep the load within safe limits. (2) The hoist operator must not leave the construction material hoist controls unattended unless the platform is at grade level.
Inspection	14.110	A construction material hoist installation must be inspected weekly unless the manufacturer specifies more frequent inspections, and records of the inspections must be made in the record system.
Testing safety and control devices	14.111	(1) Control devices for a construction material hoist, including hoist control switches, hoist drum brakes, and hoist signal systems, must be tested on each shift and determined to be in safe condition before using the hoist. (2) Safety devices, including upper and lower travel limit switches, landing door interlocks and rope guides must be tested once a week, and slack cable and load limit devices must be tested once a month, unless more frequent testing is specified by the manufacturer. (3) The result of each test required by subsections (1) and (2) must be recorded in the record system.
Securing the platform	14.112	(1) A construction material hoist powered by an internal combustion engine, or a hoist without automatically applied brakes, must have spring loaded pawls that engage ratchets on the winch drums.

**PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATION**

		(2) The operator must ensure that the pawls are engaged whenever material is being placed on or removed from the construction material hoist platform.
Signal systems	14.113	(1) Hand signals may be used to control construction material hoist operations if (a) the hoist does not exceed 21 m (70 ft) in height, (b) the operator has a clear and unobstructed view of all hoist landings and of the signaller, and (c) the code of signals authorized by the Board is used. (2) A signal system, designed to inform the operator of the level from which each signal originates and the platform motion required, must be installed at all hoist landings and at the operator's position if the operator of a construction material hoist does not have a clear and unobstructed view, or if the hoist is more than 21 m (70 ft) in height. (3) Means must be provided to indicate the floor level the construction material hoist platform is at if the hoist is over 21 m (70 ft) in height or if all hoist landings are not clearly visible to the operator.
Operating signals	14.114	The following signals must be used if a bell or a light is used to signal the movement of a construction material hoist platform: 1 bell or lightStop 2 bells or lights.....Raise 3 bells or lights.....Lower 4 bells or lights.....All clear
Operating restrictions	14.115	The hoist operator must not move the construction material hoist platform until informed by a signal that the equipment is clear for movement.

Explanatory Note:

Construction material hoists, other than the portable light duty type referred to in section 14.96 (3), are rarely used in BC and there is no need for the *Occupational Health and Safety Regulation* to contain a lot of detail on such systems. It is proposed that sections 14.96 to 14.98 be retained with some modification, and that sections 14.99 to 14.115 be deleted as the requirements specified in these sections are covered in the applicable standard (*CSA Standard CAN/CSA-Z256-M87, Safety Code for Material Hoists*).

