



Elevating and Amusement Devices Safety Division	Ref. No.: 277-19
<b>Elevating Devices Code Adoption Document Amendment</b>	Date: May 3, 2019

IN THE MATTER OF:

*Technical Standards and Safety Act 2000, S.O. 2000, c. 16,*  
Ontario Regulation 223/01 (Codes and Standards Adopted by Reference), *and*  
Ontario Regulation 2190/01 (Elevating Devices)

The Director for the purposes of Ontario Regulation 219/01 (Elevating Devices), pursuant to section 4 of Ontario Regulation 223/01 (Codes and Standards Adopted by Reference), hereby provides notice that the ELEVATING DEVICES CODE ADOPTION DOCUMENT published by the Technical Standards and Safety Authority and dated June 1, 2001, as amended, is further amended as follows:

**All sections of the Elevating Devices Code Adoption Document dated June 1, 2001 are hereby replaced with the following, and all previous amendments thereto are thereby superseded:**

1. The attached Elevating Devices Code Adoption Document - Amendment 277-19, dated May 3, 2019, is hereby adopted, effective as follows:
  - a. Parts 3, 6, and 7 (which are unchanged from the previous CAD amendment\*) are effective immediately.
  - b. Parts 1, 2, 4 and 8 are effective immediately.
  - c. Part 5 is effective July 31, 2019.

Any person involved in an activity, process or procedure to which this document applies shall comply with this document.

\_\_\_\_\_  
Roger Neate  
Director, O. Reg. 209/01 (Elevating Devices)

Distribution:        Posted to TSSA website.

\*Note: Part 3 contains updated references to the Ontario Building Code.





# **ELEVATING DEVICES CODE ADOPTION DOCUMENT AMENDMENT 277-19**

**May 3, 2019**

**Elevating and Amusement Devices Safety Program  
Technical Standards and Safety Authority**



## Background

This document and the codes it adopts establish requirements and minimum standards for the design, construction, installation, erection, maintenance and alteration of elevating devices.

Pursuant to s. 4(1) of O. Reg. 223/01 (Codes and Standards Adopted by Reference) made under the *Technical Standards and Safety Act, 2000*, the “Elevating Devices Code Adoption Document” published by TSSA and dated June 1, 2001 (the “CAD”) forms a part of O. Reg. 209/01 (Elevating Devices).

The CAD, in turn, adopts various codes. Since its adoption as part of O. Reg. 209/01, the CAD has been amended several times to adopt different versions of codes and to make modifications to those codes.

CAD amendment 261-13r1 replaced all previous CAD amendments.  
CAD amendment 277-19 now replaces CAD amendment 261-13r1.

For the user’s convenience, this CAD amendment indicates previous amendments using the colour coding and reference symbols in the following table:

### Colour Coding and Reference Symbols Used in CAD Amendment 277-19

7.5	is a reference to another section in this CAD amendment
(197/06)	is a reference to a predecessor document (Director’s Order, Enforcement Procedure, etc.)
7.2.4.	is a reference to a section in an external document or code
as part of	is a reference to text from a published code that is not part of this code but is shown for reference only
Red Text	is used to identify changes from the previous CAD Amendment or TSSA-specific additions to a published code
★	is used to denote a TSSA-specific alteration
Blue greyed	denotes a maintenance permission that will expire on <b>March 31, 2014</b>
Peach highlight	-identifies new code amending text that: - was originally contained in CAD Amendment-261-13r1 or - is contained in CAD Amendment 277
Peach highlight	-identifies text from the A17.1/B44-2013 code introduced in amendment 261-13-r1

Note that definitions contained in O. Reg. 209/01 apply to the CAD and adopted codes.

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# Elevating Devices Code Adoption Document Amendment 277-19

## Part 1

### 1 GENERAL

#### 1.1 Definitions

- 1.1.1 The terms in this Code Adoption Document amendment (Document) have the same meaning as in the *Act* or the Regulation unless otherwise specified herein.
- 1.1.2 Where a provision of a code or standard adopted in this Document is inconsistent with the requirements of this Document, the provision of this Document shall prevail.
- 1.1.3 In this Document,
- (a) “accredited” means that an organization has been evaluated and approved by an Authorized Agency to operate a Certification program, and is designated as such in a publication of the Authorized Agency. [CAD Amendment 277-19]
  - (b) “ANSI” means the American National Standards Institute.
  - (c) “CAN” means a standard recognised as a National Standard of Canada and approved by the Standards Council of Canada.
  - (d) “certified” means equipment or materials accepted for inclusion in a publication by a certifying organization.  
NOTE: The means for identifying certified equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as certified unless it is also marked. The authority having jurisdiction utilizes the system employed by the certifying organization to identify a certified product. [CAD Amendment 277-19]  
  
“certifying organization” means an approved or accredited, independent organization concerned with product evaluation that maintains periodic inspection of production of certified equipment or material and whose certification states whether that equipment meets appropriate standards or has been tested and found suitable for use in a specified manner. [CAD Amendment 277-19]
  - (e) “common-mode failure” means the result of an event(s) which because of dependencies, causes a coincidence of failure states of components in two or more separate channels of a redundancy system, leading to the defined system failing to perform its intended function. [CAD Amendment 216-07]
  - (f) “CSA” means the Canadian Standards Association.
  - (g) “dedicated function fire alarm system” means a protected premises fire alarm system installed specifically to perform emergency control fire safety function(s) where a building fire alarm system is not required See NFPA 72-2013. [CAD Amendment 261-13] [CAD Amendment 277-19]
  - (h) “fire authority” as used in A17.1 has the same meaning as Chief Fire Official in Ontario Regulation 213/07; [CAD Amendment 277-19]

- (i) “freight elevator-P” means a freight elevator upon which passengers are permitted to ride;
- (j) “marked” means equipment or material to which has been attached a symbol or other identifying mark of an approved or accredited independent certifying organization, concerned with product evaluation, that maintains periodic inspection of production of marked equipment or material, and by whose marking the manufacturer indicates compliance with appropriate standards or performance in a specified manner. [CAD Amendment 277-19]
- (k) “minor alteration – type A” means a minor alteration per O. Reg. 209/01 which requires the signature and seal of a professional engineer per O. Reg. 209/01, s. 15.(6)
- (l) “minor alteration – type B” means a minor alteration per O. Reg 209/01, s. 19.(1) which may be signed as per O. Reg. 209/01, s. 15.(9)
- (m) “Regulation” means Ontario Regulation 209/01 (Elevating Devices) made under the *Technical Standards and Safety Act, 2000*.
- (n) “software system failure” means a behaviour of the software, including its support (host) hardware, that is not in accordance with the intended function.
- (o) “solid-state device” means an element that can control current flow without moving parts.
- (p) “transport platform” means a temporarily installed construction hoist equipped with a car or platform that moves vertically in guides, and is tied to the building or structure, that is used for hoisting, lowering or otherwise moving authorized persons or materials and necessary tools to various access levels on a building or structure for construction, renovation, alteration, maintenance, demolition or other types of work of a building or structure. [CAD Amendment 277-19]

## 1.2 Referenced Documents

- 1.2.1 For undated references, the latest edition of the referenced document applies.
- 1.2.2 For dated references, any subsequent amendments or revisions of these referenced documents do not apply.
- 1.2.3 Where documents are referenced in reprinted materials, the edition intended by the reprinted publication shall apply. [CAD Amendment 277-19]

## 1.3 Exceptions

- 1.3.1 Except where otherwise indicated, this Document applies to all elevating devices and parts thereof.
- 1.3.2 Despite subsection 1.3.1 and unless otherwise specified in the Regulation, in this Document or by the director, the codes and standards referred to in this Document do not apply to existing elevating devices except for those sections respecting alterations, the inspection, testing, maintenance, operation and use of the elevating device, including signage and instructions relating to the use of the elevating device.

## Part 2

### 2 GENERAL TECHNICAL REQUIREMENTS

#### 2.1 Welding

- 2.1.1 The welding of a steel structure on an elevating device shall conform to the requirements of CSA Standard W59, Welded Steel Construction (Metal Arc Welding).
- 2.1.2 The welding of a steel structure on an elevating device shall be undertaken by a fabricator or contractor qualified to the requirements of CSA Standard W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- 2.1.3 The field welding of piping and fittings on an elevating device shall conform to the requirements of CSA Standard B51, Code for the Construction and Inspection of Boilers.
- 2.1.4 Despite subsections 2.1.1, 2.1.2 and 2.1.3, an equivalent welding standard may be used if it is acceptable to the director.

#### 2.2 Electrical

- 2.2.1 Electrical work and electrical equipment shall conform to the requirements of, the Ontario Electrical Safety Code as amended from time to time.
- 2.2.2 Electrical equipment shall be certified / listed to the requirements of:
  - (a) CAN/CSA B44.1/ASME A17.5, Elevator and Escalator Electrical Equipment; or
  - (b) CAN/CSA C22.2 No. 14, Industrial Control Equipment (applicable to elevating devices other than elevators, escalators, moving walks, dumbwaiters, material lifts, manlifts, and lifts for persons with physical disabilities).
- 2.2.3 Where certification to IEC61508 (Functional safety of electrical/electronic/programmable electronic safety-related systems) of Electrical / electronic / programmable electronic systems (E/E/PES) or of software systems is required by this CAD or by the adopted codes, the certification body shall be,
  - (a) accredited by Standards Council of Canada (SCC),
  - (b) accredited by ANSI as a National Recognized Testing Laboratory (NRTL), or
  - (c) acceptable to the director. [CAD Amendment 277-19]

#### 2.3 Rope Clips

- 2.3.1 Where clips are permitted to fasten metal rope in an elevating device,
  - (a) the minimum number of clips to be used on each rope ends shall be,
    - (1) two clips for rope under nine millimetres in diameter,
    - (2) three clips for rope nine millimetres in diameter and over but under sixteen millimetres in diameter,

- (3) four clips for rope sixteen millimetres in diameter and over but under nineteen millimetres in diameter;
- (b) the rope end shall be bent over a heart-shaped thimble that has a groove of a radius equal to that of the rope or shall be provided with protection that a director considers equivalent;
- (c) the clips shall be spaced at a distance apart equal to six times the rope diameter from the short end of the rope;
- (d) U-type clips shall be placed so that the U bolts bear on the short or dead end of the rope and the bases bear on the load part of the rope; and
- (e) the nuts on the clips shall not be fully tightened until after the rope has been under load and all nuts shall be fully tightened while the rope is still loaded.

## **2.4 Rope & Stranded Cable Replacement (17/84)(122/95)**

- 2.4.1 When changing or shortening ropes on counterweighted elevators, the installation shall be provided with a data plate permanently and securely attached in the pit, in the vicinity of the counterweight buffer, indicating the maximum designed counterweight runby.
- 2.4.2 The minimum stranding for cables used to relate any car or landing door shall be not less than 7 x 19 construction.

## **2.5 Relocation of an Elevating Device**

- 2.5.1 Where an elevating device is relocated it shall meet the requirements of the applicable code or standard adopted in this Document, unless otherwise specified in this Document or by the director.

## **2.6 Alteration**

- 2.6.1 Where an alteration is made to an elevating device the altered components and functions and those components and functions that are affected by the alterations shall conform to the requirements of codes or standards adopted in this document, including any changes set out in this document. [CAD Amendment 250-11]
- 2.6.1 Unless otherwise specified in this Document, the adopted code or by the director, and without limiting generality of the Regulation, the following alteration to an elevating device shall constitute a major alteration:
  - (a) An increase by more than 10 per cent in,
    - (1) the rated speed of the load-carrying unit,
    - (2) the maximum capacity, or
    - (3) the dead-weight of the machine, load-carrying unit or counter-weight;
  - (b) except for construction hoists, an increase or decrease in the distance of the travel of the load-carrying unit;

- (c) a change in,
  - (1) the method or type of operation,
  - (2) the method or type of motion control,
  - (3) the type or size of guide rails or other guiding means for the load-carrying unit or counter-weight,
  - (4) the type of safety device or other safety stopping device for the load-carrying unit or counter-weight,
  - (5) the power supply to the machine,
  - (6) the type of driving machine or brake,
  - (7) the location of ;
    - a) the elevating device,
    - b) elevating device controller,
    - c) the machine,
    - d) the load-carrying unit,
    - e) the counter-weight, or
  - (8) the working pressure of a hydraulic system by more than 10 per cent;
- (d) a replacement of the controller;
- (e) changes that would result in a reclassification of the elevating device; and
- (f) the addition of an entrance to the elevating device.

2.6.2 Unless otherwise specified in this Document or by the director, and without limiting the generality of the Regulation, any action or work performed on an elevating device that is not specified in subsection **2.6.1** and that results in a change to the original design or the operational characteristics of the elevating device or affects the inherent safety level of the elevating device, shall constitute a minor alteration.

## **2.7 Rack and Pinion Safeties**

- 2.7.1 Any repair or rebuild of a type 'D' rack and pinion safety where the manufacturer has stated that such work shall only be performed by the manufacturer, may either be;
  - (a) repaired, rebuilt or replaced by the manufacturer; or
  - (b) repaired or rebuilt in accordance with a procedure certified by a professional engineer.
- 2.7.2 The procedure referred to in clause **2.7.1(b)** shall be filed with the director and shall be available to the inspector upon request.

## **2.8 Format of Submission Documents**

2.8.1 Where a design submission is in paper format it shall;

- (a) be submitted as one copy unless the submission includes oversized drawings;
- (b) drawings that are not legible when printed on 11" x 17" paper are considered oversized and shall be submitted as four paper copies as well as in an electronic media form that contains the oversized drawings in unprotected PDF format;
- (c) pages larger than 11"x17" provided in hardcopy shall be folded and submitted without any binding.

2.8.2 Electronically submitted design submissions shall be as follows;

- (a) filled specification sheets shall be provided in excel format;
- (b) other supporting documentation shall be provided in unprotected PDF, excel or word format;
- (c) where electronic pages exceed 11"x17" paper size, the information shall be legible to the smallest detail when printed to 11"x17", otherwise they shall also be provided as four hardcopies;
- (d) pages larger than 11"x17" provided in hardcopy shall be folded and submitted without any binding;
- (e) documents received electronically, will be returned electronically at the conclusion of the design review.

## **2.9 Hydraulic Elevating Device Oil Loss Monitoring Program**

2.9.1 Every contractor who maintains a hydraulic elevating device with buried cylinders or buried piping shall ensure there is a written oil loss monitoring program.

2.9.2 A "hydraulic elevating device" means a non-portable device for hoisting and lowering or moving persons or freight and includes an elevator, dumbwaiter, manlift, incline lift, construction hoist, stage lift, platform lift and special elevating device that incorporates one or more hydraulic cylinders.

2.9.3 The purpose of the oil loss monitoring program is to identify any loss of oil which cannot be accounted for in the hydraulic system.

2.9.4 If a contractor performs maintenance on a hydraulic elevating device with buried cylinders or buried piping, the contractor shall ensure that a written oil loss monitoring program is developed and maintained before the contractor performs work on the hydraulic elevating device.

2.9.5 The oil loss monitoring program shall include:

- (a) the requirement to provide an oil loss monitoring log ("OLM log") for each hydraulic elevating device with buried cylinders or buried piping;
- (b) the requirement for the OLM log to reference the elevating device installation number;
- (c) the requirement to establish a fixed reference level for the oil and the requirement to mark the reference level on the tank, dip stick or other suitable location via permanent means;

Note: "permanent" implies affixed in such a manner so as to not be easily removed or repositioned.

- (d) the requirement to document in the OLM log the location of the mark for the fixed reference level;



- (e) the requirement to check that the oil level is at the established reference point when the device is level with the lowest landing during each scheduled maintenance visit;
- (f) if the fixed reference level needs to be intentionally adjusted, the requirement to document and record the changes to the established reference level and reason for establishing the new reference level;
- (g) the requirement to record in the OLM log any quantity of oil added or removed from the hydraulic system;
- (h) that during each maintenance visit, even if no oil is added, the requirement to record in the OLM log the oil level and the date of the scheduled maintenance visit;
- (i) if oil is added or removed, the requirement to record in the OLM log the dates oil was added or removed from the hydraulic system;
- (j) the requirement to record in the OLM log the reason oil was added to or removed from the hydraulic system;
- (k) the requirement to record in the OLM log the mechanic's printed and legible name, signature and certification number for every entry made;
- (l) the requirement to keep the OLM log in the elevator machine room, in a readily identifiable location;
- (m) the requirement that the OLM log be kept in the elevator machine room for a period of at least five years from the date of the last entry in the OLM log;
- (n) the requirement to never allow oil levels to exceed the fixed reference level for the oil level;
- (o) the requirement to record in the OLM log the frequency of oil monitoring activities;
- (p) if there is any oil loss which cannot be accounted for, the requirement to immediately remove a hydraulic elevating device from service until the cause for the oil loss is determined and the cause and associated remedy noted in the OLM log;
- (q) the requirement to report in writing any oil loss attributed to leaks in buried cylinders or buried piping to the TSSA Elevating Devices Director within 7 days;
- (r) the requirement to provide maintenance personnel adequate training related to the contractor's oil loss monitoring program;
- (s) the requirement to maintain up-to-date written records showing who provided and who received the training referred to in (r), the nature of the training and the date when it was provided. A record of training shall be available to the TSSA upon request.
- (t) the requirement that the contractor's oil loss monitoring program be posted or otherwise available in the machine room, and
- (u) the requirement that the collection containers shall not exceed 19 L (5 gal) per cylinder.

2.9.6 Oil that is returned to the hydraulic system from recovery containers, either by manual means or automatically via scavenger pumps, need not be recorded.

Note 1: if oil from recovery containers is not suitable for return to the tank, it must be measured and an equivalent amount must be added to the system when recovery containers are emptied. If additional oil is needed to reach the fixed reference level it must be recorded as new oil.

Note 2: As of May 1, 2015 every hydraulic elevating device (including elevators, dumbwaiters, manlifts, incline lifts, construction hoists, stage lifts, platform lifts and special elevating devices) required mitigation (replacement or other means) to protect against single bottom cylinder failures. Where single bottom cylinders continue to exist with supplemental hazard mitigation, or where buried piping remains, the Oil Loss Monitoring requirements of 2.9 apply. [CAD Amendment 277-19]

## **2.10 Proper Use of Jumpers** *(Elevator Industry Field Employees' Safety Handbook) (01/82)*

- 2.10.1 Each contractor shall have written procedures for the use of jumpers when working on elevating device circuits. Each contractor is responsible for ensuring that their mechanics understand the procedure and are equipped to follow it. Each mechanic is responsible for ensuring that they adhere to the procedure. [CAD Amendment 246-11]
- 2.10.2 The written procedures shall contain not less than the minimum requirements prescribed in Section 6 of the 2015 edition of the Elevator Industry Field Employees' Safety Handbook. [CAD Amendment-261-13] [CAD Amendment 277-19]

Note: This procedure is applicable to all devices under regulated under O. Reg. 209/01.

## **2.11 Component Fastenings** *(10/84) (36/86) (125/96)(193/05)*

- 2.11.1 Where components are fastened or retained via machine threads, roll pins, c-clips, or similar, precautions must be taken to ensure that the fastenings can satisfactorily remain secure while resisting movement or vibration of the equipment.
- 2.11.2 Where the effectiveness of a fastener is rapidly degraded as a result of removal and reinstallation during maintenance activities, such fasteners shall be replaced and not reused. [CAD Amendment 250-11]

## **2.12 Passage Across Roofs** *(231/08)*

- 2.12.1 In addition to O. Reg 209/01, s .37, if passage across a roof is required for access to elevating device equipment the following shall apply to facilitate safe passage from the roof top access point to the elevating device equipment:
  - (a) a permanent and unobstructed walkway not less than 600 mm (24 in.) wide shall be provided
  - (b) adequate lighting that ensures shadows and/or glare are reduced to a minimum
  - (c) The means of access are maintained, including but not limited to ensuring: snow removal as needed, secure footing, no standing water, and the upkeep of safety equipment such as walkways, lifelines, stairs and fixed ladders.
  - (d) for buildings with any elevating device installation that was commissioned on or after December 27, 1985 (effective date of B44-M85) where there is no parapet at least 1070mm (42 in.) high around the roof or protecting a fall hazard on a side of the walkway, a guardrail meeting the requirements of the Occupational Health and Safety Regulations shall be provided on all sides of the walkway where a roof top edge and the associated fall hazard can be accessed.

(e) for buildings where all elevating device installation(s) were commissioned before December 27, 1985 where there is no parapet at least 1070mm (42 in.) high around the roof or protecting a fall hazard on a side of the walkway;

(1) a guardrail meeting the requirements of the Occupational Health and Safety Regulations shall be provided on all sides of the walkway where a roof top edge and the associated fall hazard can be accessed, or

(2) an engineered lifeline in lieu of a guardrail shall be provided that is designed to accommodate a travel restraint (safety belt) or fall arrest system meeting all applicable requirements of the Occupational Health and Safety Regulations.

### **2.13 Parts affecting Safe Operation** [CAD Amendment-261-13]

2.13.1 Where a defective part directly affecting the safety of the operation is identified, the equipment shall be taken out of service until the defective part has been adjusted, repaired, or replaced.

2.13.2 Where a defective part that can impact the safety of the operation is identified, the part shall be adjusted, repaired or replaced, or a risk assessment carried out to determine if the device can remain in service where the work cannot be carried out immediately. The nature of the defect and the anticipated date of repair or replacement shall be noted in the log book.

## Part 3 [No Changes from 261-13r1]

### 3 ELEVATORS, DUMBWAITERS, ESCALATORS, MOVING WALKS, MATERIAL LIFTS AND FREIGHT PLATFORM LIFTS

#### 3.1 Applied Codes and Standards [CAD Amendment 250-11] [CAD Amendment 261-13]

3.1.1 Every elevator, dumbwaiter, escalator, moving walk, material lift, and freight platform lift shall conform to the requirements of:

(a) ASME A17.1-2010/CSA B44-10 Safety Code for Elevators and Escalators,

Note: Parts 1, 5.10, 8.1, 8.6, 8.7, 8.8, 8.9, 8.10 and 8.11 apply to both new and existing installations. For the purpose of these parts, existing installations means devices installed under the 2010 code and prior editions.

(b) ASME A17.6-2010 Standard for Elevator Suspension, Compensation, and Governor Systems.

(c) The requirements of **3.1(a)** are adopted with the following modifications and clarifications:

- (1) Requirements which are identified as applicable to “jurisdictions not enforcing NBCC” are not adopted, unless otherwise stated. *Note: NBCC means the National Building Code of Canada;*
- (2) Requirements identified as applicable “in jurisdictions enforcing NBCC” are adopted;
- (3) Any reference to the “building code” or to the National Building Code of Canada or “NBCC” in this definition and throughout the Code shall be deemed to refer to the Ontario Regulation **332/12** ~~350/06~~ (**Building Code**) made under the Building Code Act 1992, as amended, commonly known as Ontario Building Code or OBC;
- (4) Where there is inconsistency between the Regulations and this Code (e.g. Requirement **2.15.9.2** related to the car-platform guards or aprons) the Regulation prevails, unless otherwise specified in this Amendment;
- (5) Any reference containing a star ★ notation (example **8.7.3.31★**) is a TSSA defined alteration or additional requirement;
- (6) Requirement **2.5.1.6** is revoked and the following substituted:

#### **2.5.1.6 Clearance Between Car Platform Apron and Pit Enclosure.**

Where the lowest landing sill, **on each side of the hoistway**, projects into the hoistway, the clearance between the car platform apron and the pit enclosure or fascia plate shall be not more than 32 mm (1.25 in.). This clearance shall be maintained, **between the bottom face of the apron and the pit fascia**, until the car is resting on its fully compressed buffer.

- (7) Requirement **2.7.3.2.2** is revoked and the following substituted:

2.7.3.2.2 Where the passage is over a roof having a slope exceeding 15 deg from the horizontal, or over a roof where there is no parapet or guardrail at least 1 070 mm (42 in.) high around the roof or passageway, a permanent, unobstructed and substantial walkway not less than 600 mm (24 in.) wide, equipped ~~on the side sloping away from the walk~~ with a railing conforming to 2.10.2.1, 2.10.2.2, and 2.10.2.3 **and 2.10.2.4 or 2.12.1(a)(2) of the CAD on all sides**, shall be provided from the building exit door at the roof level to the means of access.

- (8) Requirement **2.7.8.4** is revoked and the following substituted:

2.7.8.4 A permanent means of communication between the elevator car and a remote machine room, **control space** ~~and~~ or control room shall be provided.

- (9) Requirement **2.10.2** is revoked and the following substituted (see also **3.8.2**): (245/10)

### **2.10.2 Standard Railing / Guard Rail**

A standard railing / **guard rail** shall be substantially constructed of metal and shall consist of a top rail, intermediate rail or equivalent structural member or solid panel, and toe-board.

#### **2.10.2.1 Top Rail**

The top rail shall have a smooth surface, and the upper surface shall be located at a vertical height of 1 070 mm (42 in.) from the working surface. **For alterations only: On elevator car tops of existing devices where a non collapsible guard rail is being added, this dimension is permitted to be reduced to a height between 910 mm (36 in.) and 1070 mm (42 in.).**

#### **2.10.2.2 Intermediate Rail, Member, or Panel**

The intermediate rail or equivalent structural member or solid panel shall be located approximately centered between the top rail and the working surface.

#### **2.10.2.3 Toe-Board**

The toe-board shall be securely fastened and have a height not less than **125 mm (5 in.)** above the working surface.

#### **2.10.2.4 Strength of Standard Railing / Guard Rail**

##### **2.10.2.4.1 Strength**

In jurisdictions enforcing NBCC, guards shall be fixed in position and designed to resist the following:

- (a) a horizontal load applied inward or outward, of 750N/m (52 lbf/ft) or a concentrated load of 1000N (225 lbf) applied at any point, whichever governs, at the top of every guard rail
- (b) elements within the guard, including solid panels and pickets, shall be designed for a load of 500 N (112 lbf) applied over an area of 100 mm by 100 mm (4 in. x 4 in.) located at any point in the element or elements so as to produce the most critical effect. These loads need not be considered to act simultaneously with the loads provided for in (a) and (c).
- (c) The minimum specified load applied vertically at the top of every required guard shall be 1500 N/m (103 lbf/ft) and need not be considered to act simultaneously with the horizontal load provided for in (a)

Note: The loads specified in 2.10.2.4.1 are extracted from O. Reg. ~~332/12~~ ~~350/06~~ (Building Code) Article ~~4.1.5.14~~ ~~4.1.5.15~~, as required by Reg. 851 (Regulations for Industrial Establishments) Section 14(2).

For Limit States Design a principal load factor of 1.5 applies per sentence ~~4.1.3.2(6)~~ ~~4.1.3.2(5)~~ of O. Reg. ~~332/12~~ ~~350/06~~ (Building Code). For Allowable Stress Design, typically 66% of ultimate stress (1.5 safety factor) is applied to material strength, in which case the stated loads are not factored.