CHIMNEY HOISTS

Permission to use	14.116	<p>During the construction of a chimney or similar structure where If it is not practicable to provide safe access to a work platforms on a chimney or similar structure using cannot be provided by stairs or ladders other means acceptable under the British Columbia Building Code or this Regulation, a chimney hoist meeting the requirements of <i>WorkSafeBC Standard 14.116 Chimney Hoists</i> may, with the , a hoist meeting the requirements of <i>ANSI Standard A10.22-1990, American National Standard for Rope-Guided and Nonguided Workers' Hoists—Safety Requirements</i> and the requirements of this Part may, with prior permission of the Board, be used to provide access for workers any person.</p>
Certification	14.117	<p>(1) Before a chimney hoist is used, a A professional engineer must certify that a</p> <p style="padding-left: 20px;">(a) the chimney hoist is safe for use, and</p> <p style="padding-left: 20px;">(b) the installation of the hoist complies with has been installed in conformity with this Part and the equipment manufacturer's requirements, and is safe for use before the hoist is put into service.</p> <p style="padding-left: 40px;">(i) the design criteria for the installation,</p> <p style="padding-left: 40px;">(ii) the hoist manufacturer's specifications,</p> <p style="padding-left: 40px;">(iii) the requirements of <i>WorkSafeBC Standard 14.116 Chimney Hoists</i>, and</p> <p style="padding-left: 40px;">(iv) the requirements of this Regulation.</p> <p>(2) A copy of the certification required in subsection (1) must be available at the workplace where the chimney hoist is installed.</p>
Support structures	14.118	<p>The structure supporting a chimney hoist, together with all hoisting gear and equipment, must be well constructed, accurately aligned, securely anchored and have the required strength and stability to safely withstand the loads imposed.</p>
Load rating	14.119	<p>The rated capacity of a chimney hoist must be conspicuously marked on the platform or cage and must not be exceeded.</p>
Emergency brakes	14.120	<p>A bucket, skip or cage on a chimney hoist must be prevented from falling if a cable fails, by automatically applied arresting devices operating on at least 2 separate guide cables.</p>
Safety factors	14.121	<p>Suspension and guide cables, supporting structures, slings and metal fittings used on a chimney hoist must have a safety factor of 10.</p>
Drive restrictions	14.122	<p>The hoisting winch of a chimney hoist must have a positive drive and there may be no clutch between the transmission and the hoisting cable drum.</p>
Brakes	14.123	<p>The hoisting winch of a chimney hoist must have 2 independent braking systems, one of which must apply automatically when the controls are in the neutral position.</p>
Limit switches	14.124	<p>Each chimney hoist must have upper and lower terminal stopping devices that automatically stop the bucket, skip, or cage, from normal travel speed, within the top and bottom travel limits.</p>

PROPOSED AMENDMENTS FOR PART 14: CRANES AND HOISTS
IN THE *OCCUPATIONAL HEALTH AND SAFETY REGULATION*

Speed governor	14.125	The hoisting equipment of a chimney hoist must have a governing device which will effectively prevent the drum speed from exceeding 110% of the design speed.
Hoisting speed	14.126	Workers must not be raised or lowered on a chimney hoist at a speed greater than 76 m/min (250 fpm).
Guardrails and gates	14.127	(1) Each landing 3 m (10 ft) or more above grade must have gates, hinged guardrails, or hinged covers. (2) The lower landing for a chimney hoist must be guarded by perimeter guardrails and a gate. (3) All gates of a chimney hoist system must be kept closed, except at the landing where the bucket, skip or cage is located for loading or unloading.
Raising materials	14.128	Materials, equipment or supplies must not be raised or lowered by the chimney hoist with a worker in the cage or platform.
Communication	14.129	There must be effective voice communication between the chimney hoist operator, occupants of the cage or platform and workers on each hoist landing.
Fall protection	14.130	A worker on a chimney hoist platform that is not a fully enclosed cage must wear a personal fall arrest system, meeting the applicable requirements in Part 11 (Fall Protection), secured to the lead hook, or to an anchorage above the lead hook.
Operator qualifications	14.131	A chimney hoist operator must demonstrate competency in operation of the hoist and familiarity with the operating instructions and signal codes for use with the equipment before being authorized to operate the equipment.
Unattended controls	14.132	The operator of a chimney hoist must not leave the hoist controls unattended unless the platform or cage is at grade level.

Explanatory Note:

Chimney hoists are rarely used in BC and there is no need for the *Occupational Health and Safety Regulation* to contain a lot of detail on such systems. It is proposed that section 14.116 be changed to refer to a new WorkSafeBC standard, sections 14.117 to 14.119 be retained with some modification, and that sections 14.120 to 14.132 be deleted and the requirements specified in these sections be included in the proposed new WorkSafeBC standard. A draft of the proposed new *WorkSafeBC Standard 14.116 Chimney Hoists* is provided at the end of this Part for review and comment.

PART 16: MOBILE EQUIPMENT

- Operation and maintenance** **16.3**
- (1) Repealed. [B.C. Reg. 312/2003.]
 - (2) Repealed. [B.C. Reg. 312/2003.]
 - (3) Maintenance records for any service, repair or modification which affects the safe performance of the equipment must be maintained and be reasonably available to the operator and maintenance personnel during work hours.
 - (4) Repealed. [B.C. Reg. 312/2003.]
 - (5) Servicing, maintenance and repair of mobile equipment must not be done when the equipment is operating, unless continued operation is essential to the process and a safe means is provided.
 - (6) Mobile equipment used off maintained roads must be appropriate and safe for the intended use considering factors such as the nature of the travel surface, the slope of the travel surface, and the activities to be undertaken.

[Amended by B.C. Reg. 312/2003.]
 - (7) In addition to complying with the applicable requirements in this Part, a class 7 variable reach lift truck must meet and be used in accordance with the requirements of sections 14.5, 14.7, 14.8, 14.12, 14.13, 14.15, 14.39, 14.43 and 14.69.**
 - (8) A record of inspections and maintenance meeting the requirements of section 4.9 must be kept by the operator of a class 7 variable reach lift truck and any other persons inspecting and maintaining that truck.**
-

Explanatory Note:

The type of equipment covered by proposed new sections 16.3(7) and 16.3(8) has a rated capacity that varies with the load radius and the equipment functions in a manner similar to a mobile crane. The effect of this proposal is to require inspection and maintenance records meeting the requirements of section 4.9 to be maintained for this type of equipment. This means a log book or similar recording system must be immediately available to the operator and any other person involved with operation and maintenance of the equipment. In addition, it is proposed that other requirements from Part 14 that are applicable must be met for this type of equipment.

This type of equipment comes in a variety of sizes and styles, and is commonly referred to in the workplace as a “zoom boom” or a “telehandler”. The following figures are from the *CSA Standard B335-04 Safety standard for lift trucks*, and are provided to illustrate the type of equipment covered by proposed new sections 16.3(7) and (8).

Class VII – Rough terrain forklift trucks
Lift Code 1 – Variable reach rough terrain
fork lift truck

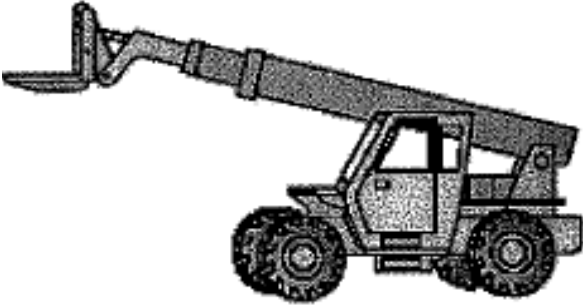


Figure B.1.27

Variable reach linkage type
rough terrain lift truck
(four wheel steer, two wheel steer;
four wheel drive, two wheel drive)

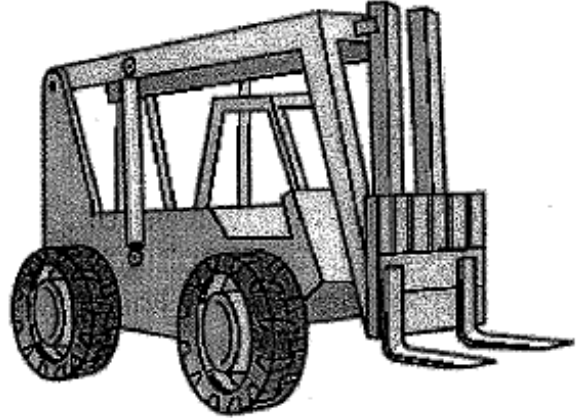


Figure B.1.31

PART 16: MOBILE EQUIPMENT

- Load handling attachments** **16.19** **(1)** Buckets, forks, booms, hoists and other load handling attachments must only be installed on mobile equipment as specified by the equipment manufacturer or when certified by a professional engineer for use on the equipment.
- (2) The installation specified by the equipment manufacturer or certified by the professional engineer under subsection (1) for hoists or load handling attachments must**
- (a) include instructions for safe use of the equipment with the load handling attachment, and**
- (b) provide for the evaluation of the stability of the equipment, including the effect of load swing.**
-