##### **2.10.2.4.2 Deflection**

A standard railing shall be capable of resisting anywhere along its length the following forces when applied separately, without deflecting more than 75 mm (3 in.) and without permanent deformation:

- (a) a force of at least 890 N (200 lbf) applied in any lateral or downward vertical direction, at any point along the top rail.
- (b) a force of at least 666 N (150 lbf) applied in any lateral or downward vertical direction at any point along the center of the intermediate rail, member, or panel. If the standard railing is a solid panel

extending from the top rail to the toe-board, the application of the force specified in 2.10.2.4(a) shall be considered to meet the requirements of 2.10.2.4(b).  
(c) a force of 225 N (50 lbf) applied in a lateral direction to the toe-board.

- (10) Requirement 2.14.1.7 is amended and supplemented with the following (see also 3.8.2):  
(245/10)

2.14.1.7.2 When the car has reached its maximum upward movement (2.4.6.1), The following minimum clearances shall be provided to mitigate shearing hazards caused by relative motion between from the top rail of the standard railing and the building structure or equipment not attached to the car:

(a) when the car has reached its maximum upward movement (2.4.6.1):

- (1) 100 mm (4 in.) vertically
- (2) 300 mm (12 in.) horizontally towards the centerline of the car enclosure top
- (3) 100 mm (4 in.) horizontally in the direction towards the hoistway enclosure

(b) throughout the hoistway 100 mm (4 in.) horizontally in the direction towards the hoistway enclosure for submissions received after November 1, 2013. [CAD Amendment 261-13r1]

2.14.1.7.5 Where a standard guardrail per 2.10.2 cannot be provided due to overhead clearance issues, a foldable, collapsible or other stowable design shall be acceptable provided that:

- (1) the car will not operate in “top-of-car inspection operation” unless the railing is in the fully extended position,
- (2) the car will not operate in “normal operation”, “hoistway access operation”, or any type of “inspection operation” other than “top-of-car inspection operation”, unless the railing is in the fully retracted position,
- (3) switches used to monitor the fully collapsed position shall have contacts that are positively opened mechanically when the railing is moved from its fully collapsed position (leaving the collapsed position will forcibly/positively remove the car from all modes of operation and top-of-car operation cannot be engaged until the extended position is reached),
- (4) the switch used to monitor the fully collapsed position shall comply with the requirements of the car top transfer switch when in the open position, except the top-of-car operation shall not be permitted until the guardrail is in the fully extended position,
- (5) switches used to monitor the fully extended position shall have contacts that are positively opened mechanically when the railing is moved from its fully extended position (leaving the extended position will forcibly/positively remove the car from top-of-car operation and other modes of operation cannot be engaged until the collapsed position is reached),
- (6) related circuits for switches used to monitor the fully collapsed and fully extended position of the guardrail shall comply with 2.26.9.3 and 2.26.9.4 of A17.1-2007/B44-07,
- (7) electrical means shall be provided to prevent upward movement of the car beyond the point required to maintain top of car clearances when the railing is not in the fully collapsed position,
- (8) when in the fully extended position the handrail shall not be less than 1 070 mm (42 in.) in height and shall meet the requirements of 2.10.2, and
- (9) a suitably designed and marked fall arrest anchor point shall be provided if there is worker exposure to a fall hazard (per R.R.O. 1990, Reg. 851 (Industrial Establishments) made under the *Occupational Health and Safety Act*, s. 85) while engaging or lowering the alternative height guardrail provided for in 2.14.1.7.5

- (11) Requirement 2.14.2.1.2 is revoked and the following substituted:

**2.14.2.1.2** In jurisdictions enforcing the NBCC

- (a) materials in their end-use configuration, other than those covered by 2.14.2.1.2(b), 2.14.2.1.3, and 2.14.2.1.4, shall conform to the following requirements, based on the tests conducted in accordance with the requirements of ASTM E 84, ANSI/UL 723, or CAN/ULC-S102:
  - (1) flame spread rating of 0 to 75
  - (2) smoke development classification of 0 to 450
- (b) floor surfaces shall have a flame spread rating of 0 to 300 with smoke development classification of 0 to 450, based on the test conducted in accordance with the requirements of CAN/ULC-S102.2
- (c) not adopted

- (12) Requirement **2.27.3.2.2** is revoked and the following substituted:

**2.27.3.2.2** In jurisdictions enforcing the NBCC, the requirements of (a) through (c) are applicable to new installations and the requirements of (a) through (h) are applicable for alterations as amended below:

- (a) smoke detectors, or heat detectors in environments not suitable for smoke detectors (fire alarm initiating devices), used to initiate Phase I Emergency Recall Operation, shall be installed in conformance with the requirements of the NBCC, and shall be located
  - (1) at each floor served by the elevator
  - (2) in the associated elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room, and
  - (3) in elevator and dumbwaiter shafts per,
    - (i) ~~O. Reg. 350/06 Article 3.2.4.10.(e) if a fire alarm system is required by O. Reg. 350/06 Article 3.2.4.1, except as provided in O. Reg. 350/06 Article 3.2.4.15., or~~
    - (ii) ~~O.Reg. 332/12 Article 3.2.4.11.(e) if a fire alarm system is required by O. Reg. 332/12 Article 3.2.4.1, except as provided in O. Reg. 332/12 Article 3.2.4.16.~~
- (b) alternate floor recall required by 2.27.3.2.4 is not required if the floor area containing the recall level is sprinklered. ~~(ref O.Reg 350/06 article 3.2.4.14.(3) or O.Reg 332/12 article 3.2.4.15.(3)).~~  
Note: If fire detectors are provided in the hoistway at or below the lowest landing of recall, an alternate (upper) recall shall be provided in accordance with 2.27.3.2.3(d).
- (c) where a building fire alarm system is not required by OBC or where an alteration is being performed and the existing building fire alarm system does not provide suitable signaling, the devices referred to in 2.27.3.2.2(a) shall be installed and shall be connected to a Dedicated Function Fire Alarm (DFFA). The installation of this control panel shall conform to the following:
  - (1) in a building with an existing fire alarm system, the building fire alarm system and the Dedicated Function Fire Alarm system shall be interconnected. [CAD Amendment-261-13]
  - (2) in a building without an existing fire alarm system, the Dedicated Function Fire Alarm control panel used to initiate elevator recall shall be permanently identified as "Elevator Recall Control and Supervisory Control Unit" in lettering not less than 6mm (0.25in.) in height.
  - (3) the installation or alteration of any fire alarm systems or DFFA system must be installed in accordance with CAN/ULC-S524 (Installation of Fire Alarm Systems), and
  - (4) where a DFFA has been installed to serve as an Elevator Recall Control and Supervisory Control Unit, the system shall be subject to inspection and testing in accordance with CAN/ULC-S536 (Inspection and Testing of Fire Alarm Systems). For these systems the owner or contractor shall provide written confirmation of testing at the initial inspection, and confirmation of annual testing shall be available to an inspector upon request.

NOTE(S):

1. (2.27.3.2.2(a) (b) and (c) ): Smoke and heat detectors (fire alarm initiating devices) are referred to as fire detectors in the NBCC. Pull stations are not deemed to be fire detectors.
2. The installation or alteration of a fire alarm system, including dedicated function fire alarm systems require permits and installation by qualified personnel.
3. See 8.6.11.1 for notes related to DFFA testing.

**(ALTERATIONS ONLY)**

(d) for alterations **8.7.2.16, 8.7.3.17 (change in type of service)** and **8.7.2.27.6, 8.7.3.31.7 (operation control)**, that require conformance to 2.27,

- (1) requirements 2.27.3.2.2(a)(1), 2.27.3.2.2(a)(2) and 2.27.3.2.2(c) do not apply within a floor area if the floor area is sprinklered and the sprinkler system is electrically supervised in conformance with O. Reg. ~~332/12 350/06~~ Sentence ~~3.2.4.10.(2) 3.2.4.9.(2)~~. The activation of the electrically supervised system shall cause automatic recall.
- (2) requirements 2.27.3.2.2(a)(3) does not apply.

(e) for alterations **8.7.2.27.4 and 8.7.3.31.5 (controllers)**, if firefighters' emergency operation was required or provided at the time of the original installation, or required or provided by a subsequent alteration,

the requirements of (1) below apply, otherwise the requirements of (2) below apply:

- (1) requirements, 2.27.3.2.2(a), 2.27.3.2.2(b) and 2.27.3.2.2(c)
- (2) the installation shall as a minimum conform to the requirements of 2.27.3.1 (manual recall), unless the introductory exemption in 2.27.3 applies.

(f) for alterations **8.7.2.27.5 and 8.7.3.31.6 (motion control)**, emergency operation and signaling devices where required by NBCC at the time of the original installation, or required or provided by a subsequent alteration,

the requirements of (1) below apply, otherwise the requirements of (2) below apply:

- (1) requirements of 2.27.3.2.2(a), 2.27.3.2.2(b) and 2.27.3.2.2(c)
- (2) the installation shall as a minimum conform to the requirements of 2.27.3.1 (manual recall), unless the introductory exemption in 2.27.3 applies.

(g) for alterations under **8.7.2.28** or **8.7.3.31.8 (emergency operation and signaling devices)** or **8.7.2.28★2** or **8.7.3.31★9 (fire code retrofit)** that require conformance to all or part of 2.27 the requirements of 2.27.3.2.2(a), 2.27.3.2.2(b) and 2.27.3.2.2(c) apply.

(h) In all cases the level of activation shall not be diminished per 8.7.1.2.

- (13) The opening requirement of **3.7** – Machinery Spaces, Machine Rooms, Control Spaces and Control Rooms, is revoked and the following substituted:

A machinery space outside the hoistway containing a hydraulic machine and a motor controller shall be a machine room, or a machinery space with headroom of not less than 2130 mm(84”).

- (14) Requirement **5.2.1.4.4** – Alternative to Top Car Clearance Requirement, is adopted for new and existing buildings

- (15) Requirement **5.2.1.14** is supplemented with the following:

(n) where conformance to 2.14.1.7 is required, the provisions of 2.10.2.1 or 2.14.1.7.5 are permitted for new installations.



(16) Requirement 5.2.1.15.2 is revoked and the following substituted: (166/01)

**5.2.1.15.2 Platform Guards.**

(a) Requirement 2.15.9.2 applies to LU/LA elevators that utilize traction drives and that serve 3 or more floors.

(b) Requirement 2.15.9.2 does not apply to LU/LA elevators utilizing hydraulic or roped hydraulic drive and serving 2 or more floors, provided that the following requirements are met:

(1) The platform guard shall have a straight vertical face, extending below the floor surface of the platform of not less than the depth of the unlocking zone plus 75 mm (3 in.) but in no case less than the maximum distance from the landing that it takes to stop 165 and hold the car upon detection and actuation of the device as prescribed in 2.19.2.

(2) Owners of LULA elevators shall complete and sign a SUPPLEMENTARY OWNERS REPORT FOR LULA ELEVATORS indicating their understanding that:

- (i) *only elevator personnel are permitted to unlock hoistway doors*
- (ii) *only emergency personnel are permitted to perform emergency evacuations.*
- (iii) *access to the unlocking device is controlled or has a controlled procedure*
- (iv) *owners shall ensure the appropriate building personnel are made aware of these requirements*

(3) Signage shall be provided on the apron plate that meets the following criteria:

- (i) *lettering shall be a minimum of 16 mm in height*
- (ii) *the sign shall remain permanent and readily legible, viewable from the hall*
- (iii) *the Context of the message shall convey the following information:*
  - (a) *a 'warning' advising of the potential fall hazard that exists below when the car is above the floor level*
  - (b) *lower the car prior to attempting rescue of trapped passengers*
  - (c) *lowering and Rescue by trained personnel only.*

(17) Requirement 5.2.1.16.5 - Maximum Rise limitation for LULA elevators is not adopted;

(18) Sections 5.3, 8.6.7.3 and 8.7.5.3 – Private Residence Elevators, are not adopted;

(19) Sections 5.4, 8.6.7.4 and 8.7.5.4 – Private Residence Inclined Elevators, are not adopted;

(20) Sections 5.7, 8.6.7.7 and 8.7.5.7 – Special Purpose Personnel Elevators, are not adopted;

(21) Sections 5.8, 8.6.7.8 and 8.7.5.8 – Marine Elevators, are not adopted;

(22) Sections 5.9, 8.6.7.9 and 8.7.5.9 – Mine Elevators, are not adopted;

(23) Section 5.10 "Elevators Used for Construction" is adopted with the following modifications:

a) "Elevators Used for Construction" shall have the same meaning as "temporary elevator" used in Ontario Regulation 209/01;

b) 5.10.1.9.5(a) is not adopted,

c) 5.10.1.9.5(b) is revoked and the following substituted:

**5.10.1.9.5(b)**

- (b) **regardless of car speed**, hoistway doors shall be provided with either of the following:
  - (1) interlocks conforming to 2.12.2
  - (2) combination mechanical locks and electric contacts conforming to 2.12.3

(24) Requirement 6.1.6.3.1(a) is supplemented with the following:

Additionally, escalator operation in accordance with Section 5.5.2 of NFPA 130, Standard for Fixed Guideway Transit and Passenger Rail Systems (2010 Edition), shall be permitted for transit facilities.

(25) “Material lift – type B” shall mean the same as the term “freight platform lift – type B” used in Ontario Regulation 209/01;

(26) Requirement 7.4.2.2 is revoked and the following substituted: (48/87) (189/05)

**7.4.2.2**

Type B Material Lifts shall be permitted to carry one operator and be provided with in-car mounted operating devices, subject to the following limitations:

- (a) Access to and usage of Type B Material Lifts is restricted to authorized personnel.
- (b) The rated speed is not to exceed 0.15 m/s (30 ft/min).
- (c) **not adopted**
- (d) Travel does not exceed **7 600 mm (300 in.)**.
- (e) They are operated only by continuous-pressure control devices.
- (f) They shall not be accessible to the general public.
- (g) The upper limit of travel shall be
  - (1) level with the **top** penetrated floor; or
  - (2) level with the top landing where no floor is penetrated.
- (h) They are permitted to serve one or more intermediate landings, provided that these landings have doors as required in 7.4.14.

(27) Requirement 7.4.14.8 is added:

**7.4.14.8**

**Requirement 2.12.3 applies only to Type A Material Lifts.**

(28) Requirement 7.5.12.2.6 is revoked and the following substituted:

**7.5.12.2.6**

Requirement 2.26.2.5 does not apply. Each control station shall be provided with an emergency stop switch (switches) conforming to 2.26.2.5(a), (b), and (c), **except that the emergency stop switch located at each landing may be of a constant-pressure type.** And it shall cause the power to be removed from the driving machine when operated.

(29) Sections 7.8 to 7.11 – Dumbwaiters and Material Lifts with Automatic Transfer Devices, that meet the requirements as specified in item **2(3)(j)** of the Elevating Device Regulation 209/01, are not adopted;

(30) The requirements of Section **8.6**. Maintenance, Repair, Replacement and Testing is adopted as modified and clarified in **3.3** of the Code Adoption Document;

(31) The requirements of Section **8.7** – Alterations, is adopted, as modified and clarified in **3.4** of the Code Adoption Document;

- (32) Section 8.7.7.3 Material Lifts and Dumbwaiters with Automatic Transfer Devices, is not adopted, except 8.7.7.3.2 is adopted;
- (33) Section 8.9 – Code Data Plate, is adopted except that the requirements shall not apply to the existing devices installed or altered to versions of the B44 Code earlier than B44-00;
- (34) Section 8.11 - Periodic Inspection and Test Requirements are not adopted.

### 3.2 Performance Based Safety Code

3.2.1 Where conformance with the prescriptive requirements in 3.1 are not strictly met, conformance may be demonstrated through compliance to the requirements in ASME A17.7-2007/CSA B44.7-07 Performance-based safety code for elevators and escalators.

### 3.3 Maintenance, Repair, Replacement, and Testing

- 3.3.1 A Maintenance Control Program (MCP) referred to in the code adopted in 3.1 shall have the same meaning as “general instructions for maintenance” referred to in O.Reg 209/01 s.25.(2)
- 3.3.2 A copy of the Maintenance Control Program shall be provided for every new elevating device installation as required in O. Reg. 209/01, s.15.(4)(c) ,where a Maintenance Control Program has been implemented.
  - (a) For new installations for which a design submission is received on or after May 1, 2013 the Maintenance Control Program shall be available to the inspector at the time of the acceptance inspection, and a copy shall be forwarded to the elevating devices program prior to the inspection. Where appropriate, versions of MCP’s may be filed with the director.
  - (b) For existing or altered installations the Maintenance Control Program shall be fully implemented not later than March 31, 2014. [CAD Amendment-261-13r1]
- 3.3.3 Where a Maintenance Control Program has been implemented on an existing device, a copy of the Maintenance Control Program (MCP) shall be supplied to the owner of the elevating device.
- 3.3.4 Section 8.6 Maintenance, Repair, Replacement, and Testing is revoked and the following substituted;

#### 8.6 MAINTENANCE, REPAIR, REPLACEMENT, AND TESTING

Requirement 8.6 applies to maintenance, repairs, replacements, and testing.

Maintenance, repair and replacement shall be performed to provide compliance with the code applicable at the time of installation or alteration.

##### NOTES:

- (1) See 8.7 for alteration requirements.
- (2) See “General” in Preface for assignment of responsibilities.

#### 8.6.1 General Requirements

##### 8.6.1.1 Maintenance, Repair, and Replacement

8.6.1.1.1 Equipment covered within the scope of this Code shall be maintained in accordance with

- (a) 8.6. and an established Maintenance Control Program including any requirements specified in the Code Adoption Document, or
- (b) 8.6.1, 8.6.2, 8.6.3, 8.6.11 and the supplemental maintenance requirements and intervals specified in CSA standard B44.2-07 Maintenance requirements and intervals for elevators, dumbwaiters, escalators, and moving walks, including any requirements specified in the Code Adoption Document.

Requirement (a) is applicable for

- (1) new installations submitted on or after May 1, 2013,
- (2) any existing devices where an Maintenance Control Program has been implemented, and
- (3) all devices maintained after March 31, 2014. [CAD Amendment-261-13]

Requirement (b) is applicable until March 31, 2014 for

- (1) existing installations, or
- (2) new installations submitted prior to May 1, 2013. [CAD Amendment-261-13r1]

**8.6.1.1.2** Maintenance, repairs, replacements, and tests shall conform to 8.6 and the applicable

- (a) Code at the time of the installation; and
- (b) Code requirements at the time of any alteration; and
- (c) ASME A17.3 if adopted by the authority having jurisdiction

**8.6.1.1.3** It is not the intent of 8.6 to require changes to the equipment to meet the design, equipment nameplate(s) or performance standard other than those specified in 8.6.1.1.2, unless specifically stated in 8.6. (see 8.6.3.2, 8.6.5.8, 8.6.8.3 and 8.6.8.4.3).

### **8.6.1.2 General Maintenance Requirements**

**8.6.1.2.1** A written Maintenance Control Program where implemented shall be in place to maintain the equipment in compliance with the requirements of 8.6 and the following, otherwise the requirements of 8.6.1.1.1(b) apply.

The MCP shall specify examinations, tests, cleaning, lubrication, and adjustments to applicable components at regular intervals (see definition for maintenance) and shall comply with the following:

- (a) A Maintenance Control Program for each unit (see 8.6.1.1.1) shall be provided by the person(s) and/or firm maintaining the equipment and shall be viewable on site by elevator personnel at all times from time of acceptance inspection and test or from the time of equipment installation or alteration (see 8.10.1.5).
- (b) The MCP shall include, but not be limited to, the code required maintenance tasks, maintenance procedures and examinations and tests listed with the associated requirement (see 8.6.4 to 8.6.11). Where maintenance tasks, maintenance procedures, or examinations or tests have been revised in 8.6 the MCP shall be updated.
- (c) The MCP shall reference On-Site Equipment Documentation (see 8.6.1.2.2) needed to fulfill 8.6.1.2.1(b) and On-Site Maintenance Records (see 8.6.1.4.1) that record the completion of all associated maintenance tasks specified in 8.6.1.4.1(a).
- (d) Where the MCP is maintained remotely from the machine room, machinery space, control room, or control space (see 8.11.1.8) instructions for on-site locating or viewing the MCP either in hard copy or in electronic format shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The instructions shall be permanently legible with characters a minimum of 3mm (0.125in) in height.
- (e) In addition to s. 32(1) of the Regulation, the specified scheduled maintenance intervals (see 1.3) shall, as applicable, be based on
  - (1) equipment age, condition, and accumulated wear ,
  - (2) design and inherent quality of the equipment ,
  - (3) usage,
  - (4) environmental conditions,
  - (5) improved technology,
  - (6) the manufacturer's recommendations and original equipment certification for any SIL rated devices or circuits (see 8.6.3.12 and 8.7.1.9), and

- (7) the manufacturer's recommendations based on any A17.7/B44.7 approved components or functions.
- (f) Procedures for tests, periodic inspections, maintenance, replacements, adjustments, and repairs for traction-loss detection means, broken-suspension-member detection means, residual-strength detection means, and related circuits shall be incorporated into and made part of the Maintenance Control Program.  
[See 2.20.8.1, 2.20.8.2, 2.20.8.3, 8.6.11.10, 8.10.2.2.2(cc)(3)(c)(2), 8.10.2.2.2(ss), and 8.6.4.19.12.]
- (g) The manufacturer's or installer's procedures for tests, periodic inspections, maintenance, replacements, adjustments, and alterations repairs, of SIL Rated Device(s) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), and 2.26.9.6.1(b) shall be incorporated into the Maintenance Control Program. (ref TN 08-802)

**8.6.1.2.2 On-Site Documentation**

The following documents specified in 8.6.1.2.2 (a), (b), and (c) shall be written and permanently kept on-site in the machine room, machinery space, control room, control space, or in the means necessary for test (2.7.6.4) in hard copy for each unit for elevator personnel.

The documentation specified in 8.6.1.2.2(d) shall be on-site and available to the specified personnel.

- (a) Up-to-date wiring diagrams detailing circuits of all electrical protective devices (see 2.26.2) and critical operating circuits (see 2.26.3).
- (b) Procedures for inspections and tests not described in A17.2 and procedures or methods required for elevator personnel to perform maintenance, repairs, replacements and adjustments, as follows:
  - (1) all procedures specifically identified in the code as required to be written (e.g. 8.6.4.20.8 check out procedure for leveling, 8.6.5.16.5 check out procedure for over speed valve, and 8.6.8.15.7 check out procedure for reversal stop switch, etc),
  - (2) unique maintenance procedures or methods required for inspection, tests, and replacement of SIL rated E/E/PES electrical protective devices and circuits (see 2.26.4.3.2, 2.26.9.3.2(b), 2.26.9.5.1(b), and 2.26.9.6.1(b)),
  - (3) unique maintenance procedures or methods required for inspection, tests, and replacement of equipment applied under alternative arrangements (see 1.2.2.1) shall be provided by the manufacturer or installer, and
  - (4) unique maintenance procedures or unique methods required for inspection and test of equipment specified in an A17.7/B44.7 Code Compliance Document (CCD).
- (c) Written checkout procedures:
  - (1) to demonstrate E/E/PES function as intended (see 8.6.4.19.10),
  - (2) for elevator leveling speed with open doors (see 8.6.4.20.8),
  - (3) for hydraulic elevator over speed valve (see 8.6.5.16.5),
  - (4) for escalator reversal stopping device (see 8.6.8.15.7), and
  - (5) for escalator handrail retarding force (see 8.6.8.15.13).
- (d) Written procedures for the following:
  - (1) evacuation procedures for elevators by authorized persons and emergency personnel shall be available on site. (see 8.6.11.5.2 and A17.4)
  - (2) the procedure for cleaning of a car and hoistway transparent enclosures by authorized persons. (see 8.6.11.4.2)

**8.6.1.2.3** Where a defective part directly affecting the safety of the operation is identified, the equipment shall be taken out of service until the defective part has been adjusted, repaired, or replaced.

### 8.6.1.3 Maintenance Personnel.

Maintenance, repairs, replacements, and tests shall be performed only by elevator personnel (see 1.3).

### 8.6.1.4 Log Book of Maintenance Records

Maintenance records shall document compliance with 8.6. Instructions for locating the maintenance records of each unit, for viewing on site, shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) in height. These records shall be retained for the most recent 5 years or from the date of installation or adoption of this code edition, whichever is less or as specified by the authority having jurisdiction. Existing maintenance records up to 5 years shall be retained.

#### 8.6.1.4.1 On-Site Maintenance Records

##### 8.6.1.4.1(a) Maintenance Control Program Records

- (1) A record that shall include the maintenance tasks listed with the associated requirements of 8.6 identified in the Maintenance Control Program (8.6.1.2.1), other tests (see 8.6.1.2.2), examinations and adjustments, and the specified scheduled intervals shall be maintained.
- (2) The specified scheduled maintenance intervals (see 1.3) shall, as applicable, be based on the criteria given in 8.6.1.2.1(e).
- (3) MCP records shall be viewable on-site by elevator personnel in either hard copy or electronic format acceptable to the authority having jurisdiction and shall include but not limited to the following:
  - (a) site name and address,
  - (b) service provider (Contractor) name,
  - (c) conveyance identification (ID) (TSSA or MCCR installation number) and type,
  - (d) date of record,
  - (e) a description of the maintenance task, interval, and associated requirements of 8.6,
  - (f) indication of completion of maintenance task,
  - (g) year and month when the task was performed,
  - (h) Contractor's Registration Number, and
  - (i) the printed name, signature and mechanic certification number of the person(s) who completed the task, except that where tasks are not yet completed, or where a part directly affecting the safety of the operation is found to be defective, the record of the maintenance task shall not be signed off until the task is complete or the defect is adjusted repaired or replaced. (242/10)

Note [8.6.1.4.1(a)]: ~~Recommended format for documenting maintenance control program records can be found in non-mandatory Appendix Y. This is only an example format.~~ A specific maintenance control program that includes all maintenance needs is required for each unit.

##### 8.6.1.4.1 (b) Repair and Replacement Records

The repairs and replacements listed in paragraphs (1) and (2) below shall be recorded and shall be kept on-site for viewing by elevator personnel in either hard copy or electronic format. Instructions for locating the records of each unit for immediate viewing shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) in height. The record shall include an explanation of the repair or replacement, date, and name of person(s) and/or firm performing the task. The record of repairs and replacements shall be retained by the owner of the equipment for the most recent 5 years or from the date of installation or adoption of this code edition, whichever is less, or as specified by the authority having jurisdiction and shall be a permanent record for the installation. These records may be kept remotely from the site.

- (1) Repairs (8.6.2.1- 8.6.2.5) including repairs of components and devices listed in 8.6.4, 8.6.5, 8.6.6, 8.6.7, 8.6.8, 8.6.9, and 8.6.10.

- (2) Replacements (8.6.3.1 - 8.6.3.11 except 8.6.3.7 and 8.6.3.10) including replacements of components and devices listed in 8.6.4, 8.6.5, 8.6.6, 8.6.7, 8.6.8, 8.6.9, and 8.6.10.