Explanatory Note:

A new section 16.19 (2) is proposed to ensure load handling attachments developed for use on mobile equipment, including those for use on a class 7 variable reach lift truck, are evaluated to ensure stability of the base or carrier unit when the load handling attachment is being used, and that any special operating instructions necessary for the safe use of the attachment are developed and available to the user. This is particularly important when a custom built attachment is being developed, and particularly where the nature of use of the attachment allows the load to swing. The load ratings for most earthmoving machines and lift trucks were developed based on a payload that only moves with the bucket or forks. Loads that are suspended on rigging and free to swing introduce additional dynamic loads not generally contemplated in the stability design and testing of such mobile equipment.

G14.71 Inspection and certification of a mobile crane or boom truck

Proposed revision March 2007

Regulatory excerpt

The proposed revision to section 14.71 of the *OHS Regulation ("Regulation")* states:

- Annual inspection** **14.71** (1) A mobile crane or boom truck must be inspected **at least once a year** in accordance with good engineering practice ~~at intervals not exceeding 12 months,~~ **to ensure it meets**
- (a) the crane or boom truck manufacturer's specifications,**
 - (b) the requirements of the applicable design or safety standard specified in section 14.2, and**
 - (c) the requirements of this Regulation** ~~and certified as safe for use by a professional engineer, the crane manufacturer or the crane manufacturer's authorized representative.~~
- (2) **A mobile crane or boom truck must not be used after an inspection under subsection (1) unless a professional engineer certifies it is safe for use on the basis of that inspection.** ~~A mobile crane or boom truck temporarily located at a remote workplace may have the annual inspection and certification required by subsection (1) delayed up to 3 months after its due date, but the next annual inspection and certification must be done within 12 months of the due date.~~

Purpose of guideline

This guideline outlines some of the factors that should be considered when determining if an inspection has been conducted in accordance with "good engineering practice" under section 14.71. It also provides information on who is authorized to certify that the inspection has been done and that the crane or boom truck is safe for use.

The concept of good engineering practice

An annual inspection and certification of a mobile crane or boom truck is required by the *Regulation*. This inspection and certification is to be done in accordance with good engineering practice. The concept of good engineering practice as it applies to section 14.71 means inspection, assessment, repair (if necessary) and certification of the equipment, is to be done in consideration of

- Applicable regulations, safety codes and standards
- Manufacturer's instructions for operation, inspection, maintenance, servicing, and repair
- Operating, maintenance and service records

Who may do the certification

Certification will be done by a professional engineer. If the inspection, assessment and any necessary repair work is done in BC, the engineer, as required by the *Engineers and Geoscientists Act*, must be licensed to practice in BC. If this work is being done outside BC, for example in Alberta, the engineer must be licensed to practice in that jurisdiction.

The inspection and certification process

The employer or owner of the equipment should consult the certifying engineer in

advance to arrange the location of the inspection, testing and necessary repair work, and to ensure qualified people and adequate facilities are used. Generally the "hands on" part of inspection, testing and repair will be done by mechanics, service technicians, non-destructive testing (NDT) technicians and other qualified workers as necessary (for example, welders), working under the direction of the certifying engineer.

Inspection and certification requires assessment of the "critical components", meaning the structural, mechanical and control system components that affect the safe operation of the equipment. The specific identity of these components will vary from one type of equipment to another, depending on the design and configuration of the equipment.

The frequency of inspections of individual components and the extent of inspections, including dismantling, assessment and NDT or other testing, will be determined by the certifying engineer. The factors relevant in making these determinations include:

1. Requirements of the applicable regulations, safety codes and standards
2. The equipment manufacturer's specifications and instructions
3. The certifying engineer's familiarity with the particular design and model of equipment, including known reliability problems or component problems
4. Previous inspection history and results
5. Age of the equipment and number of hours of use
6. Circumstances of use of the equipment (for example, heavy duty vs. light use) and any known incidents since the last certification
7. The general condition of the equipment
8. The environment in which the equipment has been used (for example, a corrosive environment vs. a clean, dry shop or yard area)
9. The available use, service, inspection and maintenance records
10. The certifying engineer's knowledge of the overall effectiveness of the service and maintenance program

Based on the outcomes of the inspection, the certifying engineer will determine any necessary repair work.

The certification document will include a statement that the equipment is "safe for use" at the completion of the inspection and any necessary repair. This means that the equipment should then reasonably be expected to perform safely until the next inspection and certification is required if operated according to the manufacturer's instructions.

If the certifying engineer deems it necessary to provide a restricted certification statement (for example, that some components are currently acceptable for safe use but will likely require replacement or renewal before the next annual inspection), the engineer will ensure the owner or employer is made aware of these concerns. He or she will also note the concerns on the equipment inspection and maintenance records. It is not acceptable for the certifying engineer to provide a certification when there are

outstanding deficiencies affecting the safe performance or compliance of the equipment with the *Regulation*.

G14.88(5) Alternative means of jib access

Proposed March 2007

Regulatory excerpt

The proposed amendments to section 14.88 of the *OHS Regulation* (“*Regulation*”) state:

Access ladders 14.88

Access

- (1) ~~An access ladder must be provided and fixed in position on the mast and crown of a tower crane.~~

A tower crane must have a fixed ladder installed in or on the mast to provide access to the jib and crown of the crane.

- (2) ~~An access ladder on a tower crane must be able to support two 1.1 kN (250 lbs) point loads between any two consecutive attachment points, and there must be a minimum horizontal distance of 15 cm (6 in) between the rungs and the object to which the ladder is attached.~~

The ladder under subsection (1) must meet the following requirements:

- (a) **the ladder must be able to support two 1.1 kN (250 lbs.) point loads between any two consecutive points where the ladder is attached to the crane;**
 - (b) **there must be a minimum horizontal distance of 15 cm (6 in.) between the rungs and the object to which the ladder is attached;**
 - (c) **landing platforms must be provided at least every 9 m (30 ft.) on the ladder;**
 - (d) **each section of the ladder must be offset horizontally from adjacent sections or the landing platforms must have trap doors;**
 - (e) **if a section of the ladder has a climb exceeding 6 m (20 ft.) in length, that section of ladder must have a ladder safety cage 68 cm to 76 cm (27 in. to 30 in.) in diameter or a ladder safety device must be used.**
- (3) ~~Landing platforms must be provided at least every 9 m (30 ft) on the access ladder of a tower crane.~~

Each tower crane jib must have a continuous walkway from the mast to the tip.

- (4) ~~Each section of access ladder on a tower crane must be offset horizontally from adjacent sections or the landing platforms must have trap doors.~~

The walkway referred to in subsection (3) must meet the following requirements:

- (a) **the walkway must be at least 30 cm (12 in.) wide and constructed with a non-skid surface;**
- (b) **a handline, which is approximately 1 m (39 in.) above the level of the walkway, and a midline must be provided on both sides of the walkway not more than 30 cm (12 in.) out from the edge of the walkway and supported at intervals not exceeding 3 m (10 ft.);**
- (c) **the handline and midline referred to in paragraph (b) must be wire rope of at least 1 cm (3/8 in.) diameter;**

- (d) if it is not practicable to provide handlines in accordance with paragraph (b), alternative means of fall protection, such as a horizontal lifeline system, must be provided in accordance with the requirements of Part 11 (Fall Protection) and must be set out in the fall protection plan.
- (5) If a section of ladder on a tower crane has a climb exceeding 6 m (20 ft) in length, that section of ladder must have a ladder safety cage 68 cm to 76 cm (27 in to 30 in) in diameter or a ladder safety device must be used.
- If, due to the design or size of the tower crane, it is not practicable to meet the requirements set out in subsections (1) to (4), alternative safe means of access acceptable to the Board must be provided.
- (6) The climbing space of a tower crane mast must be clear of protruding objects and must provide a safe and unobstructed passage.
- (7) A written fall protection plan, which addresses the requirements of fall protection when a person is operating, inspecting, servicing and maintaining the tower crane, must be developed and implemented.