#### **8.6.1.4.1 (c) Other Records**

The written records listed in paragraphs (1) to(4) below shall be kept on-site for each unit. Instructions for locating the records of each unit for immediate viewing shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) in height. These records shall be retained for the most recent 5 years from of the date of installation or adoption of this code edition, whichever is less, or as specified by the authority having jurisdiction. The record shall include the date and name of person(s) and/or firm performing the task.

- (1) A record of oil usage (8.6.5.7).
- (2) A record of findings for firefighter’s service operation required by 8.6.11.1 with identification of the person(s) that performed the operation.
- (3) Periodic tests (see 8.6.1.7) shall be documented or recorded in accordance with 8.6.1.7.2.
- (4) Written record to document compliance with replacement criteria specified in ASME A17.6 requirement 1.10.1.1(c).

#### **8.6.1.4.1 (d) Acceptance Tests**

A permanent record of the results of all Acceptance tests as required by 8.10.1.1.4 and 8.10.1.1.5 shall be kept with the on-site records.

#### **8.6.1.4.2 Call Backs (Trouble Calls)**

A record of call backs shall be maintained and shall include the description of reported trouble, dates, time and corrective action(s) taken that are reported by any means to elevator personnel. These records shall be made available to elevator personnel when performing corrective action. For elevator personnel other than personnel performing the corrective action, records will be available upon request **and shall be maintained for a minimum of one year**. Instructions on how to report any need for corrective action (trouble calls) to the responsible party shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The instructions shall be permanently legible with characters a minimum of 3mm (0.125 in.) in height.

#### **8.6.1.5 Code Data Plate**

~~8.6.1.5.1 The Code data plate shall comply with 8.9.~~

#### **8.6.1.6 General Maintenance Methods and Procedures**

##### **8.6.1.6.1 Making Safety Devices Inoperative or Ineffective.**

No person shall at any time make inoperative or ineffective any device on which safety of users is dependent, including any electrical protective device, except where necessary during tests, inspections (see 8.10 and 8.11), maintenance, repair, and replacement, provided that the installation is first removed from normal operation. Such devices shall be restored to their normal operating condition in conformity with the applicable requirements prior to returning the equipment to service (see 2.26.7 and 8.6.1.6).

##### **8.6.1.6.2 Lubrication.**

All parts of the machinery and equipment requiring lubrication shall be lubricated with lubricants equivalent to the type and grade recommended by the manufacturer. Alternative lubricants shall be permitted when intended lubrication effects are achieved. All excess lubricant shall be cleaned from the equipment. Containers used to catch leakage shall not be allowed to overflow.

##### **8.6.1.6.3 Controllers and Wiring**

- (a) The interiors of controllers and their components shall be cleaned when necessary to minimize the accumulation of foreign matter that can interfere with the operation of the equipment.
- (b) Temporary wiring and insulators or blocks in the armatures or poles of magnetically operated switches, contactors, or relays on equipment in service are prohibited.

- (c) When jumpers are used during maintenance, repairs, or testing, all jumpers shall be removed and the equipment tested prior to returning it to service. Jumpers shall not be stored in machine rooms, control rooms, hoistways, machinery spaces, control spaces, escalator/moving walk wellways, or pits (see also 8.6.1.6.1).  
NOTE [8.6.1.6.3(d)]: See “Elevator Industry Field Employees’ Safety Handbook” for recommended minimum jumper control procedures.
- (d) Control and operating circuits and devices shall be maintained in compliance with applicable Code requirements (see 8.6.1.1.2).
- (e) Substitution of any wire or current-carrying device for the correct fuse or circuit breaker in an elevator circuit shall not be permitted.

**8.6.1.6.4 Painting.**

Care shall be used in the painting of the equipment to make certain that it does not interfere with the proper functioning of any component. Painted components shall be tested for proper operation upon completion of painting.

**8.6.1.6.5 Fire Extinguishers.**

In jurisdictions not enforcing NBCC, Class “ABC” fire extinguishers shall be provided in elevator electrical machine rooms, control rooms, and control spaces outside the hoistway intended for full bodily entry, and walk-in machinery and control rooms for escalators and moving walks; and they shall be located convenient to the access door.

**8.6.1.6.6 Workmanship.**

Care should be taken during operations such as torquing, drilling, cutting, and welding to ensure that no component of the assembly is damaged or weakened. Rotating parts shall be properly aligned.

**8.6.1.6.7 Signs and Data Plates.**

Required signs and data plates that are damaged or missing shall be repaired or replaced.

**8.6.1.7 Periodic Tests.**

The frequency of maintenance and tests shall conform to the following;

- (a) Where a Maintenance Control Program is in effect,
  - (1) the maintenance frequency shall be established as prescribed in 8.6, but in no case shall the interval between maintenance visits to an elevating device excluding wind tower elevators exceed three months, nor shall it exceed the manufacturer’s specified limit or other imposed limit which is less than three months (see CAD 2.9 for example of a one month limit), and
  - (2) testing shall be performed at intervals specified in Appendix N, such that;
    - (a) category 1 tests are performed annually,
    - (b) category 3 tests are performed every 3 years and
    - (c) category 5 tests are performed every 5 years.

(225/07-r3)

(b) Where the maintenance method follows B44.2-07

- (1) the maintenance frequency shall be established as prescribed in B44.2-07, but in no case shall the interval between maintenance visits extend beyond three months.
- (2) Where frequencies of maintenance, examinations or inspections identified in B44.2-07 are extended:
  - (a) the altered maintenance, examination and/or inspection frequencies must take into account the age and inherent quality of the equipment, the frequency and method of usage, and the recommendation(s) by either the original manufacturer, or manufacturer’s agent, or the maintaining contractor;
  - (b) the owner and maintenance contractor shall agree in writing to the altered maintenance, examination and/or inspection frequencies;



- (c) the log book shall either capture this agreement or make reference to another document where such an agreement is made;
- (d) a copy of the altered maintenance, examination and/or inspection frequency agreement shall be made available to TSSA upon request;
- (e) the interval between maintenance visits shall not exceed three (3) months;
- (f) the frequency of tests\*\* identified in B44.2 shall not be altered; and
- (g) despite the allowance to adjust maintenance, examination or inspection frequencies as stated above, the frequency of activities listed in B44.2-07 section 5.2.1 shall not be altered.

\*\*where the terms:

'operate'- (or equivalent thereof), such as "governors shall be operated by hand" or

'check'- (or equivalent thereof), such as "skirt switches shall be checked" are used, the frequency of these tests shall not be altered.

The frequency of periodic tests shall be established by the authority having jurisdiction as required by 8.11.1.3.

NOTE: Recommended intervals for periodic tests can be found in Non-mandatory Appendix N.

#### **8.6.1.7.1 Not adopted**

~~Periodic tests shall be witnessed by an inspector employed by the authority having jurisdiction or by a person authorized by the authority having jurisdiction. The inspector shall conform to the requirements in 8.11.1.1.~~

#### **8.6.1.7.2 Periodic Test Records**

A periodic test record for all periodic tests containing the applicable code requirement(s) and date(s) performed, and the name of the person or firm performing the test, shall be kept readily visible adjacent to or securely attached to the controller of each unit in the form of a **log book record** ~~metal tag~~ or other format designated by and acceptable to the authority having jurisdiction. If any of the alternative test methods contained in **8.6.4.20** were performed then the test **record tag** must indicate alternative testing was utilized for the applicable requirement.

**8.6.1.7.3** No person shall at any time make any required safety device or electrical protective device ineffective, except where necessary during tests. Such devices shall be restored to their normal operating condition in conformity with the applicable requirements prior to returning the equipment to service (see 2.26.7).

**8.6.1.7.4** All references to "Items" and "Parts" are to Items in A17.2.

### **8.6.2 Repairs**

See 8.6.2.1 through 8.6.2.5 for general requirements for repairs.

**8.6.2.1 Repair Parts.** Repairs shall be made with parts of at least equivalent material, strength, and design (see 8.6.3.1).

#### **8.6.2.2 Welding and Design.**

Welding and design of welding shall conform to 8.7.1.4 and 8.7.1.5.

#### **8.6.2.3 Repair of Speed Governors.**

Where a repair is made to a speed governor that affects the tripping linkage or speed adjustment mechanism, the governor shall be checked in conformance with 8.6.4.19.2. Where a repair is made to the governor jaws or associated parts that affect the pull-through force, the governor pull-through force shall be checked in conformance with 8.6.4.19.2(b). A test tag shall be attached, indicating the date the pull-through test was performed.

#### **8.6.2.4 Repair of Releasing Carrier.**

When a repair is made to a releasing carrier, the governor rope pull-out and pull-through forces shall be verified in conformance with **8.6.4.20.2(b)** ~~8.11.2.3.2(b)~~.

#### **8.6.2.5 Repair of Suspension and Compensating Means and Governor Ropes.**

Suspension and compensating members and governor ropes shall not be lengthened or repaired by splicing (see 8.7.2.21).

#### **8.6.2.6 Repairs involving SIL Rated Device(s)**

SIL Rated Device(s) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), and 2.26.9.6.1(b) shall:

- (a) not be repaired in the field
- (b) be permitted to be repaired in accordance with the provisions for repair where included in the listing/certification, and
- (c) shall not be affected by other repair(s) such that the listing/certification is invalidated.

### **8.6.3 Replacements**

#### **8.6.3.1 Replacement Parts.**

Replacements shall be made with parts of at least equivalent material, strength, and design.

#### **8.6.3.2 Replacement Suspension Means.**

Suspension means, compensation means, and governor ropes shall be replaced when they no longer conform to the requirements of ASME A17.6. Replacement of suspension means, compensation means, and governor ropes shall conform to the requirements of ASME A17.6 as stated in 8.6.3.2.1 through 8.6.3.2.3.

**8.6.3.2.1** For steel wire rope, ASME A17.6, Section 1.10 shall apply.

NOTE (8.6.3.2.1): See Non-mandatory Appendix T for inspection and replacement of steel wire ropes.

**8.6.3.2.2** For aramid fiber ropes, ASME A17.6, Section 2.9 shall apply.

**8.6.3.2.3** For noncircular elastomeric-coated steel suspension members, ASME A17.6, Section 3.7 shall apply.

#### **8.6.3.3 Replacement of Suspension-Means Fastenings and Hitch Plates.**

Replacement of suspension-means fastenings and hitch plates shall conform to the requirements in 8.6.3.3.1 through 8.6.3.3.5.

**8.6.3.3.1** When the suspension-means fastenings are replaced with an alternate means that conforms to 2.20.9, load-carrying ropes shall be in line with the shackle rod.

**8.6.3.3.2** Existing hitch plates that do not permit the load-carrying ropes to remain in line with the shackle rods shall have the replacement fastening staggered in the direction of travel of the elevator and counterweight, or the hitch plates shall be replaced.

**8.6.3.3.3** Replacement hitch plates shall conform to 2.15.13 and shall provide proper alignment of load carrying ropes and shackle rods.

**8.6.3.3.4** Replacement fastenings shall be permitted to be installed on the car only, the counterweight only, at either of the dead-end hitches, or at both attachment points.

**8.6.3.3.5** Rope fastenings at the drum connection of winding-drum machines shall comply with 8.6.4.10.2.

#### **8.6.3.4 Replacement of Governor or Safety Rope**

**8.6.3.4.1** Governor ropes shall be of the same size, material, and construction as the rope specified by the governor manufacturer, except that a rope of the same size but of different material or construction shall be permitted to be installed in conformance with 8.7.2.19.

**8.6.3.4.2** The replaced governor ropes shall comply with 2.18.5.

**8.6.3.4.3** After a governor rope is replaced, the governor pull-through force shall be checked as specified in 8.6.4.20.2(b). ~~8.11.2.3.2(b)~~.

**8.6.3.4.4** ~~A test tag indicating the~~ The date when the pull-through test was performed shall be ~~attached~~ recorded in the log book.

**8.6.3.4.5** The safety rope shall comply with 2.17.12.4 and 2.17.12.5.

**8.6.3.4.6** A new rope data tag conforming to 2.18.5.3 shall be installed at each rope replacement, and the date of the rope replacement shall be recorded in the maintenance records (8.6.1.4.1(b)(2)).

#### **8.6.3.5 Belts and Chains.**

If one belt or chain of a set is worn or stretched beyond that specified in the manufacturer's recommendation, or is damaged so as to require replacement, the entire set shall be replaced.

Sprockets and toothed sheaves shall also be replaced if worn beyond that specified in the manufacturer's recommendations.

#### **8.6.3.6 Replacement of Speed Governor.**

When a speed governor is replaced with a governor of the same make and model (see also 8.7.2.19), it shall conform to 2.18. When a releasing carrier is provided, it shall conform to 2.17.15. The governor rope shall be of the type and size specified by the governor manufacturer. The governor shall be checked in conformance with 8.6.4.20.2. ~~8.11.2.3.2~~. Drum-operated safeties that require continuous tension in the governor rope to achieve full safety application shall be checked as specified in 8.6.4.20.1 ~~8.11.2.3.1~~ and 8.7.2.19.

#### **8.6.3.7 Listed/Certified Devices**

**8.6.3.7.1** Where a listed/certified device is replaced, the replacement shall be subject to the applicable engineering or type test as specified in 8.3, or the requirements of CSA B44.1/ASME A17.5. Hoistway door interlocks, hoistway door combination mechanical lock and electric contact, and door or gate electric contact, shall conform to the type tests specified in 2.12.4.1. The device shall be labeled by the certifying organization (see 8.6.1.1). In jurisdictions not enforcing NBCC, door panels, frames, and entrances hardware shall be provided with the instructions required by 2.11.18.

**8.6.3.7.2** Where a component in a listed/certified device is replaced, the replacement component shall be subject to the requirements of the applicable edition of CSA B44.1/ASME A17.5 and/or the engineering or type test in 8.3. Hoistway door interlocks, hoistway door combination mechanical lock and electric contact, and door or gate electric contact, shall conform to the type tests specified in 2.12.4.1. The component shall be included in the original manufacturer's listed/certified device documentation or as a listed/certified replacement component (see 8.6.1.1). Each replacement component shall be plainly marked for identification in accordance with the certifying organization's procedures. In jurisdictions not enforcing NBCC, door panels, frames, and entrances hardware shall be provided with the instructions required by 2.11.18.

NOTE (8.6.3.7): Devices that may fall under this requirement are included but not limited to hoistway door locking devices and electric contacts, car door contacts and interlocks, hydraulic control valves, escalator steps, fire doors, and electrical equipment.

#### **8.6.3.8 Replacement of Door Reopening Device.**

Where a reopening device for power-operated car doors or gates is replaced (see also 8.7.2.13), the following requirements shall apply:

(a) The door closing force shall comply with the Code in effect at the time of the installation or alteration.

- (b) The kinetic energy shall comply with the Code in effect at the time of the installation or alteration.
- (c) When firefighters' emergency operation is provided, door reopening devices and door closing on Phase I and Phase II shall comply with the requirements applicable at the time of installation of the firefighters' emergency operation.

**8.6.3.9 Replacement of Releasing Carrier.**

Where a replacement is made to a releasing carrier, the governor rope pull-out and pull-through forces shall be verified in conformance with 8.6.4.20.2(b) ~~8.11.2.3.2(b)~~.

**8.6.3.10 Replacement of Hydraulic Jack, Plunger, Cylinder, Tanks, and Anticreep Leveling Device**

**8.6.3.10.1** A hydraulic jack replacement shall be classified as an alteration and shall comply with 8.7.3.23.1.

**8.6.3.10.2** A plunger replacement shall be classified as an alteration and shall comply with 8.7.3.23.2.

**8.6.3.10.3** A cylinder replacement shall be classified as an alteration and shall comply with 8.7.3.23.3.

**8.6.3.10.4** A tank replacement shall be classified as an alteration and shall comply with 8.7.3.29.

**8.6.3.10.5** An anticreep leveling device replacement shall be classified as an alteration and shall comply with 8.7.3.31.3.

**8.6.3.11 Replacement of Valves and Piping.**

- (a) Where any valves, piping, or fittings are replaced, replacements shall conform to 3.19. ~~with the exception of 3.19.4.6. Replacement control valves must conform to the Code under which it was installed.~~
- (b) Where any valve is replaced with a valve of the same make and model, the replacement shall conform to 3.19.
- (c) Where any control or overspeed valve is replaced with a valve of different make or model, the replacement shall be classified as an alteration and shall comply with 8.7.3.24.

**8.6.3.12 Runby and Clearances After Reropeing or Shortening.**

The minimum car and counterweight clearances specified in 2.4.6 and 2.4.9 shall be maintained when new suspension means are installed or when existing suspension means are shortened. The minimum clearances shall be maintained by any of the methods described in 8.6.3.12.1 through 8.6.3.12.3 (see 8.6.4.11). (see also CAD 2.4)

**8.6.3.12.1** Limit the length that the suspension means are shortened.

**8.6.3.12.2** Provide blocking at the car or counterweight strike plate. The blocking shall be of sufficient strength and secured in place to withstand the reactions of buffer engagement as specified in 8.2.3. If wood blocks are used to directly engage the buffer, a steel plate shall be fastened to the engaging surface or shall be located between that block and the next block to distribute the load upon buffer engagements.

**8.6.3.12.3** Provide blocking under the car or counterweight buffer or both of sufficient strength and secured in place to withstand the reactions of buffer engagement as described in 8.2.3.

**8.6.3.12.4** Provide the month and year the suspension means were first shortened. Appropriate data shall be recorded on the data tag (see 2.20.2.2.2).

**8.6.3.13 Replacement of Demarcation Lights**

Fluorescent lighting fixtures shall be permitted to be replaced by any type light source, except incandescent sources, and shall comply with all other applicable step demarcation lighting requirements under which the escalator was installed or altered.

**8.6.3.14 Replacements involving SIL Rated Device(s) (See 1.3)**

- (a) SIL Rated Device (see 1.3) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), or 2.26.9.6.1(b) shall not be affected by other replacement(s) such that the listing/certification is invalidated.

(b) Where a SIL Rated Device (see 1.3) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), or 2.26.9.6.1(b) is replaced, it shall be considered a replacement only when the replacement device is the original manufacturer's listed/certified SIL rated device or the original manufacturer's listed/certified SIL rated replacement device; otherwise it shall be considered an alteration (see 8.7.1.9(d)).

(c) Where a non-SIL Rated Device used to satisfy 2.26.4.3.1, 2.26.8.2, 2.26.9.4(a), 2.26.9.5.1(a), or 2.26.9.6.1(a) is replaced with SIL Rated Device, it shall be considered an alteration. (see 8.7.1.9(c)).

#### **8.6.3.15 to 8.6.3.24 Reserved**

#### **8.6.3.25 Replacement of Driving Machine (226/07)**

Where a driving machine is replaced it shall be considered an alteration and shall conform to the requirements of 8.7.2.25.1(a) except that:

(a) if the elevator controllers are pre-B44-00 and the installation had ascending car overspeed and unintended car movement protection existing

- (1) ascending car overspeed and unintended car movement protection shall be retained
- (2) the detection means are permitted to meet the requirements of B44-M90 clause 3.16 or later
- (3) the means shall require manual reset

(b) if the elevator controllers are pre-B44-00 and the installation had only ascending car overspeed protection existing

- (1) ascending car overspeed protection shall be retained
- (2) the addition of unintended car movement protection is permitted
- (3) the detection means are permitted to meet the requirements of B44-M90 clause 3.16 or later
- (3) the means shall require manual reset

(c) if the elevator controllers are pre-B44-00 and ascending car overspeed and unintended car movement protection was not previously existing

- (1) ascending car overspeed and unintended car movement protection shall be provided
- (2) the detection means are permitted to meet the requirements of B44-M90 clause 3.16 or later
- (3) the means shall require manual reset

#### **8.6.3.26 Replacement of Controller (226/07)**

Where an elevator controller is replaced it shall conform to the requirements specified in 8.7.2.27.4(a) or 8.7.3.31.5(a) whichever is applicable.

#### **8.6.3.27 Replacement of Anticreep Leveling Device (226/07)**

Where an anticreep leveling device is replaced it shall conform to 8.7.3.31.3.

### **8.6.4 Maintenance and Testing of Electric Elevators**

The maintenance and testing of electric elevators shall conform to 8.6.1 through 8.6.4.

#### **8.6.4.1 Suspension and Compensating Means**

**8.6.4.1.1** Suspension and compensating means shall be kept sufficiently clean so that they can be visually inspected.

Suspension Means shall be inspected at intervals not exceeding 12 months and replaced per the replacement criterion specified in A17.6 or B44.2.

**8.6.4.1.2** Steel wire ropes shall be lightly lubricated. Precautions shall be taken in lubricating suspension steel wire ropes to prevent the loss of traction. Lubrication shall be in accordance with instructions on the rope data tag [see 2.20.2.2.2(n)], if provided.

**8.6.4.1.3** Equal tension shall be maintained between individual suspension members in each set. ~~Suspension members are considered to be equally tensioned when the smallest tension measured is within 10% of the highest tension measured.~~ When suspension-member tension is checked or adjusted, an antirotation device conforming to the requirements of 2.20.9.8 shall be permitted.

Note: Suspension members are considered to be equally tensioned when the smallest tension measured is within 10% of the highest tension measured.

#### **8.6.4.2 Governor Wire Ropes**

**8.6.4.2.1** The ropes shall be kept clean.

**8.6.4.2.2** Governor wire ropes shall not be lubricated after installation. If lubricants have been applied to governor ropes, they shall be replaced, or the lubricant removed, and the governor and safety shall be tested as specified in 8.6.4.19.2(b) and 8.6.4.18.2.

#### **8.6.4.3 Lubrication of Guide Rails**

**8.6.4.3.1** The lubrication of guide rails shall be in accordance with the requirements on the crosshead data plate (see 2.17.16), where provided.

**8.6.4.3.2** Where a data plate is not provided, the lubrication of guide rails shall conform to the following:

- (a) Guide rails, except those of elevators equipped with roller or other types of guiding members not requiring lubrication, shall be kept lubricated.
- (b) Where sliding-type safeties are used, the guiderail lubricants, or prelubricated or impregnated guideshoe gibs, where used, shall be of a type recommended by the manufacturer of the safety (see 8.6.1.6.2. and 2.17.16).

**8.6.4.3.3** If lubricants other than those recommended by the manufacturer are used, a safety test conforming to 8.6.4.20.1 shall be made to demonstrate that the safety will function as required by 2.17.3.

**8.6.4.3.4** Rails shall be kept clean and free of lint and dirt accumulation and excessive lubricant. Means shall be provided at the base of the rails to collect excess lubricant.

**8.6.4.3.5** Rust-preventive compounds such as paint, mixtures of graphite and oil, and similar coatings shall not be applied to the guiding surfaces, unless recommended by the manufacturer of the safety. Once applied, the safety shall be checked as specified in 8.6.4.20.1.

#### **8.6.4.4 Oil Buffers**

**8.6.4.4.1** The oil level shall be maintained at the level indicated by the manufacturer. The grade of oil to be used shall be as indicated on the buffer marking plate, where required (see 2.22.4.10 and 2.22.4.11).

**8.6.4.4.2** Buffer plungers shall be kept clean and shall not be coated or painted with a substance that will interfere with their operation.

**8.6.4.4.3** Buffer oil shall not be stored in the pit or hoistway or on top of the car.

#### **8.6.4.5 Safety Mechanisms**

**8.6.4.5.1** Safety mechanisms shall be kept lubricated and free of rust, corrosion, and dirt that can interfere with the operation of the safety.

**8.6.4.5.2** The required clearance between the safety jaws and the rail shall be maintained.

#### **8.6.4.6 Brakes**

**8.6.4.6.1** The driving-machine brake shall be maintained to ensure proper operations, including, but not limited to the following:

- (a) residual pads (antimagnetic pads)
- (b) lining and running clearances
- (c) pins and levers
- (d) springs
- (e) sleeves and guide bushings
- (f) discs and drums
- (g) brake coil and plunger

**8.6.4.6.2** If any part of the driving machine brake is changed or adjusted that can affect the holding capacity or decelerating capacity of the brake when required (see 2.24.8.3), it shall be adjusted and checked by means that will verify its proper function and holding capacity. A test complying with 8.6.4.20.4 shall be performed.

**8.6.4.6.3** If any part of the emergency brake is changed or adjusted that can affect the holding capacity or decelerating capacity of the emergency brake when required (see 2.19.3), it shall be adjusted and checked by means that will verify its proper function and holding capacity.

**8.6.4.7 Cleaning of Hoistways and Pits**

**8.6.4.7.1** Hoistways and pits shall be kept free of dirt and rubbish and shall not be used for storage purposes.

**8.6.4.7.2** Landing blocks and pipe stands shall be permitted to be stored in the pit, provided that they do not interfere with the operation of the elevator and do not present a hazard for persons working in the pit.

**8.6.4.7.3** Pit access doors shall be kept closed and locked.

**8.6.4.7.4** Water and oil shall not be allowed to accumulate on pit floors.

**8.6.4.8 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms**

**8.6.4.8.1** Floors and machinery and control spaces shall be kept free of water, dirt, rubbish, oil, and grease.

**8.6.4.8.2** Articles or materials not necessary for the maintenance or operation of the elevator shall not be stored in machinery spaces, machine rooms, control spaces, and control rooms.

**8.6.4.8.3** Flammable liquids having a flashpoint of less than 44°C (110°F) shall not be kept in such rooms or spaces.

**8.6.4.8.4** Access doors shall be kept closed and locked.

**8.6.4.8.5** Machinery spaces and control spaces located in the hoistway shall not be used for storage purposes (see also 8.6.4.7.1).

**8.6.4.9 Cleaning of Top of Cars.**

The tops of cars shall be kept free of oil, water, dirt, and rubbish, and shall not be used for storing lubricants, spare parts, tools, or other items.

**8.6.4.10 Refastening or Resocketing of Car-Hoisting Ropes on Winding-Drum Machines**

**8.6.4.10.1 General.**

The hoisting ropes of elevators having winding-drum driving-machines with 1:1 roping, if of the babbitted rope socket type, shall be resocketed, or for other type of fastenings, replaced or moved on the rope to a point above the existing fastening at the car ends at intervals no longer than

- (a) 1 year, for machines located over the hoistway.
- (b) 2 years, for machines located below or at the side of the hoistway.

- (c) where auxiliary rope-fastening devices conforming to 2.20.10 are installed, refastening at the periods specified is not required, provided that, where such devices are installed, all hoisting ropes shall be refastened on the failure or indication of failure of any rope fastening.
- (d) where the elevator is equipped with a drum counterweight, the fastenings shall be examined for fatigue or damage at the socket. Where fatigue or damage is detected, the ropes shall be refastened in conformance with 8.6.4.10.2.