Purpose of guideline

For some tower cranes it may not be practicable to attach a walkway to the jib in a manner that would meet the requirements of section 14.88(3) & (4). For example, in some cases, there may be a walkway that can extend only as far as the trolley drive assembly, and on others it may not be feasible to fit a walkway at all.

Under the terms of proposed section 14.88(5), other options for access can be considered. One option that has been developed is the use of a work platform (basket) mounted on the tower crane trolley. Other options may also be possible, for example the use of an elevating work platform to access the jib area.

If an employer or other party wishes to use an alternative means of access they need to make a submission to WorkSafeBC to determine acceptability. This guideline provides information on

- The functions of the walkway as required by section 14.88(3) & (4)
- What to include in a submission under section 14.88(5)
- Where to send the submission

The functions of the walkway

The walkway required by section 14.88(3) & (4) is intended to provide a means of safe access by a worker to all points along the jib. Access along the full length is needed for the purposes of inspections, maintenance, and any repairs on the jib or its support system. The walkway also provides access to the cab, if mounted on the jib. In addition, it may provide an emergency access route should it be necessary to rescue a worker from the jib.

The *CSA Standard Z248-2004 Code for Tower Cranes* lists the types of inspections that must be done on the components of the crane, and their frequency. Inspections that would typically be done from the walkway include

- Daily inspections of guy lines and guy line connections, and load hoist ropes
- Weekly inspections of structural pins and keepers, trolley rollers and tracks, gear shaft and belt drives, sheaves, bushings, pins, rope attachments, pendant lines, cable clips, thimbles, and ferrules
- Monthly inspections of all running ropes, the jib structure, sheaves, bearings and mounts

If the crane will be in place for extended periods of time, annual inspections are needed of the jib structure using nondestructive testing methods, all load carrying equipment, including sheaves, blocks, rings, shackles and hooks, and all fixed and running wire ropes.

When reviewing a submission, WorkSafeBC will consider the capability of the alternative proposed by the applicant to provide protection for workers to carry out activities that would otherwise need to be done from the walkway.

What to include in a submission

At minimum, a submission should cover the items listed below. The items are provided in two groups: Those of general application, and the additional items that are specific to trolley-mounted work platforms. The lists are not intended to be comprehensive. It is up to the applicant to ensure that the submission covers all relevant points. When reviewing a submission, WorkSafeBC will contact the applicant if it determines additional information is needed.

A. Items of general application

- Communication procedures and equipment that will allow safe use of the access system.
- Assurance that any work platform used provides firm, non-slip footing.
- The means of compliance with Part 11 (Fall Protection) of the *OHS Regulation*, as it applies to personal fall protection for a worker.
- The means of inspection and certification of the device, in compliance with section 14.77 (Structural inspection), if the device is part of the tower crane.
- An emergency procedure and means of rescuing a worker in the event that the access system fails, or the worker has become incapacitated.
- Instructions for use of the system.

B. Additional items specific to trolley-mounted work platforms

- The means of compliance with section 14.2(5) (Standards), which requires that tower cranes meet the requirements of *CSA Standard Z248 - 2004, Code for Tower Cranes*. (Among other things, for trolley systems, the Standard sets out requirements for braking the trolley, the means to prevent the trolley from becoming detached in the event of trolley wheel or axle breakage, and the means of stopping the outward movement of the load trolley in the event of trolley drive rope breakage).