**8.6.4.10.2 Procedure.**

- (a) In resocketing babbitted rope sockets or replacing other types of fastenings, a sufficient length shall be cut from the end of the rope to remove damaged or fatigued portions. The fastenings shall conform to 2.20.9. Where the drum ends of the ropes extend beyond their clamps or sockets, means shall be provided to prevent the rope ends from coming out of the inside of the drum and to prevent interference with other parts of the machine.
- (b) the suspension wire ropes shall conform to 2.20.7.

**8.6.4.10.3 Tags.** A legible metal tag shall be securely attached to one of the wire rope fastenings after each resocketing or changing to other types of fastenings and shall bear the following information:

- (a) the name of the person or firm who performed the resocketing or changing of other types of fastenings and
  - (b) the date on which the rope was resocketed or other types of fastening changed
- The material and marking of the tags shall conform to 2.16.3.3, except that the height of the letters and figures shall be not less than 1.5 mm (0.0625 in.).

**8.6.4.11 Runby**

**8.6.4.11.1** The car and counterweight runby shall be permitted to be reduced (see 2.4.2), provided the car or counterweight does not strike the buffer, the top car clearances are not reduced below that required at the time of installation or alteration, and the final terminal stopping device is still operational (see also 8.6.3.3.3).

**8.6.4.11.2** Where spring-return oil buffers are provided and compression was permitted with the car at the terminals (see 2.4.2 and 2.22.4.8), the buffer compression shall not exceed 25% of the buffer stroke.

**8.6.4.12 Governors**

**8.6.4.12.1** Governors shall be examined to ensure that all seals are intact and manually operated to determine that all moving parts, including the rope-grip jaws and switches, operate freely.

**8.6.4.12.2** Governors, governor ropes, and all sheaves shall be free from contaminants or obstructions, or both, that interfere with operation or function, including the accumulation of rope lubricant or materials, or both, in the grooves of governors or sheaves.

**8.6.4.13 Door Systems**

**8.6.4.13.1 General.** All landing and car-door or gate mechanical and electrical components shall be maintained to ensure safe and proper operation **at an interval not exceeding 6 months**, including but not limited to, the following:

- (a) hoistway door interlocks or mechanical locks and electric contacts
- (b) car door electric contacts or car door interlocks, where required
- (c) door reopening devices
- (d) vision panels and grilles, where required
- (e) hoistway door unlocking devices and escutcheons
- (f) hangers, tracks, door rollers, up-thrusts, and door safety retainers, where required
- (g) astragals and resilient members, door space guards, and sight guards, where required
- (h) sills and bottom guides, fastenings, condition, and engagement
- (i) clutches, engaging vanes, retiring cams, and engaging rollers
- (j) interconnecting means
- (k) door closers, where required
- (l) means to restrict hoistway or car door opening ~~and expiration date for the alternate power source~~, where required.



#### **8.6.4.13.2 Kinetic Energy and Force Limitation for Automatic Closing, Horizontal Sliding Car and Hoistway Doors or Gates.**

Where a power-operated horizontally sliding door is closed by momentary pressure or by automatic means, the closing kinetic energy and closing force shall be maintained to conform to 2.13.4 and 2.13.5.

#### **8.6.4.14 Hoistway Access Switches.**

Hoistway access switches, where provided, shall be maintained.

#### **8.6.4.15 Car Emergency System.**

Emergency operation of signaling devices (see 2.27), lighting (see 2.14.7), communication (see 2.27.1.1.2, 2.27.1.1.3, and 2.27.1.2) and ventilation (see 2.14.2.3), shall be maintained. **Where a dedicated function fire alarm system has been added to comply with CAD requirement 2.27.3.2.2(c) the owner shall ensure that testing of the "Elevator Recall Control and Supervisory Control Unit" is performed annually.**

#### **8.6.4.16 Stopping Accuracy.**

The elevator shall be maintained to provide a stopping accuracy at the landings during normal operation as appropriate for the type of control, in accordance with applicable Code requirements.

#### **8.6.4.17 Ascending Car Overspeed and Unintended Car Movement Protection.**

Devices for ascending car overspeed and unintended car movement protection shall be maintained (see 2.19).

#### **8.6.4.18 Compensation Sheaves and Switches**

**8.6.4.18.1** Suspension and compensation means shall be maintained to prevent the compensation sheave from reaching the upper or lower limit of travel and to prevent unintended actuation of compensation sheave switch(es) during normal operation.

#### **8.6.4.19 Periodic Test Requirements — Category 1**

NOTE: For test frequency, see 8.11.1.3.

**8.6.4.19.1 Oil Buffers.** Car and counterweight buffers shall be tested to determine conformance with the applicable plunger return requirements (Item 5.9.2.1).

#### **8.6.4.19.2 Safeties**

(a) Examinations.

All working parts of car and counterweight safeties shall be examined to determine that they are in satisfactory operating condition and that they conform to the applicable requirements of 8.7.2.14 through 8.7.2.28 (see 2.17.10 and 2.17.11). Check the level of the oil in the oil buffer and the operation of the buffer compression-switch on Type C safeties.

(b) Tests.

Safeties shall be subjected to the following tests with no load in the car:

- (1) Type A, B, or C governor-operated safeties shall be operated by manually tripping the governor with the car operating at the slowest operating speed in the down direction. In this test, the safety shall bring the car to rest promptly. In the case of Type B safeties, the stopping distance is not required to conform to 2.17.3. In the case of Type C safeties, full oil buffer compression is not required. In the case of Type A, B, or C safeties employing rollers or dogs for application of the safety, the rollers or dogs are not required to operate their full travel (Item 2.29.2.1).
- (2) Governor-operated wood guide-rail safeties shall be tested by manually tripping the governor with the car at rest and moving the car in the down direction until it is brought to rest by the safety and the hoisting ropes slip on traction sheaves or become slack on winding drum sheaves (Item 2.29.2.(d)).

- (3) Type A and wood guide-rail safeties without governors which are operated as a result of the breaking or slackening of the hoisting ropes shall be tested by obtaining the necessary slack rope to cause it to function (Item 2.29.2.1).

#### **8.6.4.19.3 Governors.**

Governors shall be operated manually to determine that all parts, including those which impart the governor pull-through tension to the governor rope, operate freely [Item 2.13.2.1(a)].

#### **8.6.4.19.4 Slack-Rope Devices and Stop Motion Switch on Winding Drum Machines.**

Slack-rope devices on winding drum machines shall be operated manually and tested to determine conformance with the applicable requirements. The final terminal stopping device and the machine final (stop motion switch) shall be examined and tested by disabling the normal stopping device, normal terminal stopping device and final terminal stopping device located in the hoistway and operating the unit to verify proper operation. (Item 2.20)

#### **8.6.4.19.5 Normal and Final Terminal Stopping Devices.**

Normal and final terminal stopping devices shall be examined and tested to determine conformance with the applicable requirements (2.25) (Items 2.20, 2.28.2.1, 3.5.2.1 and 3.6.2.1).

#### **8.6.4.19.6 Firefighters' Emergency Operation.**

Firefighters' emergency operation (Phase I and II) shall be tested **annually to the requirements of 8.6.11.1.** **Additional testing may be performed** to determine conformance with the applicable requirements. Phase I recall shall be tested by individually activating fire alarm initiating device inputs to the elevator control, the three position switch at the designated landing and where provided, the two position switch at the building fire control station. (see Part 6 of A17.2)

#### **8.6.4.19.7 Standby or Emergency Power or Emergency Lowering Operation.**

Operation of elevators equipped with standby or emergency power shall be tested to determine conformance with the applicable requirements (Item 1.17.2.1). Tests shall be performed with no load in the car. **Elevators equipped with auxiliary power lowering shall be tested to ensure that they comply with 3.26.10 of ASME A17.1/CSA B44. The main disconnect switch auxiliary contact shall be tested to ensure compliance with Section 38 of the Canadian Electrical Code, Part I.**

#### **8.6.4.19.8 Power Operation of Door System.**

The closing forces and speed of power-operated hoistway door systems shall be tested to determine conformance with the applicable requirements (Item 1.8.1). For elevators required to comply with 2.13.4.2.4, the time in the door Code zone distance shall be measured and compared with the time specified on the data plate.

#### **8.6.4.19.9 Broken Rope, Tape, or Chain Switch.**

Where a rope, tape, or chain is used to connect the motion of the car to the machine room normal limit, the switch that senses failure of this connection shall be tested for compliance with 2.26.2.6 (Item 3.26.1.1).

#### **8.6.4.19.10 Functional Safety of SIL Rated Devices.**

Verify SIL Rated Device(s) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.3.2(b), 2.26.9.5.1(b), and 2.26.9.6.1(b) are as identified on wiring diagrams (8.6.1.6.3) with part identification, SIL, and certification identification information.

The person or firm maintaining the equipment shall provide a written checkout procedure and demonstrate that SIL Rated Devices, Safety Functions (see table 2.26.4.3.2), and related circuits operate as intended.

#### **8.6.4.19.11 Ascending Car Overspeed Protection and Unintended Car Movement Devices**

(a) **Examinations.** All working parts of ascending car overspeed protection and unintended car movement devices shall be examined to determine that they are in satisfactory operating condition and that they conform to the applicable requirements of 2.19.1.2(a) and 2.19.2.2(a).

- (b) **Tests.** Ascending car overspeed protection shall be subjected to tests to demonstrate compliance with 2.19.1 with no load in the car at the slowest operating speed (inspection speed) in the up direction.
- (c) **Tests.** Unintended car movement shall be subjected to tests with no load in the car. Testing shall confirm compliance with 2.19.2 due to an elevator rollaway caused by a brake and releveling failure. ~~at the slowest operating speed in the up direction.~~

**8.6.4.19.12 Traction-Loss Detection Means.**

Where provided, conformance with the traction-loss detection means specified in 2.20.8.1 shall be demonstrated by

- (a) causing relative motion between the drive sheave and the suspension means either by bottoming the car or counterweight [see 8.6.4.20.10(b)], or
- (b) an alternative test provided in the Maintenance Control Program [see 8.6.1.2.1(f)]

**8.6.4.19.13 Broken-Suspension-Member and Residual-Strength Detection Means**

Where provided, testing of broken-suspension and residual-strength detection means shall comply with the following:

- (a) The broken-suspension-member detection means shall be tested by simulating a slack suspension member or a loss of a suspension member as appropriate (see 2.20.8.2).
- (b) Suspension-member residual-strength detection means shall be tested to simulate a reduction of residual strength to 2.20.8.3.

**8.6.4.19.14 Occupant Evacuation Operation.**

Occupant Evacuation Operation shall be tested to determine conformance with the applicable requirements. Deficiencies shall be corrected. A record of findings shall be available to the building owner and the authority having jurisdiction.

**8.6.4.19. 15 Emergency Communications**

Emergency Communications shall be tested to determine conformance with the applicable requirements (Item 1.6)

**8.6.4.19. 16 Means to Restrict Hoistway or Car Door Opening**

Means to restrict hoistway or car door opening shall be tested to determine conformance with the applicable requirements (Item 1.18)

**8.6.4.19.17 to 8.6.4.19.24 Reserved**

**8.6.4.19.25 Driving Machine Brakes**

Testing shall be performed to ensure that the car decelerates from the rated speed when power is removed from the driving machine and brakes while empty and travelling upward at the rated speed. Any rate of deceleration shall be considered acceptable. A means other than the disconnect switch should be used to remove the power.

For new installations and where the annual testing per 8.6.4.19.25 occurs after the first five year load test conducted under 8.6.4.20.4 or 8.6.4.20.10, the following additional actions are required. [Note: Successful demonstration of 8.6.4.20.4 and 8.6.4.20.10 testing confirms proper adjustment of the driving machine brake.]

- (a) Marking plates for brakes (see 2.24.8.5) shall be checked and modified where necessary to reflect a brake setting method which specifies either;
  - (1) the required no load torque for both the clockwise and counter clockwise directions,
  - (2) the no load braking slide distance associated with the car travelling in the up direction or
  - (3) the requirements to test the driving machine brake annually with rated load, in which case a marking tag to indicate spring force shall be utilized / retained to provide an interim brake checking method.
- (b) Except as permitted in (a3), marking plates utilizing spring length or spring force shall be replaced.

- (c) Following the first five year load test, driving machine brakes shall be tested annually to ensure they are adjusted properly per the marking plate for brakes requirements.

#### **8.6.4.20 Periodic Test Requirements — Category 5**

NOTE: For test frequency, see 8.11.1.3.

Where category 5 tests require the use of load for testing purposes, alternative no load methods shall be permitted where the alternative method is acceptable to the Director.

##### **8.6.4.20.1 Car and Counterweight Safeties.**

Types A, B, and C car and counterweight safeties shall be tested in accordance with **8.6.4.20.1(a)** or subject to approval by the authority having jurisdiction with **8.6.4.20.1(b)**.

###### **(a) Rated Load and Rated Speed Test.**

Car safeties, except those operating on wood guide rails, and their governors, shall be tested with rated load in the car. Counterweight safety tests shall be made with no load in the car. Tests shall be made by tripping the governor by hand at the rated speed. The following operational conditions shall be checked (Item 2.29.2.):

- (1) Type B safeties shall stop the car with the rated load within the required range of stopping distances for which the governor is tripped (Item 2.29.2.) and the level of the platform checked for conformance to 2.17.9.2.
- (2) For Type A safeties and Type A safety parts of Type C safeties, there shall be sufficient travel of the safety rollers or dogs remaining after the test to bring the car and its rated load to rest on safety application at governor tripping speed. The level of the platform shall be checked for conformance to 2.17.9.2.

###### **(b) Alternative Test Method for Car Safeties.**

The alternative test methods shall comply with requirement 8.6.11.10, and the following:

- (1) The testing of safeties with any load in the car, centered on each quarter of the platform symmetrically with relation to the centerlines of the platform from no load up to rated load, and at not less than rated speed shall be permitted provided that,
  - a) when the alternative test is performed, the test shall stop the car and verify that the safeties will be capable of stopping an overspeeding car in accordance with the requirements of Section 2.17 applicable to the specific classification of safeties, and
  - b) when applied the method shall verify that the safeties perform or are capable of performing in compliance with 8.6.4.20.1(a) and the platform shall not be out of level more than 30 mm/m (0.36 in/ft) in any direction.

- (2) A test **record tag** as required in 8.6.1.7.2 shall be provided.

**Governor-operated wood guide-rail safeties shall be tested by tripping the governor by hand with the car at rest and moving the car in the down direction until it is brought to rest by the safety and the hoisting ropes slip on traction sheaves or become slack on winding drum sheaves (Item 2.29.2.). (Note: Aligns with 4.2.2.1 of B44.2-10)**

NOTE: To ensure that the safety will retard the car with the minimum assistance from the elevator driving machine and minimize the development of slack rope and fallback of the counterweight, the switch on the car operated by the car safety mechanism should, for the duration of the test, be temporarily adjusted to open as close as possible to the position at which the car safety mechanism is in the fully applied position.

##### **8.6.4.20.2 Governors**

- (a) The tripping speed of the governor and the speed at which the governor overspeed switch, where provided, operates shall be tested to determine conformance with the applicable requirements and the adjustable means shall be sealed (Item 2.13.2.1).

- (b) The governor rope pull-through and pull-out forces shall be tested to determine conformance with the applicable requirements, and the adjustment means shall be sealed (Item 2.13.2.1).
- (c) **not adopted** After these tests in jurisdictions enforcing NBCC, a metal tag indicating the date of the governor tests, together with the name of the person or firm that performed the tests, shall be attached to the governor in a permanent manner.

**8.6.4.20.3 Oil Buffers**

- (a) Car oil buffers shall be tested to determine conformance with the applicable requirements by running the car
  - (1) onto the buffer with rated load at rated speed, or
  - (2) subject to approval by the authority having jurisdiction, with
    - (a) any load, from no load up to rated load onto the buffer at rated speed when the requirements of 8.6.11.10 are complied with, provided that when applied the method verifies that the buffer performs or is capable of performing in compliance with 8.6.4.20.3(a), except as specified in **8.6.4.20.3(b)** and (c) (Item 5.9.2.1). or,
    - (b) onto the buffer with any load, from no load up to rated load, and at less than rated speed, when the requirements of 8.6.11.10 are complied with, provided that when applied the method verifies that the buffer performs or is capable of performing in compliance with 8.6.4.20.3(a),
- (b) For reduced stroke buffers, this test shall be made at the reduced striking speed permitted (Item 5.9.2.1).
- (c) This test is not required where a Type C safety is used (see 8.6.4.20.1).
- (d) In making these tests, the normal and emergency terminal stopping devices shall be made temporarily inoperative. The final terminal stopping devices shall remain operative and be temporarily relocated, if necessary, to permit compression of the buffer during the test.
- (e) After completion of the test, a metal tag, indicating the date of the test, together with the name of the person or firm who performed the test, shall be attached to the buffer [Item 5.3.2(b)].
- (f) Counterweight oil buffers shall be tested by running the counterweight onto its buffer at rated speed with no load in the car, except as specified in **8.6.4.20.3(b)** and (c) (Item 5.9.2.1), or at reduced speed if requirements of 8.6.11.10 are met.
- (g) A test **record tag** as required in 8.6.1.7.2 shall be provided.

**8.6.4.20.4 Driving Machine Brake(s).**

For passenger elevators and all freight elevators, the driving machine brake shall be tested for compliance with applicable requirements, in accordance with **8.6.4.20.4(a)** or subject to approval by the authority having jurisdiction with **8.6.4.20.4(b)**. For elevators installed under A17.1-2000/B44-00 and later editions, have the brake setting verified in accordance with the data on the brake marking plate.

Upon completion of the test, the means of adjusting the holding capacity shall be sealed to prevent changing the adjustment without breaking the seal. The seal shall bear or otherwise attach the identification of the person or firm that installed it. (See also 8.6.1.7.2 Periodic Test **Records Tags**).

- (a) Test with load per Table **8.6.4.20.4**.  
Place the load as shown in Table **8.6.4.20.4** in the car. The driving machine brake, on its own, shall hold the car with this load. With no load in the car the driving machine brake shall hold the empty car at rest, and shall decelerate an empty car traveling in the up direction from governor tripping speed. The driving machine brake on freight elevators of class C-2 loading, when loaded to their maximum design load shall hold the elevator car at rest (Item 2.17.2.1).
- (b) Alternative Test Method for Driving Machine Brakes.  
The alternative test methods shall comply with requirement 8.6.11.10, and the following:

- 1) Any method of verifying conformity of the driving-machine brake with the applicable Code requirements (see 2.24.8.3 and Table **8.6.4.20.4**) shall be permitted, including the testing method of the brakes with or without any load in the car, provided that when applied the method verifies that the brake performs or is capable of performing in compliance with 8.6.4.20.4(a) and shall include,
- 2) A test **record tag** as required in **8.6.1.7.2** shall be provided.

Upon completion of the test, the means of adjusting the holding capacity shall be sealed to prevent changing the adjustment without breaking the seal. The seal shall bear or otherwise attach the identification of the person or firm that installed it. (See also 8.6.1.7.2 Periodic Test **Record Tags**)

Freight elevators of Class C2 loading shall sustain and level the elevator car with the maximum load shown on the freight elevator loading sign (Item 2.17.2.1). (**Note: Aligns with 4.6.4 of B44.2-10**) For elevators installed under A17.1-2000/B44-00 and later editions, have the brake setting verified in accordance with the data on the brake marking plate.

**8.6.4.20.5 Reserved**

**8.6.4.20.5 Emergency and Standby Power Operation.**

**Not adopted. (see 8.6.4.19.5)**

Operation of elevators equipped with emergency or standby power shall be examined and tested for conformance with the applicable requirements (Item ~~2.17.2.1~~ 1.17.2.1).

**8.6.4.20.6 Emergency Terminal Stopping and Speed-Limiting Devices.**

Emergency terminal speed-limiting devices, where provided, shall be tested for conformance with applicable requirements (2.25.4; and Item 5.3.2.1). For static control elevators, emergency terminal stopping devices, when provided, shall be tested for conformance with applicable requirements (2.25.4) (Item 2.28.2.1).

**8.6.4.20.7 Power Opening of Doors.**

Determine that power opening of car and hoistway doors only occurs as permitted by the applicable requirements ~~when the car is at rest at the landing, or in the landing zone, except, in the case of static control, check that power shall not be applied until the car is within 300 mm (12 in.) of the landing~~ (Item 1.10.2).

**Table 8.6.4.20.4 Brake Test Loads**

Class of Service	Not Permitted to Carry Passengers	Permitted to Carry Passengers
Passenger	Not applicable	125% rated load
Freight	Rated load	125% rated load
One Piece Load by 2.16.7	Rated load or one piece load, whichever is greater	125% rated load or one piece load, whichever is greater

**8.6.4.20.8 Leveling Zone and Leveling Speed.**

Check that the leveling zone does not exceed the maximum allowable distance. Check that the leveling speed does not exceed 0.75 m/s (150 ft/min). For static control elevators, the person or firm installing or maintaining the equipment shall provide a written checkout procedure and demonstrate that the leveling speed with the doors open is limited to a maximum of 0.75 m/s (150 ft/min) and that the speed-limiting (or speed monitor) means is independent of the normal means of controlling this speed [Item 1.10.2(b)].

**8.6.4.20.9 Inner Landing Zone.**

For static control elevators, check that the zone in which the car can move with the doors open is not more than 75 mm (3 in.) above or below the landing (Item 1.10.2.1).

**8.6.4.20.10 Braking System, Traction and Traction Limits.**

Traction and traction limits on traction elevators shall be verified for compliance with 2.24.2.3 in accordance with **8.6.4.20.10(a)** or subject to approval by the authority having jurisdiction, with **8.6.4.20.10(b)**.

**(a) Dynamic Stopping Test.**

Traction elevators shall be tested to ensure that:

- (1) during an emergency stop initiated by any of the electrical protective device(s) listed in 2.26.2 (except 2.26.2.13), (except buffer switches for oil buffers used with Type C car safeties) at the rated speed in the down direction, with passenger elevators and freight elevators permitted to carry passengers carrying 125% of their rated load, or with freight elevators carrying their rated load, cars shall safely stop and hold the load (see 2.24.2.3.1, 2.24.2.3.2 and 2.24.2.3.3); and
- (2) if either the car or the counterweight bottoms on its buffers or becomes otherwise immovable, one of the following shall occur (see 2.24.2.3.4):
  - (a) the suspension means shall lose traction with respect to the drive sheave and not allow the car or counterweight to be raised; or
  - (b) the driving system shall stall and not allow the car or counterweight to be raised.
- (3) with a load in the car in accordance with Table 8.6.4.20.4, the braking system and traction relation shall be tested to show the system can safely stop and hold the car, and where required by 2.16.2.2.4(c) shall relever the car.

**(b) Alternative Test Method for Braking System, Traction and Traction Limits.**

Alternative test methods shall comply with requirement 8.6.11.10 and the following;

- (1) Other methods for verifying traction for compliance with 2.24.2.3, and traction limits in compliance with 2.24.2.3.4 shall be permitted provided the test method complies with the following:
  - (a) When applied, the method shall verify that the elevator traction system performs, or is capable of performing, in compliance with the performance requirements of 8.6.4.20.10(a); and
  - (b) The braking system and traction relation shall be tested to show the system can safely stop and hold the car, and where required by 2.16.2.2.4(c) shall relever the car without load in the car.
- (2) A test record tag as required in 8.6.1.7.2 shall be provided.

**8.6.4.20.11 Emergency Brake. (Note: Aligns with 4.29 of B44.2-10)**

For passenger elevators and all freight elevators, the emergency brake shall be tested at rated speed in the up direction with no load in the car for compliance with 2.19.3.2.

**8.6.4.21 Drive Sheaves With Nonmetallic Groove Surfaces and Steel Wire Ropes.**

Where steel wire ropes have worn through a nonmetallic drive-sheave groove surface and have not damaged the supporting sheave surface beneath the nonmetallic sheave groove surface, the groove surfaces shall be replaced and the steel wire ropes shall be inspected for conformance to the criteria of ASME A17.6, Section 1.10, and replaced, if necessary. Where the sheave-supporting surfaces have been damaged, the drive sheave shall also be replaced or repaired and the groove surfaces shall be replaced.

**8.6.4.22 Maintenance of Seismic Devices**

8.6.4.22.1 A seismic switch, where provided, shall be maintained in accordance with the manufacturer's recommendations.

8.6.4.22.2 The counterweight displacement switch components, where provided, shall be:

- a) maintained in accordance with the manufacturer's recommendations, and
- b) properly aligned and tensioned and kept free of dirt, debris and other contaminants that may interfere with proper operation.

**8.6.5 Maintenance and Testing of Hydraulic Elevators**

The maintenance and testing of hydraulic elevators shall conform to 8.6.1 through 8.6.3, and the applicable requirements of 8.6.4 and 8.6.5.

### **8.6.5.1 Pressure Tanks**

#### **8.6.5.1.1 Cleaning.**

Pressure tanks shall be thoroughly cleaned internally at least every 3 years and prior to the inspection and test required by 8.6.5.15.

#### **8.6.5.1.2 Level.**

The liquid level in pressure tanks should be maintained at about two-thirds of the capacity of the tank.

### **8.6.5.2 Piston Rods.**

Piston rods of roped-hydraulic elevators shall be thoroughly cleaned prior to the test required by 8.6.5.15.

### **8.6.5.3 Water-Hydraulic Plungers.**

Plungers of water-hydraulic elevators shall be thoroughly cleaned to remove any buildup of rust and scale prior to the test required by 8.6.5.15.

### **8.6.5.4 Tank Levels.**

The level of oil in the oil tanks shall be checked and, where necessary, adjusted to comply with the prescribed minimum and maximum level.

### **8.6.5.5 Gland Packings and Seals**

#### **8.6.5.5.1 Examination and Maintenance.**

Where pressure piping, valves, and cylinders use packing glands or seals, they shall be examined and maintained to prevent excessive loss of fluid. When a cylinder packing or seal or a pressure-piping seal is replaced, the integrity of the entire hydraulic system shall be verified by operating it at relief-valve pressure for not less than 15 sec.

#### **8.6.5.5.2 Collection of Oil Leakage.**

Oil leakage collected from each cylinder head seals or packing gland shall not exceed 19 L (5 gal) before removal. The container shall be covered and shall not be permitted to overflow.

### **8.6.5.6 Flexible Hoses and Fittings.**

Flexible hose and fittings assemblies installed between the check valve or control valve and the cylinder, and that are not equipped with an overspeed valve conforming to 3.19.4.7, shall be replaced not more than 6 years beyond the installation date. Existing hose assemblies that do not indicate an installation or replacement date shall be replaced. Replacements shall conform to 3.19.3.3.1(a) through (e) and 3.19.3.3.2.

### **8.6.5.7 Record of Oil Usage.**

#### **(a) Oil monitoring shall conform to 2.9 of the Code Adoption Document.**

For systems where the part of cylinder and/or piping is not exposed for visible examination, a written record shall be kept of the quantity of hydraulic fluid added to the system and emptied from leakage collection containers and pans. The written record shall be kept in the machine room.

#### **(b) When the quantity of hydraulic fluid loss cannot be accounted for, the test specified in 8.6.5.14.1 and 8.6.5.14.2 shall be made.**

### **8.6.5.8 Safety Bulkhead.**

**Not later than May 1, 2015**, hydraulic cylinders installed below ground shall conform to 3.18.3.4, or the elevator shall conform to 8.6.5.8(a) or 8.6.5.8(b):

- (a) the elevator shall be provided with car safeties conforming to 3.17.1 and guide rails, guide-rail supports, and fastenings conforming to 3.23.1; or
- (b) the elevator shall be provided with a plunger gripper conforming to 3.17.3. The plunger gripper shall grip the plunger when the applicable maximum governor tripping speed in Table 2.18.2.1 is achieved.



#### **8.6.5.9 Relief-Valve Setting.**

The relief-valve adjustment shall be examined to ensure that the seal is intact. If the relief-valve seal is not intact, tests shall be conducted in accordance with 8.6.5.14.1.

#### **8.6.5.10 Runby and Clearances After Reropeing or Shortening.**

The minimum car and counterweight clearances and runby shall be maintained in compliance with the applicable code when replacement suspension ropes are installed or when existing suspension ropes are shortened.

#### **8.6.5.11 Cylinder Corrosion Protection and Monitoring**

##### **8.6.5.11.1 Corrosion Protection Monitoring.**

Where monitored cylinder corrosion protection is required, the monitoring means shall be examined and maintained.

##### **8.6.5.11.2 Corrosion Protection Loss.**

If the monitoring means detects that loss of corrosion protection has occurred, the means of corrosion protection shall be repaired or replaced.

##### **8.6.5.12 Anticreep and Low Oil Protection.**

The anticreep function and low oil protection shall be maintained to operate in compliance with the applicable code.

##### **8.6.5.13 Overspeed Valve Setting.**

Overspeed valves shall be calibrated and maintained in accordance with the manufacturer's recommendations including replacement of the valve seals or entire valves at intervals specified.

All elevators provided with field adjustable overspeed valves shall have the adjustment means examined to ensure the seal is intact. If the overspeed adjustment seal is not intact, compliance with 8.6.5.16.5 shall be verified and a new seal shall be installed.

#### **8.6.5.14 Periodic Test Requirements — Category 1**

NOTE: For test frequency, see 8.11.1.3.

##### **8.6.5.14.1 Relief Valve Verification of Setting and System Pressure Test.**

The relief valve setting shall be tested to determine that it will bypass the full output of the pump before the pressure exceeds 150% of the working pressure. Once this is established, test the entire system to ensure that it will withstand this pressure. It shall be sealed if the relief valve setting is altered or if the seal is broken (Item 2.31).

##### **8.6.5.14.2 Hydraulic Cylinders and Pressure Piping.**

This test shall be performed after the relief valve setting and system pressure test in 8.6.5.14.1:

- (a) Cylinders and pressure piping that are exposed shall be visually examined.
- (b) Cylinders and pressure piping that are not exposed shall be tested for leakage, which cannot be accounted for by the visual examination in 8.6.5.14.2(a) (Item 2.36.2). The duration of the test shall be for a minimum of 15 min (Item 2.36.2).

##### **8.6.5.14.3 Additional Tests.**

The following tests shall also be performed:

- (a) Normal Terminal Stopping Devices (8.6.4.19.5) (Item 2.28)
  - (b) Governors (8.6.4.19.3) (Item 2.13)
  - (c) Safeties (8.6.4.19.2) (Item 2.9)
  - (d) Oil Buffers (8.6.4.19.1) (Items 3.29 and 5.8)
  - (e) Firefighters' Emergency Operation (8.6.4.19.6) (Items 6.3 and 6.4)
  - (f) Standby or Emergency Power Operation (8.6.4.19.7) (Item 1.17)
- NOTE: Absorption of regenerated power (2.26.10) does not apply to hydraulic elevators.
- (g) Power Operations of Door System (8.6.4.19.8) (Items 4.6 and 4.7)
  - (h) Emergency Terminal Speed-Limiting Device and Emergency Terminal Stopping Device (3.25.2) (Item 3.6.2.2)
  - (i) Low Oil Protection Operation (3.26.9) (Item 2.39.2)

#### **8.6.5.14.4 Flexible Hose and Fitting Assemblies.**

Flexible hose and fitting assemblies shall be tested at the relief valve setting pressure for a minimum of 30 s. Any signs of leakage, slippage of hose fittings, damage to outer hose covering sufficient to expose reinforcement, or bulging, or distortions of the hose body is cause for replacement.

CAUTION: If the motor protection or motor overloads trip during this test, DO NOT change the adjustment or jumper the overloads. Damage to the motor can result from running the motor without adequate overload protection.

#### **8.6.5.14.5 Pressure Switch.**

The pressure switch and its related circuits shall be tested for conformance with applicable requirements (3.26.8) (Item 2.37).

#### **8.6.5.14.6 Power Operation of Door System.**

The closing forces and speed of power-operated hoistway door systems shall be tested to determine conformance with the applicable requirements (Item 1.8.2). For elevators required to comply with 2.13.4.2.4, the time in the door Code zone distance shall be measured and compared with the time specified on the data plate.

#### **8.6.5.14.7 Slack-Rope Device.**

The slack-rope device shall be tested on a roped hydraulic elevator by causing a slack-rope condition to occur and verify that it will remove power in compliance with 3.18.1.2.5 (Item 3.31.2).

#### **8.6.5.14.8 Plunger Gripper**

A plunger gripper, where provided, shall be examined and tested per 8.10.3.2.5(n), except testing is permitted to be performed without rated load.

#### **8.6.5.15 Periodic Test Requirements — Category 3**

NOTE: For test frequency, see 8.11.1.3.

##### **8.6.5.15.1 Unexposed Portions of Pistons.**

Piston rods of roped water-hydraulic elevators shall be exposed, thoroughly cleaned, and examined for wear or corrosion. The piston rods shall be replaced if at any place the diameter is less than the root diameter of the threads (Item 5.11).

##### **8.6.5.15.2 Pressure Vessels.**

Pressure vessels shall be checked to determine conformance with the applicable requirements, thoroughly cleaned, internally examined, and then subjected to a hydrostatic test at 150% of the working pressure for 1 min (3.24.4) (Item 2.33).

#### **8.6.5.16 Periodic Test Requirements — Category 5**

NOTE: For test frequency, see 8.11.1.3.

**8.6.5.16.1** Governors, safeties, and oil buffers, where provided, shall be inspected and tested as specified in 8.6.4.20.1, 8.6.4.20.2, and 8.6.4.20.3 at intervals specified by the authority having jurisdiction. Where activation is allowed or required both by overspeed and slack rope, the safety shall have both means of activation tested.

**8.6.5.16.2** Coated ropes shall be required to have a magnetic flux test capable of detecting broken wires, in addition to a visual examination.

**8.6.5.16.3** Wire rope fastenings shall be examined in accordance with Item 3.23 of A17.2. Fastenings on roped-hydraulic elevators utilizing pistons that are hidden by cylinder head seals shall also be examined, even if it is temporarily necessary to support the car by other means and disassemble the cylinder head.

**8.6.5.16.4** Not adopted (see 8.6.5.14.8). A plunger gripper, where provided, shall be examined and tested per 8.10.3.2.5(n).

**8.6.5.16.5** Overspeed valves, where provided, shall be inspected and tested to verify that they will stop the car, traveling down with rated load, within the specified limits of 3.19.4.7.5(a) using a written procedure supplied by the valve manufacturer or the person or firm maintaining the equipment. If the seal has been altered or broken, the overspeed valve shall be resealed after successful test (Item 5.15.2).

**8.6.5.16.6** Freight elevators of Class C2 loading shall sustain and level the elevator car with the maximum load shown on the freight elevator loading sign (Item 2.17.2.2).

**8.6.5.17 Plunger Gripper.** Plunger grippers, where provided, shall be maintained in accordance with the manufacturer's recommendations.

## **8.6.6 Maintenance and Testing of Elevators With Other Types of Driving Machines**

### **8.6.6.1 Rack-and-Pinion Elevators.**

The maintenance of rack-and-pinion elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6. Where the car and/or counterweight safeties are sealed to prevent field adjustment and examination, they shall be returned to the manufacturer for replacement of components and calibration at the interval recommended by the manufacturer. A data plate shall be installed to show the date that the next maintenance/calibration is due.

#### **8.6.6.1.1 Rack-and-Pinion Elevator Periodic Test.**

Rack-and-pinion elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20. The test requirements shall apply to the corresponding requirements of 4.1. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.6.2 Screw-Column Elevators.**

The maintenance of screw-column elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.6.2.1 Screw-Column Elevator Periodic Test.**

Screw-column elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 4.2. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.6.3 Hand Elevators.**

The maintenance of hand elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.6.3.1 Hand Elevator Periodic Test.**

Hand elevators shall be subject to the applicable periodic tests specified in 8.6.4.19 and 8.6.4.20. The test requirements shall apply to the corresponding requirements in 4.3. Any additional requirements for this equipment shall also be checked during these tests. The driving-machine brake required by 4.3.19.2 shall be tested with both empty car and rated load in the car.

## **8.6.7 Maintenance and Testing of Special Application Elevators**

### **8.6.7.1 Inclined Elevators.**

The maintenance of inclined elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.1.1 Periodic Test.**

Inclined elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in 5.1. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.2 Limited-Use/Limited-Application Elevators.**

The maintenance of limited-use/limited-application elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.2.1 Periodic Test.**

Limited-use/limited applications elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 5.2. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.3 Private Residence Elevators.**

The maintenance of private residence elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.3.1 Periodic Test.**

Private residence elevators and lifts should be subject to the periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in 5.3. Any additional requirements for this equipment should also be checked during these tests.

### **8.6.7.4 Private Residence Inclined Elevators.**

The maintenance of private residence inclined elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.4.1 Periodic Test.**

Private residence inclined elevators and lifts should be subject to the periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in 5.4. Any additional requirements for this equipment should also be checked during these tests.

### **8.6.7.5 Power Sidewalk Elevators.**

The maintenance of power sidewalk elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.5.1 Periodic Test.**

Sidewalk elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in 5.5. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.6 Rooftop Elevators.**

The maintenance of rooftop elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.6.1 Periodic Test.**

Rooftop elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 5.6. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.7 Special Purpose Personnel Elevators.**

Except in jurisdictions enforcing NBCC, maintenance of special purpose personnel elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6 (see Section 5.7).

#### **8.6.7.7.1 Periodic Test.**

Special purpose personnel elevators shall be subject to the applicable tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in 5.7. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.8 Shipboard Elevators.**

The maintenance of shipboard elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.8.1 Periodic Test.**

Shipboard elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 5.8. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.9 Mine Elevators.**

Except in jurisdictions enforcing NBCC, maintenance of mine elevators shall conform to 8.6.7.9.1 through 8.6.7.9.5. ~~8.6.7.9.1~~ Rails on mine elevators shall be kept free of rust and scale, that will prevent proper operation of the car (or counterweight) safety device.

~~8.6.7.9.2~~ Oil buffers that are installed on elevators where water can accumulate in the pit shall be checked every 60 days for accumulation of water.

~~8.6.7.9.3~~ The mine elevator hoistway shall be maintained to minimize the entry of water and formation of ice, that would interfere with the operation of the elevator.

#### **8.6.7.9.4 Suspension, Compensating, and Governor Ropes.**

When elevator suspension, compensating, or governor ropes show deterioration caused by corrosion, the replacement wire ropes shall be constructed of electrogalvanized or other types of corrosion resistant material suitable for the environment and application. The installation shall conform to 8.7.2.21 for suspension ropes and 8.7.2.19 for governor ropes. Where emergency replacement of wire ropes is required, noncorrosion resistant wire ropes shall be permitted to be installed for temporary use. These emergency replacement noncorrosion resistant wire ropes shall be replaced by corrosion resistant wire ropes within one year of installation.

#### ~~8.6.7.9.5 Periodic Test.~~

Mine elevators shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements of 5.9. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.7.10 Elevators Used for Construction.**

The maintenance of elevators used for construction shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

#### **8.6.7.10.1 Periodic Test Requirements — Category 1.**

For electric elevators, test as specified in 8.6.4.19.1 through 8.6.4.19.5. For hydraulic elevators, test as specified in 8.6.5.14.1, 8.6.5.14.2, 8.6.5.14.3(a) through (d), and 8.6.5.14.4. Where permanent doors have been installed, test as specified in 8.6.4.19.8.

#### **8.6.7.10.2 Periodic Test Requirements — Category 3.**

For hydraulic elevators, test as specified in 8.6.5.15.

#### **8.6.7.10.3 Periodic Test Requirements — Category 5.**

For electric elevators, test as specified in 8.6.4.20.1 through 8.6.4.20.4, and 8.6.4.20.6. For hydraulic elevators, test as specified in 8.6.5.16.

#### **8.6.7.11 Wind Turbine Tower Elevator**

The maintenance of wind turbine tower elevators shall conform to the applicable requirements of 8.6.7.11.1 through 8.6.7.11.3.

##### **8.6.7.11.1 Periodic Test Requirements – Category 1**

Wire rope gripping safeties with slack rope actuation, or wire rope gripping safeties with an internal centrifugal governor shall be tested with rated load in the car. Governor operated safeties shall be tested by manually tripping the governor at the rated speed. The overspeed switch on the governor shall be made ineffective during the test.

##### **8.6.7.11.2 Wind Turbine Tower Elevators.**

The maintenance of wind turbine tower elevators shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

##### **8.6.7.11.3 Car and Counterweight Safeties.**

Types A, B, and C car safeties except those operating on wood guide rails, and their governors, wire rope gripping safeties with slack rope actuation, or wire rope gripping safeties with an internal centrifugal governor, shall be tested with rated load in the car. Counterweight safety tests shall be made with no load in the car. Tests for governor operated safeties shall be made by manually tripping the governor at the rated speed. The overspeed switch on the governor shall be made ineffective during the test. Type A safeties and wire rope gripping safeties without governors that are operated as a result of the breaking or slackening of the hoisting ropes shall be tested by obtaining the necessary slack rope to cause it to function (Item 2.29.2.1) and hold the car with rated load. The following operational conditions shall be checked (Item 2.29.2.1):

##### **8.6.7.12 Outside Emergency Elevators.**

The maintenance, repair, and replacement of outside emergency elevators shall conform to 8.6.1 through 8.6.3 and A17.7/B44.7 requirement 2.12.2.

##### **8.6.7.12.1 Periodic Test Requirements -- Category 1.**

Outside emergency elevators shall be subject to applicable periodic tests specified in 8.6.4.19.1 through 8.6.4.19.5, 8.6.4.19.7, 8.6.4.19.8, 8.6.4.19.10, and A17.7/B44.7 requirement 2.12.3. Outside emergency elevators are not required to be powered by electric driving machine motors.

##### **8.6.7.12.2 Periodic Test Requirements -- Category 5.**

Outside emergency elevators shall be subject to applicable periodic tests specified in 8.6.4.20.1 through 8.6.4.20.11 and A17.7/B44.7 requirement 2.12.3. Outside emergency elevators are not required to be powered by electric driving machine motors.

#### **8.6.8 Maintenance and Testing of Escalators and Moving Walks**

- (a) The maintenance of escalators submitted and registered to A17.1-2004/B44-04 and later (effective January 1, 2006) shall conform to 8.6.1 through 8.6.3 and 8.6.8.
- (b) Not later than May 1, 2015 all escalators shall be brought into conformance with the requirements of 8.6.8.2 (Step-to-Skirt Clearance) and 8.6.8.3 (Step/Skirt Performance Index).
- (c) Escalators installed to CSA B44-75s3 (1982) or earlier, and for escalators where the skirt panels are not made of low-friction material or have not been permanently treated with a friction-reducing material, a friction-reducing agent shall be applied monthly by authorized personnel until those escalators are brought into conformance with 8.6.8.2 and 8.6.8.3.3 after which the application of friction-reducing agents will no longer be permitted, and the requirements of 8.6.8(a) apply. [241/10]

### 8.6.8.1 Handrails.

Handrails shall operate at the speed specified in the applicable codes. The handrail speed monitoring device, when provided, shall cause electric power to be removed from the driving-machine motor and brake when the speed of either handrail deviates from the step speed by 15% or more and continuously within a 2 s to 6 s range. Cracked or damaged handrails that present a pinching effect shall be repaired or replaced. Splicing of handrails shall be done in such a manner that the joint is free of pinching effect.

### 8.6.8.2 Step-to-Skirt Clearance.

Clearances shall be maintained in compliance with the applicable codes. Alternatively, the clearance on either side of the steps and between the steps and the adjacent skirt guard shall not exceed 4 mm (0.16 in.) and the sum of the clearances on both sides shall not exceed 7 mm (0.28 in.).

NOTE: The allowable clearances are applicable as follows:

- (a) ASME A17.1 1955 through A17.1d 1970; not more than 4.8 mm (0.1875 in.) with a total of both sides not more than 6.4 mm (0.25 in.), except where skirt obstruction devices are installed at the lower entrance for escalators installed under the ASME A17.1 1965 through A17.1d 1970.
- (b) ASME A17.1 1971 through A17.1 1979 editions; not more than 9.5 mm (0.375 in.) on each side.
- (c) ASME A17.1 1980 through A17.1c 1999 and ASME A17.3; not more than 4.8 mm (0.1875 in.) on each side.
- (d) For equipment installed under ASME A17.1d 2000 and later editions, the clearance (loaded gap) not more than 5 mm (0.2 in.) when 110 N (25 lbf) force is laterally applied from the step to the adjacent skirt panel. See 6.1.3.3.5.

NOTE (on CSA B44 Requirements): The allowable clearances are applicable as follows:

- (a) B44-1960 through B44S3-1982 — not more than 4.8 mm (0.1875 in.) on each side. Sum of both sides not more than 6.4 mm (0.25 in.).
- (b) B44-1985 through B44S2-1998 — Not more than 5 mm (0.197 in.) on each side. Sum of both sides not more than 6 mm (0.236 in.).
- (c) For equipment installed under CSA B44-00—not more than 4 mm (0.157 in.) on each side. Sum of both sides not more than 7 mm (0.28 in.).
- (d) For equipment installed under CSA B44-00 Update 1 and later editions — clearance (loaded gap) shall be not more than 5 mm (0.2 in.) when 110 N (25 lbf) force is laterally applied from the step to the adjacent skirt panel. See 6.1.3.3.5.

### 8.6.8.3 Step/Skirt Performance Index

**8.6.8.3.1** The step/skirt performance index, when the escalator is subjected to the test specified in 8.6.8.15.19, shall be the maximum value of the recorded instantaneous step/skirt index  $e^y/(e^y + 1)$ , where

(SI Units)

$$e = 2.7183$$

$$y = -3.77 + 2.37 (u) + 0.37 (Lg)$$

$u$  = the sliding coefficient of friction of a polycarbonate test specimen on the skirt panel at the measurement point calculated when subjected to a 110 N normal load. The coefficient of friction shall be measured without addition of any field-applied lubricant.

$Lg$  = the clearance between the step and the adjacent skirt panel when 110 N is applied from the step to skirt panel, mm

The applied load shall not deviate from 110 N by more than  $\pm 11$  N. The load shall be distributed over a round or square area not less than 1 940 mm<sup>2</sup> and not more than 3 870 mm<sup>2</sup>.

(Imperial Units)

$$e = 2.7183$$

$$y = -3.77 + 2.37 (u) + 9.3 (Lg)$$

$u$  = the sliding coefficient of friction of a polycarbonate test specimen on the skirt panel at the measurement point calculated when subjected to a 25 lbf normal load. The coefficient of friction shall be measured without addition of any field-applied lubricant.

Lg = the clearance between the step and the adjacent skirt panel when 25 lbf is applied from the step to skirt panel, in.

The applied load shall not deviate from 25 lbf by more than  $\pm 2.5$  lbf. The load shall be distributed over a round or square area not less than 3 in.<sup>2</sup> and not more than 6 in.<sup>2</sup>

**8.6.8.3.2** The step/skirt performance index polycarbonate test specimen shall conform to the following specifications:

- (a) Material: Polycarbonate without fillers
- (b) Color: Natural, no pigments
- (c) Finish: Glossy (roughness less than 0.8  $\mu\text{m}$  (32  $\mu\text{in.}$ )
- (d) Area in contact with skirt panel:  $2\,900 \pm 325$  mm<sup>2</sup> ( $4.5 \pm 0.5$  in.<sup>2</sup>) and at least 0.8 mm (0.03 in.) thick
- (e) Specification: GE Lexan 100 series or equivalent polycarbonate

**8.6.8.3.3** The escalator step/skirt performance index shall be one of the following, whichever is applicable:

- (a)  $\leq 0.15$
- (b)  $\leq 0.25$  for escalators installed under ASME A17.1a-2002/CSA B44-00 Update 1 and later editions and when a skirt deflector device complying with the requirements of 6.1.3.3.7 is provided
- (c)  $\leq 0.4$  for escalators installed under ASME A17.1-2000/CSA B44-00 and earlier editions and a skirt deflector device is provided

#### **8.6.8.4 Combplates**

**8.6.8.4.1** Combs with any broken teeth shall be repaired or replaced. Where two adjacent teeth are missing, the escalator shall be removed from operation.

**8.6.8.4.2** Combs shall be adjusted and maintained in mesh with the slots in the step surface so that the points of the teeth are always below the upper surface of the treads.

**8.6.8.4.3** For units installed under A17.1b-1992 and later editions of the Code, comb-step impact devices shall be adjusted to operate in compliance with the forces specified in 6.1.6.3.13.

#### **8.6.8.5 Escalator Skirt Panels and Skirt Obstruction Devices**

(a) Damaged skirt or dynamic skirt panels shall be replaced or repaired and the installation shall conform to 8.6.8.2 and 8.6.8.3.3.

(b) The skirt obstruction devices shall be checked for proper adjustment and operation.

#### **8.6.8.6 Steps**

**8.6.8.6.1** Steps with broken treads shall be repaired or replaced.

**8.6.8.6.2** Steps with dented or damaged risers shall be repaired or replaced.

**8.6.8.6.3** Steps that are worn or damaged and that do not provide proper engagement with the combplates shall be repaired or replaced.

**8.6.8.6.4** The width or depth of the slots in the tread surface of steps that do not meet the applicable Code requirements shall be repaired or replaced.

**8.6.8.7 Rollers, Tracks, and Chains.** Rollers, tracks, and chains shall be examined, repaired, or replaced when necessary to ensure required clearances.



**8.6.8.8 Signs.** Caution signs shall be provided in compliance with 6.1.6.9. Damaged or missing signs shall be replaced. Additional signs, if provided, shall comply with 6.1.6.9.

**8.6.8.9 Guards at Ceiling Intersections.**

Damaged or missing guards shall be repaired or replaced in compliance with 6.1.3.3.11.

**8.6.8.10 Antislid e Devices.**

Damaged or missing antislid e devices shall be repaired or replaced.

**8.6.8.11 Handrail Guards.**

Damaged or missing hand or finger guards shall be repaired or replaced.

**8.6.8.12 Brakes.**

Brakes shall be maintained in compliance with the applicable requirements of 8.6.4.6, and adjusted to the torque shown on the data plate, where provided.

**8.6.8.13 Cleaning.**

The interiors of escalators and their components shall be cleaned to prevent an accumulation of oil, grease, lint, dirt, and refuse. The frequency of the cleaning will depend on service and conditions, but an examination to determine if cleaning is necessary shall be required at least once a year.

**8.6.8.14 Entrance and Egress Ends.**

Escalator landing plates shall be properly secured in place. Landing plates shall be kept free of tripping hazards and maintained to provide a secure foothold. All required entrance and exit safety zones shall be kept free from obstructions.

**8.6.8.15 Periodic Test Requirements — Category 1**

NOTE: For test frequency, see 8.11.1.3.

**8.6.8.15.1 Machine Space.**

The machine space access, lighting, receptacles, operation, and conditions shall be examined (Items 8.1 and 10.1). All escalator components shall be cleaned and examined. These components shall include, but not be limited to

- (a) oil drip pans
- (b) upper and lower stations
- (c) steps and rollers
- (d) step frames, risers, and treads
- (e) tracks
- (f) truss components

**8.6.8.15.2 Stop Switch.**

The machine space stop switches shall be tested (Items 8.2 and 10.2).

**8.6.8.15.3 Controller and Wiring.**

Controller and wiring shall be examined (Items 8.3 and 10.3).

**8.6.8.15.4 Drive Machine and Brake.**

The drive machine and brakes shall be examined and tested, including test of the brake torque (Items 8.4 and 10.4).

**8.6.8.15.5 Speed Governor.**

The mechanical speed governor, if required, shall be tested by manually operating the trip mechanism (Items 8.5 and 10.5).

**8.6.8.15.6 Broken Drive-Chain Device.**

Operation of the broken drive-chain device, on the drive chain, shall be tested by manually operating the actuating mechanism (Items 8.6 and 10.6).

**8.6.8.15.7 Reversal Stop Switch.**

The reversal stop switch (to prevent reversal when operating in the ascending direction) shall be tested by manually operating it to determine that it functions properly (Items 8.7 and 10.7). If the device cannot be manually operated, the person or firm maintaining the equipment shall provide a written checkout procedure and demonstrate the device complies with the requirements of the Code.

**8.6.8.15.8 Broken Step-Chain or Treadway Device.**

The broken or slack step-chain or treadway device shall be tested by manual operation (Items 8.8 and 10.8).

**8.6.8.15.9 Step Upthrust Device.**

The operation of the step upthrust device shall be tested by manually displacing the step, causing the device to operate (Items 7.9 and 8.9).

**8.6.8.15.10 Missing Step or Pallet Device.**

The missing step or pallet device shall be tested by removing a step or pallet and verifying that the device will properly function (Items 8.10 and 10.10).

**8.6.8.15.11 Step or Pallet Level Device.**

The step, or pallet level device shall be tested by simulating an out of level step or pallet and verifying that the device functions properly (Items 8.11 and 10.11).

**8.6.8.15.12 Steps, Pallet, Step or Pallet Chain, and Trusses.**

The steps, pallet, step or pallet chain, and trusses shall be visually examined for structural defects, mechanical condition, and buildup of combustible materials (Items 8.12 and 10.12).

**8.6.8.15.13 Handrail Safety Systems.**

The handrail operating system shall be visually examined for condition. The handrail entry device, and the stopped handrail or handrail speed monitoring device, shall be tested by disconnecting of handrail motion sensor (Items 8.13 and 10.13). The person or firm maintaining the equipment shall provide a written checkout procedure and demonstrate that the handrail speed does not change when a retarding force, up to the maximum required by code, is applied opposite to the direction of travel (Items 7.3 and 9.3).

**8.6.8.15.14** For outdoor escalators and moving walks that require heaters, test the heaters for condition and operation (Items 8.3 and 10.3).

**8.6.8.15.15 Permissible Stretch in Escalator Chains.**

Escalators shall have periodic examination of the clearance between successive steps to detect wear or stretch of the step chains. The clearance shall not exceed 6 mm (0.25 in.) (Item 7.9).