- The design and fabrication of the trolley-mounted work platform (“platform”) and the means of attaching it to the crane. The platform should be designed and fabricated by the crane manufacturer specifically for the crane on which it is used, and be permanently marked with the manufacturer’s information, the rated capacity, a part number, and the number of occupants for which it is designed (at 250 lbs (114 kg)/occupant). The system for attaching the platform to the trolley will need to be of a design that ensures the platform remains level. If a platform system is built by another party, it will need to be accompanied by an engineering certificate and drawings that address the engineering issues previously noted.
- The means of compliance with section 14.21 (Fenders). *This provision requires that trolley wheels be fitted with fenders or guards if there is a possibility of injury to the worker from contact with trolley wheels moving along the rail.*
- The means of compliance with section 4.58 (Specifications for guards and guardrails), as it applies to the platform.
- The means of safe access to and egress from the platform.
- The installation, operation and inspection requirements for the trolley, including any additional requirements due to the attached platform, as provided by the tower crane manufacturer, or other equivalent source. *(Note: The instructions for use to include a stipulation that no loads are to be handled by the crane while the platform is occupied).*
- The means of protecting the worker from the hazards of moving or operating equipment during servicing and inspection of machine parts.

Where to send the submission

Submissions should be sent to the Regulatory Practices Department of WorkSafeBC at the following address:

Regulatory Practices Department
Worker and Employer Services Division
WorkSafeBC
PO Box 5350 Station Terminal
Vancouver BC, V6B 5L5

WorkSafeBC Standard 14.116 Chimney Hoists

1. Scope

1.1 This standard sets out the minimum requirements for the design and use of a chimney hoist to transport personnel to a work platform on a chimney and similar structure.

2. Definitions

2.1 The definitions set out in *ANSI Standard A10.22-1990, American National Standard for Rope-Guided and Nonguided Workers' Hoists -- Safety Requirements* apply to this standard.

2.2 "Cage" means the cage, platform, or skip of a chimney hoist used to raise or lower one or more people to a work platform on a chimney or similar structure.

3. Chimney Hoist Requirements

3.1 Design Requirements

A chimney hoist must meet the requirements of *ANSI Standard A10.22-1990, American National Standard for Rope-Guided and Nonguided Workers' Hoists -- Safety Requirements*, except as otherwise specified in this standard.

3.1 Certification

A professional engineer must certify that a chimney hoist has been designed, installed and tested in conformity with this standard and the equipment manufacturer's requirements, and it is safe for use before the hoist is put into service.

3.3 Certification after alteration

A professional engineer must test and certify a chimney hoist system following any alteration to the system, other than ordinary adjustments or repairs, and update the system design documents and operating instructions as necessary to ensure such documentation is complete and allows for safe use of the system.

3.4 Support structures

The structure supporting a chimney hoist, together with all hoisting gear and equipment, must be well constructed, accurately aligned, securely anchored and have the required strength and stability to safely withstand the loads imposed.

3.5 Load rating

The rated capacity of a chimney hoist must be conspicuously marked on the cage.

3.6 Emergency brakes

The cage of a chimney hoist must be prevented from falling if a cable fails, by automatically applied arresting devices operating on at least 2 separate guide cables.

3.7 Safety factors

Suspension and guide cables, supporting structures, slings and metal fittings used on a chimney hoist must have a safety factor of 10.

3.8 Drive restrictions

The hoisting winch of a chimney hoist must have a positive drive and there may be no clutch between the transmission and the hoisting cable drum.

3.9 Brakes

The hoisting winch of a chimney hoist must have 2 independent braking systems, one of which must apply automatically when the controls are in the neutral position, and one that must apply automatically in the event of loss of power.

3.10 Limit switches

Each chimney hoist must have upper and lower terminal stopping devices that automatically stop the platform from normal travel speed, within the top and bottom travel limits.

3.11 Speed governor

The hoisting equipment of a chimney hoist must have a governing device which will effectively prevent the drum speed from exceeding 110% of the design speed.