**8.6.8.15.16 Disconnected Motor Safety Device.**

Operation of the device shall be tested and verified (see 6.1.6.3.10 or 6.2.6.3.8) (Item 8.6 or 10.6).

**8.6.8.15.17 Response to Smoke Detectors (6.1.6.8 or 6.2.6.7) (Items 8.15 and 10.15)**

**8.6.8.15.18 Comb-Step or Comb-Pallet Impact Device.**

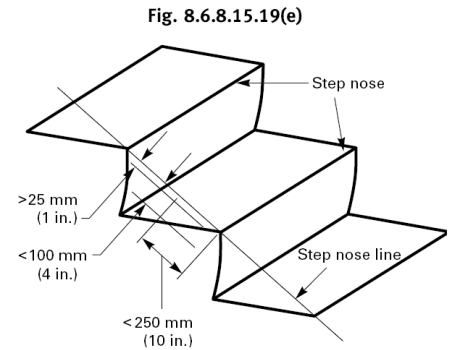
For escalator or moving walks required to comply with Rules 805.1u, 805.3n, 905.1r, or 905.3k in A17.1d-2000 or earlier editions, or requirements 6.1.6.3.13 or 6.2.6.3.11, the comb-step/pallet-impact devices shall be tested in both the vertical and horizontal directions by placing a vertical and horizontal force on the combplate to cause operation of the device. The vertical and horizontal tests shall be independent of each other. The horizontal force shall be applied at the front edge center and both sides; the force shall be applied in the direction of travel into the combplate. The vertical force shall be applied at

the front edge center. Both the vertical and horizontal forces required to operate the device shall be recorded (6.1.6.3.13 and 6.2.6.3.11; Items 7.7.2 and 9.7.2). See 8.6.9.2.3 for horizontal forces required.

**8.6.8.15.19 Step/Skirt Performance Index**

- (a) The escalator skirt shall not be cleaned, lubricated, or otherwise modified in preparation for testing. The escalator instantaneous step/skirt index measurements [6.1.3.3.9(a)] shall be recorded at intervals no larger than 150 mm (6 in.) from each side of two distinct steps along the inclined portion of the escalator, where the steps are fully extended. Test steps shall be separated by a minimum of 8 steps.
- (b) A load of 110 N (25 lbf) shall be laterally applied from the step to the adjacent skirt panel. The applied load shall not deviate from 110 N (25 lbf) by more than ±11 N (2.5 lbf). The load shall be distributed over a round or square area not less than 1 940 mm<sup>2</sup> (3 in.2) and not more than 3 870 mm<sup>2</sup> (6 in.2).
- (c) No vertical load exceeding 220 N (50 lbf) shall be applied to the test step and adjacent steps.
- (d) The coefficient of friction shall be measured with the test specimen conforming to the requirements of 8.6.8.3.2 sliding in the direction of the step motion under a 110 N (25 lbf) normal force at the operating speed of the escalator and shall be measured with devices having sensitivity better than ±2.2 N (0.5 lbf). The direction of step motion shall be the direction of normal operation. If the escalator is operated in both directions, the down direction shall be used for the test.

- (e) For both the coefficient of friction measurement and the loaded gap measurements, the center of the applied load shall be between 25 mm (1 in.) and 100 mm (4 in.) below the nose line of the steps. The center of the applied load shall be not more than 250 mm (10 in.) from the nose of the step. See Fig. 8.6.8.15.19(e).
- (f) The step/skirt performance index shall conform to the requirements in 8.6.8.3 or A17.3, Requirement 5.1.11 (Item 7.17).



**8.6.8.15.20 Clearance Between Step and Skirt (Loaded Gap).**

Escalators installed under ASME A17.1d–2000 shall be tested as follows (Item 7.17):

- (a) Loaded gap measurements shall be taken at intervals not exceeding 300 mm (12 in.) in transition region (6.1.3.6.5) and before the steps are fully extended. These measurements shall be made independently on each side of the escalator.
- (b) The applied load shall not deviate from 110 N (25 lbf) by more than ±11 N (2.5 lbf) (6.1.3.3.5). The load shall be distributed over a round or square area no less than 1 940 mm<sup>2</sup> (3 in.2) and no more than 3 870 mm<sup>2</sup> (6 in.2).
- (c) For the loaded gap measurements, the center of the applied load shall be between 25 mm (1 in.) and 100 mm (4 in.) below the nose line of the steps. The center of the applied load shall be not more than 250mm (10 in.) from the nose of the step. See Fig. 8.6.8.15.19(e).

**8.6.8.15.21** Inspection control devices shall be tested and inspected to determine conformance with the requirements of 6.1.6.2.2 for escalators and 6.2.6.2.2 for moving walks.

**8.6.8.15.22 Step Lateral Displacement Device (6.1.6.3.14).**

For curved escalators, manually test the device.

**8.6.8.15.23 Seismic Risk Zones 2 or Greater.**

Verify that operation of the seismic switch complies with requirements of 8.5.4 (Items 7.20.2 and 9.20.2).

#### **8.6.8.15.24 Maintenance of Seismic Devices.**

A seismic switch, where provided, shall be maintained in accordance with the manufacturer's recommendations.

#### **8.6.9 Maintenance of Moving Walks**

The maintenance of moving walks shall conform to 8.6.1 through 8.6.3 and 8.6.9.

##### **8.6.9.1 Handrails.**

Handrails shall operate at the speed specified in applicable codes. The handrail speed monitoring device, when provided, shall cause electric power to be removed from the driving-machine motor and brake when the speed of either handrail deviates from the treadway by 15% or more and continuously within a 2 s to 6 s range. Cracked or damaged handrails that present a pinching effect shall be repaired or replaced. Splicing of handrails shall be done in such a manner that the joint is free of pinching effect.

##### **8.6.9.2 Combplates**

**8.6.9.2.1** Combs with any broken teeth shall be repaired or replaced.

**8.6.9.2.2** Combs shall be adjusted and maintained in mesh with the slots in the treadway surface so that the points of the teeth are always below the upper surface of the treads.

**8.6.9.2.3** For units installed under A17.1b–1992 and later editions of the Code, comb-pallet impact devices shall be adjusted to operate in compliance with the forces specified in 6.2.6.3.11.

##### **8.6.9.3 Pallets**

**8.6.9.3.1** Pallets with broken treads shall be repaired or replaced.

**8.6.9.3.2** Intermeshing moving walk pallets that are damaged at the mesh shall be repaired or replaced.

**8.6.9.3.3** Pallets that are worn or damaged and that do not provide proper engagement with the combplates shall be repaired or replaced.

**8.6.9.3.4** The width or depth of the slots in the tread surface of pallets that do not meet the applicable Code requirements shall be repaired or replaced.

##### **8.6.9.4 Rollers, Tracks, and Chains.**

Rollers, tracks, and chains shall be examined, repaired, or replaced when necessary to ensure required clearances.

##### **8.6.9.5 Belt-Type Treadway.**

Belt-type treadways that are damaged or worn in such a manner that the treadway does not provide a continuous unbroken treadway surface or proper engagement with the combplates shall be repaired or replaced.

##### **8.6.9.6 Signs.**

Caution signs shall be provided in compliance with 6.2.6.8. Damaged or missing signs shall be replaced. Additional signs, if provided, shall comply with 6.2.6.8.

##### **8.6.9.7 Guards at Ceiling Intersections.**

Damaged or missing guards shall be repaired or replaced in compliance with 6.2.3.3.7.

##### **8.6.9.8 Antislid e Devices.**

Damaged or missing antislid e devices shall be repaired or replaced.

##### **8.6.9.9 Handrail Guards.**

Damaged or missing hand or finger guards shall be repaired or replaced.

#### **8.6.9.10 Brakes.**

Brakes shall be maintained in compliance with the applicable requirements of 8.6.4.6, and adjusted to the torque shown on the data plate, where provided.

#### **8.6.9.11 Cleaning.**

The interiors of moving walks, and their components shall be cleaned to prevent an accumulation of oil, grease, lint, dirt, and refuse. The frequency of the cleaning will depend on service and conditions, but an examination to determine if cleaning is necessary shall be required at least once a year.

#### **8.6.9.12 Entrance and Egress Ends.**

Moving walk landing plates shall be properly secured in place. Landing plates shall be kept free of tripping hazards and maintained to provide a secure foothold. All required entrance and exit safety zones shall be kept free from obstructions.

#### **8.6.9.13 Clearances.**

The clearance between each side of the treadway and the adjacent skirt panels, when provided, shall be maintained in compliance with 6.2.3.3.6. The clearance between the top surface of the treadway and the underside of the balustrade shall be maintained in compliance with 6.2.3.3.5 for skirtless balustrades.

### **8.6.10 Maintenance and Testing of Dumbwaiters and Material Lifts**

#### **8.6.10.1 Material Lifts and Dumbwaiters Without Automatic Transfer Devices.**

The maintenance of material lifts and dumbwaiters without automatic transfer devices shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6. **Not later May 1, 2014 than all type 'B' material lifts, and all type 'A' and type 'B' freight platform lifts shall be retrofitted as required by CAD requirement 3.9.2.**

##### **8.6.10.1.1 Periodic Test.**

Dumbwaiters shall be subject to the applicable periodic tests specified in 8.6.4.19 and 8.6.5.14. The test requirements shall apply to the corresponding requirements in Part 7. Any additional requirements for this equipment shall also be checked during these tests. On winding drum machines, the slack-rope devices required by 2.26.2.1 shall be permitted to be tested as specified in Item 2.18. The driving-machine brake shall be tested to determine conformance with 7.2.10 (Item 2.18).

#### **8.6.10.2 Material Lifts and Dumbwaiters With Automatic Transfer Devices.**

The maintenance of material lifts and dumbwaiters with automatic transfer devices shall conform to 8.6.1 through 8.6.3 and the applicable requirements of 8.6.

##### **8.6.10.2.1 Periodic Test.**

Material lifts and dumbwaiters with automatic transfer devices shall be subject to the applicable periodic tests specified in 8.6.4.19 and 8.6.5.14. The test requirements shall apply to the corresponding requirements in Part 7. Any additional requirements for this equipment shall also be checked during these tests.

### **8.6.11 Special Provisions**

#### **8.6.11.1 Firefighters' Emergency Operation. (239/10)**

- (a) **Elevators that incorporate any form of Firefighters' Emergency Operation are required to have this operating mode tested on an annual basis to verify that the firefighters' feature is operational and ready for use by firefighters or emergency personnel if required during a fire or other emergency.**
- (b) **The minimum required inspection checks shall be those listed on the form "Maintenance Checklist for Firefighters' Emergency Operation - Record of Inspection Checks"**
- (c) **The owner or the owner's authorized agent may perform the necessary annual testing provided they are trained and instructed in the use of Firefighters' Emergency Operation and the testing requirements.**

- (d) The owner or the owner's authorized agent shall record the results of the test on the form provided by the designated administrative authority or on a form containing not less than the tests prescribed on this form, and shall leave a copy at the location of the log book.
- (e) A record of findings shall be recorded and shall be available to elevator personnel and to the authority having jurisdiction.
- (f) Any deficiencies found during the testing shall be recorded and rectified.
- (g) Despite, (d) and (e) where the owner's authorized agent is a registered elevating devices contractor employing an appropriately qualified EDM mechanic capable of rectifying deficiencies', a single log book entry shall be permitted to indicate a successful test of Firefighters' Emergency Operation.

**Note:**

- 1) It is the responsibility of the elevating devices owner to ensure firefighters' emergency operation testing is performed annually.
- 2) Section 7.2 of the Ontario Fire Code requires testing at three month intervals in high buildings.
- 3) Where a dedicated function fire alarm system has been added to comply with CAD requirement 2.27.3.2.2(c) the owner shall ensure that testing of the "Elevator Recall Control and Supervisory Control Unit" is performed annually in accordance with CAN/ULC-S536 (Inspection and Testing of Fire Alarm Systems), with written confirmation of testing provided in the machine room or location of the elevator's log books.

~~All elevators provided with firefighters' emergency operation shall be subjected monthly, by authorized personnel, to Phase I recall by use of the key switch, and a minimum of one floor operation on Phase II, except in jurisdictions enforcing the NBCC. Deficiencies shall be corrected. A record of findings shall be available to elevator personnel and the authority having jurisdiction.~~

**8.6.11.2 Two-Way Communications Means.** The two-way communications means shall be checked annually by authorized personnel in accordance with the following:

- (a) Two-way communications means shall be checked to verify that two-way communications is established; or
- (b) All elevators installed under ASME A17.1a-2002/ CSA B44-00 Update 1 and later editions shall have the two-way communications means checked by pressing the "HELP" button in the car to verify that the visual indicator [2.27.1.1.3(c)] is functional and that the answering authorized personnel can receive the building location and elevator number [2.27.1.1.3(d)]; and
- (c) Where communications from the building into the elevator is provided, check the two-way communications means to each car.

**8.6.11.3 Access Keys.**

Keys required for access, operation, inspection, maintenance, repair, and emergency access shall be made available only to personnel in the assigned security level, in accordance with 8.1.

**8.6.11.4 Cleaning of a Car and Hoistway Transparent Enclosure**

**8.6.11.4.1** The cleaning of the exterior of transparent car enclosures or transparent hoistway enclosures from inside the hoistway shall be performed only by authorized personnel (see 1.3) trained in compliance with the procedures specified in 8.6.11.4.2 and 8.6.11.4.3.

**8.6.11.4.2** A written cleaning procedure shall be made and kept on the premises where the elevator is located and shall be available to the authority having jurisdiction.

**8.6.11.4.3** The procedure shall identify the hazards and detail the safety precautions to be utilized.

**8.6.11.4.4** All personnel assigned to cleaning shall be given a copy of these procedures and all necessary training to assure that they understand and comply with the procedures.

**8.6.11.4.5** A record of authorized personnel trained as specified in 8.6.11.4.4 shall be kept on the premises where the elevator is located and shall be available to the authority having jurisdiction.

#### **8.6.11.5 Emergency Evacuation Procedures for Elevators**

**8.6.11.5.1** The evacuation of passengers from stalled elevators shall be performed only by authorized, elevator and emergency personnel (see 1.3) in compliance with the procedures specified in 8.6.11.5.2 through 8.6.11.5.6.

**8.6.11.5.2** A written emergency evacuation procedure shall be made and kept on the premises where an elevator is located.

**8.6.11.5.3** The procedure shall identify the hazards. The procedure shall also detail the safety precautions utilized in evacuating passengers from a stalled elevator.

**8.6.11.5.4** All authorized personnel who are assigned to assist in evacuating passengers from a stalled elevator, and all persons who use special purpose personnel elevators and wind turbine tower elevators, shall be given a copy of these procedures and all necessary training to assure that they understand and comply with the procedures.

**8.6.11.5.5** These procedures shall be available to authorized elevator and emergency personnel.

**8.6.11.5.6** A record of authorized personnel trained, and all persons who use special purpose personnel elevators, as specified in 8.6.11.5.4, shall be kept on the premises where the elevator is located and shall be available to the authority having jurisdiction.

NOTE (8.6.11.5): See ASME A17.4, Guide for Emergency Personnel.

#### **8.6.11.6 Escalators and Moving Walks Startup and Procedures**

##### **8.6.11.6.1**

(a) Escalators and moving walks shall be started only by authorized personnel (see 1.3) trained in compliance with the procedures specified in 8.6.11.6.2 through 8.6.11.6.5.

(b) **Out of service or** stopped escalators ~~shall~~ **should** not be used as a means of access or egress by non-authorized personnel and ~~shall~~ **should** be properly barricaded if accessible to the general public to prevent such use.

NOTE(S):

- (1) Proper barricades are described in the Elevator Industry Field Employee Safety Handbook-Escalator/Moving Walk Barricades.
- (2) **Per provisions in OBC and NFPA 130, escalators in rapid transit facilities may form part of the pedestrian egress route.**
- (3) **Stationary escalators do not have uniform tread rise and may pose unique risks not associated with typical stairways.**
- (4) **The treadway of a stationary escalator relies on the escalators brake to ensure the treadway will not move under loading conditions (eg pedestrian traffic). Escalators should never be used as a stairway if the brakes holding capacity is suspect. See 8.6.11.6.2(c2) for confirmation of adequate breaking capacity. See CAD 3.21 for stopping distance check sign.**
- (5) **See CAD 2.13 for parts affecting safe operation and risk assessment for device use.**

**8.6.11.6.2** The following procedure shall be utilized when starting an escalator or moving walk:

- (a) Prior to starting the unit, observe the steps or pallets and both landing areas to ensure no persons are on the unit or about to board. Run the unit away from the landing.
- (b) Verify correct operation of the starting switch.

- (c1) Verify correct operation of the stop buttons.
- (c2) Observe steps stop within the distance on the daily stopping distance check sign (usually one step length or less).
- (d) Verify correct operation of each stop button cover alarm, if furnished.
- (e) Visually examine the steps or treadway for damaged or missing components; combplates for broken or missing teeth; skirt or dynamic skirt panels and balustrades for damage.
- (f) Verify that both handrails travel at substantially the same speed as the steps or the treadway, are free from damage or pinch points, and that entry guards are in place.
- (g) Visually verify that all steps, pallets, or the treadway is properly positioned.
- (h) Verify that ceiling intersection guards, anti-slide devices, deck barricades, and caution signs are securely in place.
- (i) Verify that demarcation lighting is illuminated, if furnished.
- (j) Check for uniform lighting on steps/tread not contrasting with surrounding areas.
- (k) Verify that the safety zone is clear of obstacles and that the landing area and adjacent floor area are free from foreign matter and slipping or tripping hazards.
- (l) Check for any unusual noise or vibration during operation.

If any of these conditions is unsatisfactory in 8.6.11.6.2(a) through (l), the unit shall be placed out of service. Barricade the landing areas and notify the responsible party of the problem.

**8.6.11.6.3** Escalators and moving walks subject to 24-h operation shall be checked daily by authorized personnel.

**8.6.11.6.4** A record of authorized personnel trained as specified in 8.6.11.6.2 shall be kept on the premises where the escalator(s) or moving walk(s) or both is located and shall be available to the authority having jurisdiction.

**8.6.11.7 Operating Instructions for Means Specified in 2.7.5.1.1 or 2.7.5.2.1.**

A written procedure for operating the means shall be posted in a permanent manner in plain view at an appropriate location on or adjacent to the means (see 2.7.5.1.1 or 2.7.5.2.1). The posting shall conform to ANSI Z535.4 or CAN/CSA Z321, whichever is applicable (see Part 9).

**8.6.11.8 Egress and Reentry Procedure From Working Areas in 2.7.5.1.3 or 2.7.5.2.3.**

A written procedure to outline the method for egress and reentry shall be posted in a permanent manner in plain view at an appropriate location at the egress/reentry point (see 2.7.5.1.3 or 2.7.5.2.3). The posting shall conform to ANSI Z535.4 or CAN/CSA Z321, whichever is applicable (see Part 9).

**8.6.11.9 Operating Instructions for Retractable Platforms.**

A written procedure to outline the method for the use of retractable platforms shall be posted in a permanent manner in plain view at an appropriate location on or adjacent to the retractable platform (see 2.7.5.3.1). The posting shall conform to ANSI Z535.4 or CAN/CSA Z321, whichever is applicable (see Part 9).

**8.6.11.10 Category 5 tests without Load via Alternative Test Methodologies**

**8.6.11.10.1 Where Permitted**

Alternative test methods without load are permitted for category 5 testing subject to approval by the Authority Having Jurisdiction of;

- (a) car and counterweight safeties per **8.6.4.20.1**,
- (b) oil buffers per **8.6.4.20.3**,
- (c) driving machine brakes per **8.6.4.20.4**, and
- (d) braking system, traction and traction limits per **8.6.4.20.10**

Note: See 8.10 note 2.

**8.6.11.10.2 Alternative Test Method and Tools**

- (a) An alternative test method shall be:
  - i) based on sound engineering principles,
  - ii) validated and documented via engineering tests,



- (b) The method, measuring devices and tools shall be capable of producing reliable and consistent measurements, suitable for the intended measurement. The monitoring and calibration of the measuring devices or tools shall be in accordance with the providers guidelines.

#### **8.6.11.10.3 Alternative Test Method Procedure**

The alternative test method shall;

- (a) include requirements to obtain and verify car and counterweight masses if necessary for the test,
- (b) have a procedure document that;
  - i) defines the permissible equipment range and limitations regarding use,
  - ii) establishes monitoring and calibration criteria for tools or measuring devices as appropriate,
  - iii) defines the test set-up procedure,
  - iv) provides instructions on how to interpret results and correlate the results to pass fail criteria,
- (c) describe how to correlate no load test results with previously acquired full load and no load results,
- (d) be included in the maintenance control program (see 8.6.1.2.1(a)),
- (e) include the information required by 8.6.1.2.1(f) where applicable, and
- (f) require a report conforming to 8.6.11.10.4

#### **8.6.11.10.4 Alternative Test Method Report**

The alternative test method report shall;

- (a) identify the alternative test tool (make / model) used to perform the test,
- (b) identify of the company performing the tests, names of personnel conducting and witnessing the tests, and testing dates,
- (c) contain all required print outs or record of tests required to demonstrate compliance to the testing requirement that were gathered during an acceptance test,
- (d) identify which results from the baseline test are to be used for future compliance evaluation,
- (e) record the car and counterweight masses that were obtained per 8.6.11.10.3(a) during the acceptance test and during any subsequent category 5 test if required by test method,
- (f) contain all subsequent category 5 results with pass-fail conclusions regarding code compliance, and
- (g) remain on site or shall be available to elevator personnel and the authority having jurisdiction.

#### **8.6.11.11 Examination After Shutdown Due to Traction Loss.**

Where the traction-loss detection means has been actuated [see 2.20.8.1 and 8.6.1.2.1(g)], the elevator shall not be returned to service until a physical examination of the drive sheave and suspension means has been conducted. The elevator shall not be moved until all passengers are out of the elevator and the elevator is posted out-of-service. In addition to the suspension-means evaluation criteria in 8.11.2.1.3(cc), any suspension-means or drive-sheave condition that would adversely affect the traction capability of the system (see 2.24.2.3) shall be corrected before returning the elevator to service.

NOTE: See lockout/tagout procedures in Elevator Industry Field Employees' Safety Handbook for procedure for removing the elevator from service.

#### **8.6.11.12 Examination After Safety Application.**

After any safety application on a traction elevator has occurred, whether due to testing or during normal service, the driving-machine sheave, all other sheaves, where furnished, and retainers and suspension members shall be examined throughout their complete length to ensure that all suspension members are properly seated in their respective sheaves, and that no damage has occurred to sheaves, suspension members, or retainers. The elevator shall not be returned to service until this physical examination has been conducted and any repairs made, if necessary.

#### **8.6.11.13 Occupant Evacuation Operation.**

All elevators provided with Occupant Evacuation Operation shall be subjected, by authorized personnel, to a check of the operation in conjunction with the fire alarm system testing in accordance with the requirements of NFPA 72. Deficiencies shall be corrected. A record of findings shall be available to elevator personnel and the authority having jurisdiction.

#### **8.6.11.14 Examination After Shutdown Due to Broken-Suspension-Member Detection Means.**

After any application of the broken-suspension-member detection means, whether due to testing or during normal service, the driving-machine sheave, all other sheaves, where furnished, and retainers and suspension members shall be examined throughout their complete length to ensure that all suspension members are properly seated in their respective sheaves, and that no damage has occurred to sheaves, suspension members, or retainers. The elevator shall not be returned to service until this physical examination has been conducted and any repairs made, if necessary. Where a single suspension member has been damaged or broken, the entire suspension means shall be replaced in accordance with 8.6.3.2.

### **3.4 Alterations**

- 3.4.1 Notwithstanding section 2.6, alterations of an elevator, dumbwaiter, escalator, moving walk, and material lifts shall conform to the requirements of the code adopted in subsection 3.1 and as specified by the director.
- 3.4.2 Alterations to freight platform lifts type - B shall conform to the requirements for Material Lifts Type - B as required by the code adopted in subsection 3.1 and as specified by the director.
- 3.4.3 Alterations to freight platform lifts type - A shall conform to the requirements for Material Lifts Type- B as required by the code adopted in subsection 3.1 and as specified by the director, except that 'in-car' controls are prohibited and no persons shall be permitted to ride.
- 3.4.4 Alteration submission documents shall adhere to the Director's Guideline on alterations and shall be accompanied by a completed alterations checklist.
- 3.4.5 Section 8.7 Alterations is revoked and the following substituted;

## **SECTION 8.7**

### **ALTERATIONS**

Requirement 8.7 applies to alterations.

#### **NOTES:**

- (1) See Nonmandatory Appendix L for an index of the requirements for alterations.
- (2) See 8.6 for maintenance, repair, and replacement requirements.

#### **8.7.1 General Requirements**

##### **8.7.1.1 Applicability of Alteration Requirements.**

When any alteration is performed, regardless of any other requirements of 8.7, the installation, as a minimum, shall conform to the following applicable Code requirements:

- (a) the Code at the time of installation
- (b) the Code requirements for the alteration at the time of any alteration
- (c) ASME A17.3 if adopted by the authority having jurisdiction

##### **8.7.1.2 Items Not Covered in 8.7.**

Where an alteration not specifically covered in 8.7 is made, it shall not diminish the level of safety below that which existed prior to the alteration. See also 1.2.

##### **8.7.1.3 Testing.**

Where alterations are made, acceptance inspections and tests shall be conducted as required by 8.10.2.3 for electric elevators, 8.10.3.3 for hydraulic elevators, or 8.10.4.2 for escalators and moving walks.

#### **8.7.1.4 Welding.**

Welding of parts on which the support of the car, counterweight, escalator, or moving walk depends, including driving machines, escalator, or moving walks, trusses, girders, and tracks, shall conform to 8.8 and 8.7.1.5.

#### **8.7.1.5 Design.**

Design shall be verified by a licensed professional engineer for welding, repair, cutting, or splicing of members upon which the support of the car, counterweight, escalator, or moving walks, trusses, girders, and tracks depends.

#### **8.7.1.6 Temporary Wiring.**

During alterations, temporary wiring shall be permitted. The electrical protective devices of cars in normal operation shall not be rendered inoperative or ineffective.

#### **8.7.1.7 Repairs and Replacements.**

Repairs and replacements shall conform to 8.6.2 and 8.6.3.

#### **8.7.1.8 Code Data Plate.**

In jurisdictions enforcing NBCC, the data plate required by 8.9.1 shall include the code and edition in effect at the time of alteration and the requirements in 8.7 that were applicable to the alteration.

#### **8.7.1.9 Alterations involving SIL Rated Device(s) (See 1.3)**

(a) A SIL Rated Device(s) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), or 2.26.9.6.1(b) shall not be:

- (1) modified such that the modification invalidates the listing/certification; or
- (2) affected by other alteration(s) such that the listing/certification is invalidated,

(b) Where a SIL Rated Device (See 1.3) used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), or 2.26.9.6.1(b) is replaced with a non SIL Rated Device, the replacement shall meet the applicable requirements of 2.26.4.3.1, 2.26.8.2, 2.26.9.4(a), 2.26.9.5.1(a), and 2.26.9.6.1(a).

(c) Where a non-SIL Rated Device used to satisfy 2.26.4.3.1, 2.26.8.2, 2.26.9.4(a), 2.26.9.5.1(a), or 2.26.9.6.1(a) is replaced with a SIL Rated Device, the replacement shall meet the applicable requirements of 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), and 2.26.9.6.1(b).

(d) Where a SIL rated device used to satisfy 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), or 2.26.9.6.1(b) is replaced with a SIL Rated Device that is not the original manufacturer's listed/certified SIL rated device or the original manufacturer's listed/certified SIL rated replacement device the replacement shall meet the applicable requirements of 2.26.4.3.2, 2.26.8.2, 2.26.9.4(b), 2.26.9.5.1(b), and 2.26.9.6.1(b).

(e) An up-to-date Maintenance Control Program (8.6.1.2.1) and wiring diagrams (8.6.1.6.3) shall be provided where they are affected by an alteration involving a SIL Rated Device (see 1.3).

### **8.7.2 Alterations to Electric Elevators**

#### **8.7.2.1 Hoistway Enclosures**

##### **8.7.2.1.1 Hoistway Enclosure Walls.**

Where alterations are made to any portion of a hoistway enclosure wall, that portion which is altered shall conform to the following:

- (a) Requirement 2.1.1.
- (b) Requirement 2.1.5.
- (c) Requirement 2.1.6.
- (d) Requirement 2.5.
- (e) Requirement 2.7.3.4.6. and 2.7.3.4.7,
- (f) Requirement 2.8.

- (g) Requirement 8.7.2.10, where the portion of the wall that is altered includes an entrance assembly.
- (h) Where a hoistway is altered so as to create a single blind hoistway, entrances and emergency doors shall be provided as required by 2.11.1.

#### **8.7.2.1.2 Addition of Elevator to Existing Hoistway.**

Where an elevator is added to an existing hoistway, the number of elevators in that multiple hoistway shall be in accordance with the requirements of the building code. The horizontal clearances for the added elevator and the clearances between the added car and adjacent cars shall conform to 2.5.

#### **8.7.2.1.3 Construction at Top of Hoistway.**

Any alteration to the construction at the top of the hoistway shall conform to 2.1.2.1 and 2.1.3. See also 8.7.2.4.

#### **8.7.2.1.4 Construction at Bottom of Hoistway.**

Any alteration to the construction at the bottom of the hoistway shall conform to 2.1.2.2, 2.1.2.3, and 2.2. See also 8.7.2.4.

#### **8.7.2.1.5 Control of Smoke and Hot Gases.**

Alterations to a hoistway that affect the means used to prevent the accumulation of smoke and hot gases in case of fire shall conform to 2.1.4.

#### **8.7.2.2 Pits.**

Alterations made to the pit shall conform to 2.2 and 2.1.2.3. See also 8.7.2.4.

#### **8.7.2.3 Location and Guarding of Counterweights.**

Where new counterweights are installed or where counterweights are relocated, their location, guarding, and clearances shall conform to 2.3 and 2.5.1.2. The installation shall also conform to 2.6.

#### **8.7.2.4 Vertical Car and Counterweight Clearances and Runbys.**

No alteration shall reduce any clearance or runby below that required by 2.4. Existing clearances shall be permitted to be maintained, except as required by 8.7.2.17.1, 8.7.2.17.2, and 8.7.2.25.2.

#### **8.7.2.5 Horizontal Car and Counterweight Clearances.**

No alteration shall reduce any clearance below that required by 2.5. Existing clearances shall be permitted to be maintained, except as required by 8.7.2.17.2.

#### **8.7.2.6 Protection of Spaces Below Hoistways.**

Where alterations are made to an elevator or the building such that any space below the hoistway is not permanently secured against access, the affected installation shall conform to 2.6.

#### **8.7.2.7 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms**

##### **8.7.2.7.1 Enclosures.**

Where an alteration consists of the construction of new machinery spaces, machine rooms, control spaces, or control rooms, it shall conform to 2.7. Electrical equipment clearances shall conform to NFPA 70 or CSA-C22.1, whichever is applicable. Where alterations are made to any portion of machinery spaces, machine rooms, control spaces, or control rooms, that portion which is altered shall conform to 2.7.

##### **8.7.2.7.2 Means of Access.**

Any alteration that affects the safe and convenient means of access to a machine room, machinery space, control space or control room shall conform to 2.7.3.1, 2.7.3.2, and 2.7.3.3 to the extent existing conditions permit.

##### **8.7.2.7.3 Access Doors and Openings.**

Where an alteration is made to any access door or opening, it shall conform to 2.7.3.4. Where an alteration is made to an access door in an overhead machinery space, a stop switch shall be provided conforming to 2.7.3.5.

#### **8.7.2.7.4 Headroom.**

No alteration shall reduce the headroom below that required by 2.7.4, or the existing headroom, whichever is less.

#### **8.7.2.7.5 Windows and Skylights.**

Alterations made to windows and skylights shall conform to 2.1.5.

#### **8.7.2.7.6 Lighting.**

No alteration shall be made that diminishes the lighting of a machine room or machinery space below that required by 2.7.9.1.

#### **8.7.2.7.7 Ventilation.**

No alteration shall be made that diminishes the ventilation of a machine room or machinery space below that required by 2.7.9.2.

#### **8.7.2.7★1 Elevator Equipment Guarding**

The installation of elevator equipment guarding shall conform to the following;

- (a) 2.7.2 maintenance path and clearance
- (b) 2.7.3.4.2 access doors or openings in cage style guarding where full bodily entry is expected shall provide a minimum width of 750 mm (29.5 in.) and a minimum clear height of 2030 mm (80 in.)
- (c) 2.10.1 as a minimum
- (d) guarding shall be openable or removable only by use of common tools
- (e) operating procedures or work instructions shall be provided and available in the location of the guarding, to inform users on how to safely access the equipment for inspection, testing or maintenance
- (f) working clearances in front of electrical control equipment shall not be less than 1000 mm (39 in.) as per CAD requirements 2.2.1 (per Ontario Electrical Safety Code 38-005 2(c)) or the permissible clearance required at the time of the original installation.
- (g) access for the operation of the disconnecting means shall be
  - (1) 1000 mm for installations installed under the Ontario Electrical Safety Code 2000 edition or later, or
  - (2) 750mm (29.5 in.) for installations installed under Ontario Electrical Safety Code 1998 edition or prior, or
  - (3) if less than 750 mm, the existing clearances shall not be further reduced
- (h) installation by a registered contractor (O.Reg 209/01 s.24)
- (i) large or heavy sections of guards that may need to be removed or opened for maintenance access shall be designed to be removed or easily handled by one person.

#### **8.7.2.8 Electrical Equipment, Wiring, Pipes, and Ducts in Hoistways and Machine Rooms.**

The installation of any new, or the alteration of existing, electrical equipment, wiring, raceways, cables, pipes, or ducts shall conform to the applicable requirements of 2.8.

#### **8.7.2.9 Machinery and Sheave Beams, Supports, and Foundations.**

Where new machinery and sheave beams, supports, foundations, or supporting floors are installed, relocated, or where alterations increase the original building design reactions by more than 5%, they shall conform to 2.9, and the adequacy of the affected building

structure to support the loads shall be verified by a licensed professional engineer.

#### **8.7.2.10 Entrances and Hoistway Openings**

##### **8.7.2.10.1 General Requirements**

- (a) Where all new hoistway entrances are installed, they shall conform to 2.11, 2.12, 2.13, and 2.29.2.
- (b) Where one or more, but not all, new hoistway entrances are installed, they shall conform to 2.11.2 through 2.11.8 and 8.7.2.10.5. The entire installation shall also conform to 2.11.6, 2.12, 2.13, and 2.29.2.

- (c) Where an alteration is made to any hoistway entrance, it shall conform to 2.11.3, 2.11.5, 2.11.7, 2.11.8, and 8.7.2.10.5. The entire installation shall also conform to 2.12, 2.13, and 2.29.2.
- (d) Where an emergency door is added or altered, it shall conform to 2.11.1 and 8.7.2.10.5.
- (e) Where access openings for cleaning are installed, they shall conform to 2.11.1.4 and 8.7.2.10.5.

#### **8.7.2.10.2 Horizontal Slide-Type Entrances.**

In addition to the requirements of 8.7.2.10.1, where any new horizontal slide-type entrance is installed, it shall conform to 2.11.11.

New components that are installed as part of an alteration to an entrance shall conform as follows:

- (a) Landing sills shall conform to 2.11.10.1, 2.11.11.1, and 2.11.11.6.
- (b) Hanger tracks and track supports shall conform to 2.11.11.2.
- (c) Entrance frames shall conform to 2.11.11.3. An applied frame shall be permitted to be fastened to an existing frame, provided that the combination of the new and existing frames conforms to 2.11.11.3, 2.11.11.5.1, 2.11.11.5.2, and 2.11.11.5.3.
- (d) Hangers shall conform to 2.11.11.4.
- (e) Panels shall comply with 2.11.11.5, 2.11.11.6, and 2.11.11.7, except that the overlap required by 2.11.11.5.1 shall be not less than 13 mm (0.5 in.).
- (f) Door safety retainers shall conform to 2.11.11.8.

#### **8.7.2.10.3 Vertical Slide-Type Entrances.**

In addition to the requirements of 8.7.2.10.1, where any new vertical slide-type entrance is installed, it shall conform to 2.11.12.

New components that are installed as part of an alteration to an entrance shall conform as follows:

- (a) Landing sills shall conform to 2.11.10.3 and 2.11.12.1.
- (b) Entrance frames shall conform to 2.11.12.2.
- (c) Rails shall conform to 2.11.12.3.
- (d) Panels shall conform to 2.11.12.3 through 2.11.12.6, and 2.11.12.8.
- (e) Guides shall conform to 2.11.12.5.
- (f) Sill guards shall conform to 2.11.12.7.
- (g) Pull straps shall conform to 2.11.12.8.

#### **8.7.2.10.4 Swing-Type Entrances.**

In addition to the requirements of 8.7.2.10.1, where any new swing type entrance is installed, it shall conform to 2.11.13.

New components that are installed as part of alteration to an entrance shall conform as follows:

- (a) Landing sills shall conform to 2.11.10.1, 2.11.10.3, and 2.11.13.1.
- (b) Entrance frames shall conform to 2.11.13.2 and 2.11.13.4.
- (c) Panels shall conform to 2.11.13.3, 2.11.13.4, and 2.11.13.5.
- (d) Hinges shall conform to 2.11.13.4.

#### **8.7.2.10.5 Marking of Entrance Assemblies**

- (a) In jurisdictions enforcing the NBCC the following shall apply:
  - (1) When an entrance or door panel is altered, it shall have the fire protection rating not less than that of the existing entrance assembly
  - (2) it shall be labeled in accordance with NBCC

#### **8.7.2.10★1 Removing Service to a Floor**

Where service to a floors area is being discontinued, the following requirements shall apply:

- (a) entrances shall be bolted shut
- (b) the related interlock shall be removed from the safety string
- (c) the rated floor buttons shall be removed from the car operating station
- (d) 2.11.6.2

- (e) 2.12.7 if the locked out floor contained the hoistway access switch

#### **8.7.2.10★2 Addition of Hoistway Door Safety Retainers**

The addition of hoistway door safety retainers shall comply with the requirements of 2.11.11.8.

#### **8.7.2.11 Hoistway Door Locking Devices, Access Switches, and Parking Devices**

##### **8.7.2.11.1 Interlocks.**

- (a) Where the alteration consists of the installation of hoistway door interlocks, the installation shall conform to 2.12.1, 2.12.2, and 2.12.4 through 2.12.7, and ~~2.24.8.3~~.
- (b) Despite the requirements in (a), conformance to 2.12.5, 2.12.6 and 2.12.7 is optional provided conformance to 2.12.5, 2.12.6 and 2.12.7 is not required by another alteration scope.

##### **8.7.2.11.2 Mechanical Locks and Electric Contacts.**

Where the alteration consists of the installation of hoistway-door combination mechanical locks and electric contacts, the installation shall conform to 2.12.1, 2.12.3, 2.12.4, and 2.12.6, and ~~2.24.8~~.

##### **8.7.2.11.3 Parking Devices.**

Where an alternation is performed to an elevator operated from within the car only, an elevator parking device shall be provided conforming to the following requirements:

- (a) At every elevator landing that is equipped with an unlocking device, if
  - (1) the doors are not automatically unlocked when the car is within the unlocking zone
  - (2) the doors are not operable from the landing by a door open button or floor button
- (b) Parking devices shall be permitted to be provided at other landings.
- (c) Parking devices shall be located at a height not greater than 2 108 mm (83 in.) above the floor.
- (d) Parking devices shall conform to the following requirements:
  - (1) they shall be mechanically or electrically operated
  - (2) they shall be designed and installed so that friction or sticking or the breaking of any spring used in the device will not permit opening or unlocking a door when the car is outside the landing zone of that floor
  - (3) springs, where used, shall be of the restrained compression type, which will prevent separation of the parts in case the spring breaks

##### **8.7.2.11.4 Access Switches and Unlocking Devices.**

Where the alteration consists of the installation of hoistway access switches and/or hoistway-door unlocking devices, the installation shall conform to

- (a) requirements 2.12.6 and ~~2.24.8.3~~ for unlocking devices
- (b) requirements 2.12.7, ~~2.24.8~~, and 2.26.1.4 for access switches.

##### **8.7.2.11.5 Restricted Opening of Hoistway Doors or Car Doors of Passenger Elevators.**

Where a device that restricts the opening of hoistway doors or car doors is altered or installed, the device shall conform to 2.14.5.7.

##### **8.7.2.12 Power Operation of Hoistway Doors.**

Where the alteration consists of the addition of, or alteration to, power opening or power closing of hoistway doors, the installation shall conform to 2.13, 8.7.2.10.1, 8.7.2.10.2, 8.7.2.10.3, and 8.7.2.10.5.

#### **8.7.2.12★1 Replacement of Door Operator**

Where a door operator is replaced the replacement shall conform to the applicable requirements of 2.13 and 8.7.2.15★1, or 8.7.2.15★2.

### **8.7.2.13 Door Reopening Device.**

Where a reopening device for power-operated car doors or gates is altered or added **or replaced**, the following requirements shall apply:

- (a) requirement 2.13.4
- (b) requirement 2.13.5
- (c) when firefighters' emergency operation is provided, door reopening devices and door closing on Phase I and Phase II shall comply with the requirements applicable at the time of installation of the firefighters' emergency operation
- (d) requirements 8.7.2.15★1 or 8.7.2.15★2.

### **8.7.2.14 Car Enclosures, Car Doors and Gates, and Car Illumination**

**8.7.2.14.1** Where an alteration consists of the installation of a new car, the installation shall conform to 2.14, 2.15, and 2.17 (see also 8.7.2.15.1).

#### **8.7.2.14★1 Installation / Replacement of Car Operating Panel (COP)**

The disconnect and reconnect of COP wiring shall be confirmed to verify functionality of COP features and operating devices. Requirement 8.7.2.15★1 or 8.7.2.15★2 applies.

#### **8.7.2.14★2 Installation of Video/Security Cameras and Monitors**

Wiring methods shall conform to 2.8.2.1. Equipment shall be securely fastened and shall not create headroom issues per 2.14.1.2.3 and 2.14.2.4. Requirement 8.7.2.15★1 or 8.7.2.15★2 applies.

#### **8.7.2.14★3 Installation of Other Equipment**

The installation of other equipment is not permitted per 2.14.1.9 unless otherwise permitted under by a variance request.

**8.7.2.14.2** The following requirements shall be conformed to where alterations are made to existing cars:

- (a) Car enclosures shall conform to 2.14.1.2.
- (b) Where an alteration is made to a top emergency exit, or where a new one is installed, it shall conform to 2.14.1.5.
- (c) Where an alteration consists of the installation of glass in an elevator car, it shall conform to 2.14.1.8.
- (d) Any equipment added to an elevator car shall conform to 2.14.1.9. **and 8.7.2.15★1 or 8.7.2.15★2 as applicable.**
- (e) All side emergency exits shall be permanently fixed in the closed position. The corresponding side emergency exit on an adjacent car shall also be fixed in the closed position.
- (f) Any alteration to passenger car ventilation shall conform to 2.14.2.3.
- (g) Any alteration to car illumination or lighting fixtures shall conform to 2.14.7.
- (h) Where partitions are installed in elevator cars for the purpose of reducing the inside net platform areas for passenger use, they shall conform to 2.16.1.2. Where conditions do not permit symmetrical loading, guide rails, car frames, and platforms shall be capable of sustaining the resulting stresses and deflections.
- (i) Where an alteration consists of the installation of a car door or gate on an existing elevator car, the installation shall conform to 2.14.4, 2.14.5, and 2.14.6.

**8.7.2.14.3 N/A** - In jurisdictions not enforcing the NBCC

**8.7.2.14.4** In jurisdictions enforcing the NBCC, where any alteration is made to the car enclosure, car doors, or car gates, other than as specified in 8.7.2.14.2, the installation shall conform to 2.14, except that existing car enclosure materials exposed to the hoistway are not required to conform to the flame spread ratings. The existing flame spread rating shall not be diminished.

#### **8.7.2.14★4 Installation of Car Top Guardrail (245/10)**

- (a) A standard car top guardrails shall:
  - (1) have a top rail not less than 1070 mm (42 in.) above the working surface, or as amended by 2.10.2.1;
  - (2) have a mid rail (or equivalent structural member);
  - (3) have a toe-board to a height of 125 mm (5 in.) above the working surface;



- (4) be fixed in position and designed to resist the loads<sup>1,2</sup> specified in O. Reg. 332/12 ~~350/06~~ (Building Code) Article ~~4.1.5.14~~ ~~4.1.5.15~~, as required by Reg. 851 (Regulations for Industrial Establishments) Section 14(2). See table in 5.2 for reference; and
- (5) not deflect beyond the perimeter of the car top [A17.1/B44 2.14.1.7.1], and in no case shall the deflection exceed 75 mm (3 in.) when the forces of A17.1/B44 2.10.2.4 are applied.

<sup>1</sup> For Limit States Design a principal load factor of 1.5 applies per sentence ~~4.1.3.2(6)~~ ~~4.1.3.2(5)~~ of O. Reg. ~~332/12~~ ~~350/06~~ (Building Code).

<sup>2</sup> For Allowable Stress Design, typically 66% of ultimate stress (1.5 safety factor) is applied to material strength, in which case the stated loads are not factored.

- (b) Where a car top railing is installed, the installation shall conform to 2.14.1.7. Where conformance with 8.7.2.14 ★4(a)(1) is not possible due to existing overhead conditions, a foldable, collapsible or other stow able design shall be acceptable provided that:
  - (1) the car will not operate in “top-of-car inspection operation” unless the railing is in the fully extended position,
  - (2) the car will not operate in “normal operation”, “hoistway access operation”, or any type of “inspection operation” other than “top-of-car inspection operation”, unless the railing is in the fully retracted position,
  - (3) switches used to monitor the fully collapsed position shall have contacts that are positively opened mechanically when the railing is moved from its fully collapsed position (leaving the collapsed position will forcibly and positively remove the car from all modes of operation and top-of-car operation cannot be engaged until the extended position is reached),
  - (4) the switch used to monitor the fully collapsed position shall comply with the requirements of the car top transfer switch when in the open position, except the top-of-car operation shall not be permitted until the guardrail is in the fully extended position,
  - (5) switches used to monitor the fully extended position shall have contacts that are positively opened mechanically when the railing is moved from its fully extended position (leaving the extended position will forcibly and positively remove the car from top-of-car operation and other modes of operation cannot be engaged until the collapsed position is reached),
  - (6) related circuits for switches used to monitor the fully collapsed and fully extended position of the guardrail shall comply with 2.26.9.3 and 2.26.9.4,
  - (7) electrical means shall be provided to prevent upward movement of the car beyond the point required to maintain top of car clearances when the railing is not in the fully collapsed position,
  - (8) when in the fully extended position the handrail shall meet the height requirements of 2.14.1.7.
  - (9) a suitably designed and marked fall arrest anchor point shall be provided if there is worker exposure to a fall hazard (per Section 85 of Reg. 851, Regulations for Industrial Establishments) while engaging or lowering the alternative height guardrail where provided.
- (c) Where a car top railing is installed the requirements of 8.7.2.15 ★1 or 8.7.2.15 ★2 apply.

### 8.7.2.15 Car Frames and Platforms

#### 8.7.2.15.1 Alterations to Car Frames and Platforms.

Where alterations are made to a car frame or platform, the frame and platform shall conform to 2.15. Where roller or similar-type guide shoes are installed, that allow a definite limited movement of the car with respect to the guide rails, the clearance between the safety jaws and rails of the car shall be such that the safety jaws cannot touch the rails when the car frame is pressed against the rail faces with sufficient force to take up all movement of the roller guides.

#### 8.7.2.15 ★1 (171/02)

Where an alteration results in a cumulative decrease in the deadweight of the car by less than 5% of car and capacity as originally installed, or causes a cumulative increase to the deadweight of the car by 115kg (255 Lbs.) including all weight changes since the car was originally installed the following requirements shall apply, except (a) does not apply if the cumulative increase is 11kg (25 Lbs.) or less;

- (a) cars and counterweights shall be weighed prior to the alteration to establish starting weights
- (b) materials added or removed during the alteration shall be weighed in or out, or the car shall be weighed after the alteration to establish final weight changes
- (c) add on weight (or decreased weight) shall be recorded on an auxiliary data tag and posted on the crosshead or for cars without crossheads in a conspicuous location on the car top or adjacent to the original data
- (d) an auxiliary data tag shall as a minimum contain;

- (1) the date of the alteration,
- (2) the weight added or removed from the car
- (3) the weight added or removed from the counterweight
- (4) the name of the alteration contractor
- (5) the measured car weight prior to the alteration

- (e) where glass, mirror, or overhead finishes are added to the car interior, a no load governor tripping speed safety tests or a no load rated speed buffer test shall be performed to ensure the security of finishes prior to the devices return to service (Minor A and Minor B alterations ONLY). For hydraulic elevators and emergency stop from rated speed in the up direction shall be performed.

**8.7.2.15★2 (171/02)**

Where an alteration results in an increase in the deadweight of the car by more than 115 kg (255 Lbs.) but less than 5% of car and capacity as originally installed including all weight changes since the car was originally installed the following requirements shall apply;

- (a) requirements 8.7.2.15★1(a) through 8.7.2.15★1(e)
- (b) an engineering assessment shall confirm compliance of any components affected by the weight change, including but not limited to;
  - (1) machines
  - (2) car and counterweight frames
  - (3) buffers
  - (4) traction and overbalance
  - (5) ropes
  - (6) plungers & working pressures
  - (7) safeties

**8.7.2.15.2 Increase or Decrease in Deadweight of Car.**

Where an alteration results in an increase or decrease in the deadweight of the car that is sufficient to increase or decrease the sum of the deadweight and rated load, as originally installed, by more than 5%, the installation shall conform to the following requirements:

- (a) requirement 2.15, except the car platform guard (apron) shall conform to 2.15.9 only to the extent the existing pit shall permit, but in no case less than the leveling or truck zone plus 75 mm (3 in.)
- (b) requirement 2.16
- (c) requirement 2.17
- (d) requirement 2.18
- (e) requirement 2.20
- (f) requirement 2.21, except as covered by 8.7.2.22.2
- (g) requirement 2.22, except for 2.22.4.7, provided that conformance with
  - (1) requirement 2.22.4.10 is established otherwise
  - (2) requirement 2.22.4.5(b) can be established by other means such as adding a buffer switch conforming to 2.26.2.22
- (h) requirement 2.23
- (i) requirement 2.24, except 2.24.1
- (j) requirement 8.7.2.9
- (k) requirement 8.7.2.15★1(a) through 8.7.2.15★1(e)

#### **8.7.2.16 Capacity, Loading, and Classification 8.7.2.16.1 Change in Type of Service.**

Where an alteration consists of a change in type of service from freight to passenger or passenger to freight, the installation shall conform to:

- (a) requirements 2.11.1 through 2.11.3, and 2.11.5 through 2.11.8
- (b) requirements 2.12 and 2.13
- (c) requirement 2.22, except 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11
- (d) requirements 2.14 and as amended by 8.7.2.14★4 and 2.15, except the car platform guard (apron) shall conform to 2.15.9 only to the extent the existing pit shall permit, but in no case less than the leveling or truck zone, plus 75 mm (3 in.)
- (e) requirement 2.17, except that where gradual wedge-clamp and drum-operated flexible guide-clamp safeties are reused, the stopping distances shall conform to the requirements of the Code at the time of installation [see ASME A17.2, Table 2.29.2(c)]
- (f) requirement 2.18, except that the pitch diameters of speed governor sheaves and governor tension sheaves are not required to conform to 2.18.7
- (g) requirements 2.16, 2.20, 2.24 through 2.27, except 2.24.1
- (h) requirement 2.19

**8.7.2.16.2 Change in Class of Loading.** Where the class of loading of a freight elevator is changed, it shall conform to 2.16.2 (see also 8.7.2.16.4).

#### **8.7.2.16.3 Carrying of Passengers on Freight Elevators.**

Where the alteration consists of a change in type of service from a freight elevator to a freight elevator permitted to carry passengers, the elevator shall conform to:

- (a) 2.16.4
- (b) CAD 3.12 or extent pit permits
- (c) signage requirements in 2.16.5.

#### **8.7.2.16.4 Increase in Rated Load.**

Where an alteration involves an increase in the rated load, the installation shall conform to the following:

- (a) Car doors or gates shall be provided at all car entrances. Where new car doors or gates are installed, they shall conform to 2.14.4, 2.14.5, and 2.14.6.
- (b) Requirement 2.15, except the car platform guard (apron) shall conform to 2.15.9 only to the extent the existing pit shall permit, but in no case less than the leveling or truck zone, plus 75 mm (3 in.).
- (c) Requirement 2.16.
- (d) Requirement 2.17.
- (e) Requirement 2.18, except that the pitch diameters of existing governor sheaves are not required to conform to 2.18.7.
- (f) Requirement 2.19.
- (g) Requirement 2.20.
- (h) Requirement 2.21, except as covered by 8.7.2.22.2.
- (i) Requirement 2.22, except 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11.
- (j) Requirement 2.23.
- (k) Requirement 2.24.
- (l) Requirements 2.26.1.4 and 2.26.1.5.
- (m) Requirement 2.26.5.
- (n) Requirement 8.7.2.9.