3.12 Equipment condition

The hoist, ropes and cage must be in good working order with all components, controls and functions meeting and operating in accordance with the manufacturer's specifications, the engineer's design specifications and the *Occupational Health and Safety Regulation*.

4. Cage Requirements

4.1 Cage markings

The cage must be legibly marked to show:

- (a) The name of the certifying engineer;
- (b) A unique identification number or code that links to the design and certification documentation for the chimney hoist from the engineer;
- (c) The weight of the cage;
- (d) The rated load of the cage (the maximum weight of people or materials permitted in or on the cage).

4.2 Cage layout and guarding

The cage must be constructed so it does not cause a hazard to the occupants and so the occupants cannot reach any hazard created by movement of the cage or the hoisting mechanism.

5. Guardrails and gates

5.1 Fall protection at landings

Each landing 3 m (10 ft) or more above grade must have gates, hinged guardrails, or hinged covers that protect people at or near the landing from the hazard of falling off of or through the landing platform whenever the cage is not at that landing.

5.2 Guarding at the lower landing

The lower landing for a chimney hoist must be guarded by perimeter guardrails and a gate.

6. Use Requirements

6.1 Instructions for use and maintenance

The instructions from the engineer who designed the chimney hoist system and from the manufacturer of component parts, such as the hoist, relating to safe use and maintenance of the chimney hoist system must be available in the workplace.

6.2 Prior to use

The chimney hoist system and cage must be in good condition and in compliance with the *Occupational Health and Safety Regulation* prior to use of the system.

6.3 Operator authorization

A chimney hoist operator must be authorized by the employer to operate the hoist, and must not be so authorized until the operator has demonstrated competency in operation of the hoist and familiarity with the operating instructions and signal codes for use of the system.

6.4 Daily testing

Before first use on each work shift, the chimney hoist must be raised to its maximum operating height and lowered back to the ground or base to ensure all functions are operating correctly, all limit devices are functioning properly, and there is adequate clearance between the platform and any surrounding object such as a structure, overhead obstruction, storage rack, or scaffold, and any hazard such as energized electrical lines and equipment.

6.5 Attending the controls

The operator of a chimney hoist must not leave the hoist controls unattended unless the cage is at the lowest landing level (usually ground or grade level) and no people are in the cage.

6.6 Communication with the operator

There must be effective voice communication between the chimney hoist operator, occupants of the cage and people at each hoist landing. If there is more than one occupant in the cage, one person in the cage must be designated to be the primary person to signal the hoist operator regarding cage movement requests.

6.7 Backup communication plan

A system of hand and arm signals must be developed and implemented as an alternative in the event the primary voice communication means becomes ineffective during system use, in which case the hand and arm signals must be used to bring the cage down to the lowest landing and the hoist must not be used until the voice communication system is effectively restored.

6.8 Cage not fully enclosed

A worker in a chimney hoist cage that is not a fully enclosed cage must use a personal fall protection system, meeting the applicable requirements of Part 11 of the

Occupational Health and Safety Regulation, secured to a designated anchorage point in the cage.

6.9 Maximum load

The weight or load placed in the cage must not exceed the rated capacity of the cage.

6.10 People or materials

Materials, equipment or supplies must not be raised or lowered by the chimney hoist with a worker in the cage.

6.11 Getting in or out of the cage

The cage must be at a designated landing before a person gets into or leaves the cage.

6.12 Hoisting speed

A person must not be raised or lowered on a chimney hoist at a speed greater than 76 m/min (250 fpm).

6.13 Position of gates

All gates of a chimney hoist system must be kept closed, except at the landing where the cage is located for loading or unloading.

6.14 Emergency evacuation

A plan for the evacuation of personnel from the cage in the event of loss of power or equipment malfunction must be developed and implemented and the hoist operator must know how to initiate a request for an evacuation.