#### **8.7.2.17 Change in Rise or Rated Speed**

##### **8.7.2.17.1 Increase or Decrease in Rise.**

Where an alteration involves an increase or decrease in the rise without any change in the location of the driving machine, the following requirements shall be conformed to:

- (a) The terminal stopping devices shall be relocated to conform to 2.25.
- (b) Where the increase in rise is less than 4 570 mm (180 in.), an existing winding-drum machine shall be permitted to be retained, provided the drum is of sufficient dimensions to serve the increased rise with not less than one full turn of wire rope remaining on the winding drum when the car or counterweight has reached its extreme limits of travel.
- (c) The bottom and top clearances and runbys for cars and counterweights shall conform to 2.4, except as follows:
  - (1) Where the increase in rise is at the upper end of the hoistway, the existing bottom car clearance and car and counterweight runby are not required to conform to 2.4. However, if existing clearances are less than as required by 2.4, they shall not be decreased by the change in rise.
  - (2) Where the increase in rise is at the lower end of the hoistway, the existing overhead car and counterweight clearances are not required to conform to 2.4. However, if existing clearances are less than as required by 2.4, they shall not be decreased by the change in rise.
  - (3) Where the decrease in rise is at the lowest end of the rise, the installation shall conform to 2.2.4, 2.2.5, and 2.2.6.

#### **8.7.2.17.2 Increase in Rated Speed**

- (a) Increase in the rated speed of a winding-drum machine is prohibited, except as permitted in 8.7.2.17.2(c).
- (b) Where the alteration involves an increase in the rated speed, except as specified in 8.7.2.17.2(c), the following requirements shall be conformed to:
  - (1) The bottom runbys and the top clearances for cars and counterweights shall conform to 2.4.2 through 2.4.11.
  - (2) Horizontal clearances shall conform to 2.5.
  - (3) The car and counterweight buffers shall conform to 2.22, except that existing buffers, where retained, are not required to conform to 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11.
  - (4) Car doors or gates shall be provided at all car entrances. Where new car doors or gates are installed, they shall conform to 2.14.
  - (5) The car safety, the counterweight safety (where provided), and the governor shall conform to 2.17 and 2.18, except that the pitch diameters of speed governor sheaves and governor tension sheaves are not required to conform to 2.18.7. Where the new rated speed is greater than 3.5 m/s (700 ft/min), compensating rope tie-down shall be provided in compliance with 2.21.4.2.
  - (6) The capacity and loading shall conform to 2.16.
  - (7) The driving machine and sheaves shall conform to 2.24.
  - (8) The terminal stopping devices shall conform to 2.25.
  - (9) The operating devices and control equipment shall conform to 2.26, except that 2.26.4.1 through 2.26.4.3 shall apply only to the electrical wiring and equipment altered. Requirement 2.26.4.4 does not apply.
  - (10) Suspension ropes and rope connection shall conform to 2.20.
  - (11) Car overspeed protection and unintended car movement protection shall conform to 2.19.
- (c) Where the increase in rated speed does not exceed 10% and does not exceed 0.20 m/s (40 ft/min), and is a result of a power supply change, and the new motor speed cannot match the existing motor speed, the installation is not required to conform to 8.7.2.17.2(b), except that the new rated speed shall not
  - (1) exceed 0.75 m/s (150 ft/min) for Type A safeties
  - (2) exceed 1 m/s (200 ft/min) when spring buffers are provided Governors shall be adjusted to conform to 2.18.2.1 and 2.18.2.2 (see also 8.7.2.27.3).

#### **8.7.2.17.3 Decrease in Rated Speed.**

Conformance with the following requirements shall be required when the alteration involves a decrease in the rated speed.

- (a) Where the bottom runbys and the top clearances for cars and counterweights are less than as required by 2.4, they shall not be decreased by the speed reduction.
- (b) The tripping speed of the car speed governor and the counterweight speed governor, where provided, shall be adjusted to conform to 2.18.2 for the new rated car speed.
- (c) The capacity and loading shall conform to 2.16.
- (d) Capacity and data plates shall conform to 2.16.3, except the information required by 2.16.3.2.2(d) shall include the name of the company doing the alteration and the year of the alteration.

(e) New electrical equipment and wiring shall conform to 2.26.4.1, 2.26.4.2, and 2.26.4.3.

#### **8.7.2.18 Car and Counterweight Safeties**

**8.7.2.18.1** Where the alteration consists of the installation of new car safeties, the car safeties, car speed governor, and car guide rails shall conform to 2.17, 2.18, and 2.23, except as noted in 8.7.2.19.

**8.7.2.18.2** Where the alteration consists of the installation of new counterweight safeties, the counterweight safeties, counterweight speed governor, and counterweight guide rails shall conform to 2.17, 2.18, and 2.23, except as noted in 8.7.2.19.

**8.7.2.18.3** Where any alterations are made to existing car or counterweight safeties, the affected safeties, governors, and guide rails shall conform to 2.17.1 through 2.17.9, 2.17.15, 2.18, and 2.23, except as noted in 8.7.2.19.

**8.7.2.18.4** Where existing rail reactions are not increased by the installation of new safeties, the existing hoistway construction for bracket support need not be modified.

#### **8.7.2.19 Speed Governors and Governor Ropes.**

Where any alteration is made to a speed governor, or where a new governor is installed, it shall conform to 2.18. Where there is a releasing carrier, it shall conform to 2.17.15. Governor ropes of a different material, or construction than originally specified by the governor manufacturer shall be permitted, provided that

- (a) there is conformance with 2.18.6 and 2.18.7, except that the pitch diameters of existing governor sheaves and tension sheaves are not required to conform to 2.18.7
- (b) a test is made of the car or counterweight safety and speed governor with the new rope to demonstrate that the safety will function as required by 2.17.3

#### **8.7.2.20 Ascending Car Overspeed and Unintended Car Movement Protection.**

The requirements of 2.19 shall be conformed to where a device for protection against ascending car overspeed and unintended car movement is altered or installed.

##### **8.7.2.20★1**

If elevator controllers are pre-B44-00 and the installation is already equipped with Ascending Car Overspeed (ACO) and Unintended Car Movement (UCM) protection, the installation shall conform to 2.19 except the detection means is permitted to meet B44-M90 or the code at the time of the alteration. The means shall require manual reset. The code data tag shall reflect under which code edition the ACO and UCM detection was provided.

##### **8.7.2.20★2**

If elevator controllers are pre-B44-00 and the installation is equipped with only ACO protection, the installation shall conform to 2.19.1, 2.19.3, and 2.19.4, except the detection means is permitted to meet B44-M90 or the code at the time of the alteration. The means shall require manual reset. The code data tag shall reflect under which code edition the ACO detection was provided.

##### **8.7.2.20★3**

Where the alteration includes the voluntary addition of ACO and UCM protection, the installation shall conform to; 2.19 except the detection means is permitted to meet B44-M90 or the code at the time of the alteration and 2.7 as applicable to the installation of the equipment. The means shall require manual reset. The code data tag shall reflect under which code edition the ACO and UCM detection was provided.

#### **8.7.2.21 Suspension Means and Their Connections**

##### **8.7.2.21.1 Change in Suspension Members.**

Where the material, grade, number, or size of suspension members is changed, the new suspension members and their fastenings shall conform to 2.20. When existing sheaves are retained using suspension members different from those

originally specified, the original elevator manufacturer or a licensed professional engineer shall certify the sheave material to be satisfactory for the revised application.

**8.7.2.21.2 Addition of Suspension-Member Equalizers.**

Where suspension-member equalizers are installed, they shall conform to 2.20.5.

**8.7.2.21.3 Addition of Auxiliary Suspension-Member-Fastening Devices.**

Where auxiliary suspension-member-fastening devices are installed, they shall conform to 2.20.

**8.7.2.21.4 Exception for Suspension-Means Monitoring and Protection.**

- (a) Where there is a change to the type of suspension means the installation shall conform to 2.20.8 and 2.20.11.
- (b) If a traction-loss detection means is provided, it shall comply with 2.20.8.1.
- (c) If a broken suspension-means detection means is provided, it shall comply with 2.20.8.2.

**Note:** Elevators installed to editions prior to A17.1-2007, including A17.1a-2008, are exempt from all of the requirements of 2.20.8 and 2.20.11 provided that there is no change to the type of suspension means and that there is no alteration to the means themselves.

**8.7.2.22 Counterweights**

**8.7.2.22.1** Where alterations are made to any part of a counterweight assembly, except guiding members, the installation shall conform to 2.21, except as specified by 8.7.2.22.2. See also 8.7.2.3.

**8.7.2.22.2** Rod-type counterweights shall be permitted to be retained, provided they are equipped with a minimum of two suspension rods and two tie rods. The two suspension rods shall conform to 2.21.2.1 and 2.21.2.3 and shall be provided with locknuts and cotter pins at each end. The tie rods shall conform to 2.21.1.2. Means shall be provided on each side of the counterweight to maintain the distance between the top and bottom guide weights in the event the counterweight lands on the buffer.

**8.7.2.22.3** Where roller or similar-type guide shoes are installed, that allow a definite limited movement of the counterweight with respect to the guide rails, the clearance between the safety jaws and rails of the counterweight shall be such that the safety jaws cannot touch the rails when the counterweight frame is pressed against the rail faces with sufficient force to take up all movement of the roller guides.

**8.7.2.23 Car and Counterweight Buffers and Bumpers.**

Where alterations are made to car and counterweight buffers or bumpers, they shall conform to 2.22. The buffers are not required to conform to 2.22.4.7 if

- (a) the buffer's load rating and properties defining method of absorbing and dissipating energy has not been altered
- (b) the load rating of the buffer can be established by other means such as using original design data, original type testing data, marking plate, etc.
- (c) the conformance with 2.22.4.5(b) can be established by other means such as adding a buffer switch conforming to 2.26.2.22

**8.7.2.24 Guide Rails, Supports, and Fastenings.**

Where alterations are made to car and counterweight guide rails, guide-rail supports, or guide-rail fastenings, or where the stresses have been increased by more than 5%, the installation shall conform to 2.23. Guide rails, supports, fastenings, and joints of different design and construction than those provided for in 2.23 shall be permitted to be retained provided they are in accordance with sound engineering practice and will adequately maintain the accuracy of the rail alignment.

### **8.7.2.25 Driving Machines and Sheaves**

#### **8.7.2.25.1 Alterations to Driving Machines and Sheaves**

- (a) Where a driving machine is **replaced, or** installed as part of an alteration, the installation shall conform to 2.7.2, 2.9, 2.10.1, 2.19 **as required by 8.7.2.20 and 8.7.2.20★1 through 8.7.2.20★3**, 2.20, 2.24, and 2.26.8. Requirement 2.7.2 applies to the extent existing installations permit.
- (b) Where alterations are made to driving machine components, the affected components shall conform to 2.24.2 through 2.24.9 and 2.26.8.
- (c) Where an alteration consists of a change in the driving-machine sheave, the suspension ropes and their connections shall conform to 2.20. The sheave shall conform to 2.24.2, 2.24.3, and 2.24.4.

#### **8.7.2.25★1**

Where the driving machine worm or gear is replaced, the replaced components shall conform to the applicable requirements of 2.24.

**Note: Refer to 8.7.2.7★1 for the addition of machine guarding.**

#### **8.7.2.25.2 Change in Location of Driving Machine**

- (a) Where the location of the driving machine is changed with no increase or decrease in rise, the installation shall conform to 2.7.2, 2.9, 2.10.1, and 2.24.2.3.
- (b) Where the location of the driving machine is changed with an increase or decrease in rise, the entire installation shall conform to Part 2, except for the following:
  - (1) requirement 2.5 (see also 8.7.2.5).
  - (2) requirement 2.11 (see also 8.7.2.10).
  - (3) where the increase in rise is at the upper end of the hoistway, the existing bottom car clearance and car and counterweight runby are not required to conform to 2.4. However, if existing clearances are less than as required by 2.4, they shall not be decreased by the change in rise.

### **8.7.2.26 Terminal Stopping Devices.**

Where an alteration is made to any terminal stopping device, the installation shall conform to 2.25.

### **8.7.2.27 Operating Devices and Control Equipment / Inspection Operation and Inspection Operation with Open Door Circuits**

#### **8.7.2.27.1 Top-of-Car Operating Devices.**

Where there is an alteration to or addition of top-of-car inspection operation, it shall conform to 2.26.1.4.

#### **8.7.2.27★1**

Where there is an alteration to or addition of any type of inspection operation (see 2.26.1.4.1(a)), the alteration shall conform to the applicable requirements in 2.26.1.4.

#### **8.7.2.27★2**

Where there is an addition of a top-of-car operating device, the requirements of 2.26.1.4 apply. See CAD **3.8.3**. Requirement 8.7.2.15★1 or 8.7.2.15★2 applies.

#### **8.7.2.27.2 Car Leveling or Truck Zoning Devices.**

Where there is an alteration to or addition of a car leveling device, or a truck zoning device, it shall conform to 2.26.1.6.

#### **8.7.2.27★3**

Where there is an alteration to or addition of car door bypass or hoistway door bypass switches, the alteration shall conform to 2.26.1.5.

#### 8.7.2.27★4

Where there is an alteration to or addition of a system to monitor and prevent automatic operation of the elevator with faulty door contact circuits on power-operated car doors that are mechanically coupled with the landing doors while the car is in the landing zone, the alteration shall conform to the requirements in 2.26.5.

#### 8.7.2.27.3 Change in Power Supply.

Where an alteration consists of a change in power supply at the mainline terminals of the elevator motion controller or motor controller, involving one of the following, whichever is applicable:

- (a) change in voltage, frequency, or number of phases
- (b) change from direct to alternating current or vice versa
- (c) change to a combination of direct and alternating current Electrical equipment shall conform to 2.26.1.1, 2.26.1.2, 2.26.1.3, 2.26.1.4, 2.26.1.6, 2.26.2, 2.26.6, 2.26.7, 2.26.9, and 2.26.10. All new and modified equipment and wiring shall conform to 2.26.4.1, 2.26.4.2, and 2.26.4.3. Brakes shall conform to 2.24.8 and 2.26.8. Winding-drum machines shall be provided with final terminal stopping devices conforming to 2.25.3.5 [see also 8.7.2.17.2(b)].

#### 8.7.2.27.4 Controllers

- (a) Where a motion controller or operation controller is installed without any change in the type of operation control or motion control, it shall conform to the following:
  - (1) Terminal stopping devices shall conform to 2.25.
  - (2) The operating devices and control equipment shall conform to 2.26.1.4, 2.26.1.5, 2.26.1.6, 2.26.2 through 2.26.9, and 2.26.11.
  - (3) Requirement 2.27.2 applies when emergency power is provided.
  - ~~(4) In jurisdictions not enforcing NBCC, 2.27.3 through 2.27.9 apply~~
    - ~~(a) when travel is 8 m (25 ft) or more above or below the designated landing; or~~
    - ~~(b) on installations when firefighters' emergency operation was required or provided at the time of installation.~~
  - (5) In jurisdictions enforcing NBCC, 2.27.3 through 2.27.9 apply ~~only if firefighters' emergency operation was required or provided at the time of installation.~~
  - (6) requirement 2.7.9.2
- (b) Where a controller for the operation of hoistway doors, car doors, or car gates is installed, all new and modified equipment and wiring shall conform to 2.26.4.1 and 2.26.4.2.
- (c) Where a controller for the elevator operation on emergency or standby power systems or firefighters' emergency operation is installed, all new and modified equipment and wiring shall conform to 2.26.4.1 and 2.26.4.2.
- (d) Equipment and floors shall be identified as required by 2.29.

#### 8.7.2.27★5

Where an elevator controller is relocated and requires disconnection and reconnection of field wiring, requirement 2.8.2 applies. The installation shall be tested to verify functionality of all circuits impacted by the relocation.

#### 8.7.2.27.5 Change in Type of Motion Control.

Where there is a change in the type of motion control, the installation shall conform to the following:

- (a) The protection of the hoistway landing openings shall conform to
  - (1) 2.11.1 except;
    - (a) existing entrance openings less than 2030 mm in height or 800 mm in width are permitted to be retained
    - (b) requirement 2.11.1.4
  - (2) 2.11.2 through 2.11.6, except 2.11.6.3
  - (3) 2.11.8, 2.11.9
  - (4) 2.11.11.8 for horizontally sliding center opening and single speed entrances
  - (5) 2.11.12.8
  - ~~through 2.11.13, except 2.11.11.9,~~



- (6) 2.12, except
    - (a) requirement 2.12.2.4.3 to allow a minimum engagement of 6 mm
    - (b) 2.12.4, and
  - (7) 2.13.
- (b) Car enclosures and car doors or gates shall conform to 2.14, the loading requirements specified by 2.14.1.6, and the requirements of 2.14.1.7 including the provisions of 2.14.1.7.5 for non standard guardrails, as specified in the CAD, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:
    - (1) requirements 2.14.1.3, 2.14.1.5.1, and 2.14.1.8, 2.14.1.9 and 2.14.1.10
    - (2) requirements 2.14.2.1, 2.14.2.3 through 2.14.2.6, and 2.14.2.4
    - (3) requirement 2.14.3
    - (4) requirements 2.14.4.2.5, 2.14.4.3, 2.14.4.5.1(c) and 2.14.4.6
    - (5) requirements 2.14.5.1, 2.14.5.6 through 2.14.5.8
    - (6) requirements 2.14.7.1.3, 2.14.7.1.4 and 2.14.7.2 through 2.14.7.4
  - (c) The car safety, the counterweight safety (where provided), and the governor shall conform to 2.17 and 2.18, except that:
    - (1) where the safety factors required by 2.17.12.1 cannot be ascertained, performance testing shall be accepted, and
    - (2) the pitch diameter of speed governor sheaves and governor tension sheaves are not required to conform to 2.18.7.
  - (d) The capacity and loading shall conform to 2.16.8 (e), (f), (g) and (h).
  - (e) The terminal stopping devices shall conform to 2.25.
  - (f) The operating devices and control equipment shall conform to 2.26. The requirements of 2.26.4.2, 2.26.4.3, and 2.26.4.4 shall not apply to electrical equipment unchanged by the alteration.
  - ~~(g) In jurisdictions not enforcing NBCC, emergency operation and signaling devices shall be provided and shall conform to 2.27.~~  
 In jurisdictions enforcing NBCC, emergency operation and signaling devices where required by NBCC shall be provided and where required by NBCC shall be provided and shall conform to 2.27
  - (h) Car overspeed protection and unintended movement protection shall conform to 2.19 as required by 8.7.2.20 and 8.7.2.20★1 through 8.7.2.20★3.
  - (i) Equipment and floors shall be identified as required by 2.29.
  - (j) requirement 2.7.9.2

#### 8.7.2.27.6 Change in Type of Operation Control.

Where there is a change in the type of operation control, the installation shall conform to the following:

- (a) The protection of the hoistway landing openings shall conform to 2.11.1 through 2.11.13, 2.12, and 2.13.
- (b) Car enclosures and car doors or gates shall conform to 2.14, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:
  - (1) requirements 2.14.1.3, 2.14.1.5.1, and 2.14.1.8
  - (2) requirements 2.14.2.1, 2.14.2.3, and 2.14.2.4
  - (3) requirement 2.14.3
  - (4) requirement 2.14.4.3 and 2.14.4.6
- (c) The car safety, the counterweight safety (where provided), and the governor shall conform to 2.17 and 2.18, except that the pitch diameter of speed governor sheaves and governor tension sheaves are not required to conform to 2.18.7.
- (d) The capacity and loading shall conform to 2.16.
- (e) The terminal stopping devices shall conform to 2.25.
- (f) The operating devices and control equipment shall conform to 2.26. The requirements of 2.26.4.2, 2.26.4.3, and 2.26.4.4 shall not apply to electrical equipment unchanged by the alteration.
- (g) Emergency operation and signaling devices shall be provided and shall conform to 2.27.

- (h) Equipment and floors shall be identified as required by 2.29.
- (i) requirement 2.7.9.2

**8.7.2.27.★6**

Where a Patient Wandering feature is added, doors shall close per 2.13.5.3 and the activation of phase 1 recall shall not be prevented per 2.27.3.1.6(l).

**8.7.2.27.★7**

Where security / floor lockout systems are added the following shall apply:

- (a) egress floor shall not be restricted when on FEO,
- (b) door open buttons shall remain operative,
- (c) requirement 2.11.6.2, and
- (d) travel to all serviced landing shall be possible per 2.27.3.3.1(i).

**8.7.2.27.★8**

Where destination dispatch is added to an automatic operation control the following shall apply:

- (a) 8.7.2.8
- (b) changes to FEO shall apply to either 8.7.2.28 or to the code applicable at the time of the original installation or subsequent FEO related alteration.

**8.7.2.27.7** On passenger elevators equipped with nonperforated car enclosures, the emergency stop switch, including all markings, shall be permitted to be removed if an in-car stop switch conforming to 2.26.2.21 is provided. The stop switch shall conform to 2.26.4.3, and a single failure shall not render the In-Car stop switch ineffective per 2.26.9.3.

**8.7.2.27.8 Electrical Protective Devices.**

Where there is an alteration to or addition of an electrical protective device, it shall conform to 2.26.2 for that device.

**8.7.2.28 Emergency Operations and Signaling Devices**

- (a) Where an alteration is made to car emergency signaling devices, the alteration shall conform to 2.27.1.
- (b) Where an alteration is made to, or consists of the addition of, an emergency or standby power system, the installation shall conform to the requirements of 2.27.2.
- (c) Where an alteration is made to, or consists of the addition of, firefighters' emergency operation, the installation shall conform to 2.27.3 through 2.27.8.
- (d) Where the alteration consists of the addition of an elevator to a group, all elevators in that group shall conform to 2.27.

**8.7.2.28★1 (175/02)**

Where the method of recall is being upgraded from manual to automatic recall, FEO features are permitted to operate as required at the time of the original FEO installation. Where the main recall level is not sprinklered, alternate floor recall shall be provided.

**8.7.2.28★2 (60/88) (105/93) (219/07)**

Where a firecode retrofit was required but not provided, and conformance to provide FEO is now being sought, the FEO features shall be as required by CAD 3.20.

**8.7.3.★ Alteration Hydraulic to Electric Elevator [CAD Amendment-261-13-r1]**

Where a hydraulic elevator that operated in an existing hoistway is being replaced with an electric elevator, the installation shall conform to Part 2, Electric Elevators, except for the following:

- (a) Existing building conditions not in conformance to the latest code maybe permitted to be retained
- (b) Apron plates must conform to 2.15.9 or where a 1220 mm (48 in.) apron is not possible due to existing pit depth, an engineered solution providing 1220 mm (48 in.) of guarding shall be permitted.

Note: Existing building conditions may include items such as pit depth or no pit drains. Items not in conformance with Part 2 shall be noted in the design submission.

### **8.7.3 Alterations to Hydraulic Elevators**

#### **8.7.3.1 Hoistway Enclosures.**

Alterations to hoistway enclosures shall conform to 8.7.2.1.

**8.7.3.2 Pits.** Alterations made to the pit shall conform to 2.1.2.3 and 2.2. See also 8.7.3.4.

#### **8.7.3.3 Location and Guarding of Counterweights.**

Where new counterweights are installed, they shall conform to 2.3 and 2.5.1.2. The installation shall also conform to 3.5.

#### **8.7.3.4 Vertical Car and Counterweight Clearances and Runbys.**

No alteration shall reduce any clearance or runby below that required by 3.4. Existing clearances shall be permitted to be maintained, except as required by 8.7.3.22.1, 8.7.3.22.2, and 8.7.3.23.5.

#### **8.7.3.5 Horizontal Car and Counterweight Clearances.**

No alteration shall reduce any clearance below that required by 2.5. Existing clearances shall be permitted to be maintained, except as required by 8.7.3.22.1, 8.7.3.22.2, and 8.7.3.23.5.

#### **8.7.3.6 Protection of Spaces Below Hoistways.**

Where alterations are made to an elevator or the building, such that any space below the hoistway is not permanently secured against access, the affected installation shall conform to 3.6.

#### **8.7.3.7 Machine Rooms and Machinery Spaces.**

Alterations to machine rooms and machinery spaces shall conform to 8.7.2.7.2 through 8.7.2.7.7. Where an alteration consists of the construction of a new machine room or machinery space enclosure, it shall conform to 2.7 and 3.7. Electrical equipment clearances shall conform to the requirements of NFPA 70 or CSA-C22.1, whichever is applicable (see Part 9). Where alterations are made to any portion of a machinery room or machinery space, the portion that is altered shall conform to 2.7 and 3.7.

#### **8.7.3.8 Electrical Wiring, Pipes, and Ducts in Hoistways and Machine Rooms.**

The installation of any new, or the alteration of existing, electrical equipment, wiring, raceways, cables, pipes, or ducts shall conform to the applicable requirements of 2.8.

#### **8.7.3.9 Machinery and Sheave Beams, Supports and Foundations.**

Where new machinery and sheave beams, supports, foundations, or supporting floors are installed, or where alterations increase the original building design reactions by more than 5%, they shall conform to 2.9, and the adequacy of the affected building structure to support the loads shall be verified by a licensed professional engineer.

#### **8.7.3.10 Hoistway Entrances and Openings.**

Alterations to hoistway entrances shall conform to 8.7.2.10, except that emergency doors meeting the requirements of 2.11.1 are only required to be installed in the blind portion of the hoistway where required by 8.7.2.10 and

- (a) for all elevators where car or counterweight safeties are used
- (b) for elevators where safeties are not used, emergency doors are not required on elevators where a manually operated valve is provided that will permit lowering the car at a reduced speed in case of power failure or similar emergency

#### **8.7.3.11 Hoistway Door Locking Devices.**

Alterations to hoistway door locking devices, access switches, parking devices, and unlocking devices shall conform to 8.7.2.11, except that conformance with 2.24.8 is not required.

#### **8.7.3.12 Power Operation of Hoistway Doors.**

Where the alteration consists of the addition of, or alteration to, power opening or power closing of hoistway doors, the installation shall conform to 2.13, 8.7.2.10.1, 8.7.2.10.2, 8.7.2.10.3, 8.7.2.10.5, 8.7.2.12★1, 8.7.2.12★2 and 8.7.3.10.

**8.7.3.13 Car Enclosures.** Where alterations are made to car enclosures, they shall conform to 8.7.2.14.

#### **8.7.3.14 Car Frames and Platforms.**

Where alterations are made to a car frame or platform, the frame and platform shall conform to 3.15. If safeties are used and if roller or similar-type guide shoes are installed, that allow a definite limited movement of the car with respect to the guide rails, the clearance between the safety jaws and rails of the car shall be such that the safety jaws cannot touch the rails when the car frame is pressed against the rail faces with sufficient force to take up all movement of the roller guides.

#### **8.7.3.15 Safeties**

**8.7.3.15.1** Where the alteration consists of the installation of car safeties, the car safeties and car guide rails shall conform to 3.17.1, 3.23, and 3.28.

**8.7.3.15.2** Where the alteration consists of the installation of counterweight safeties, the counterweight safeties and counterweight guide rails shall conform to 3.17.2, 3.23, and 3.28.

**8.7.3.15.3** Where any alterations are made to existing car or counterweight safeties, the affected safeties and guide rails shall conform to 3.17, 3.23, and 3.28, except for cross-referenced 2.17.10 through 2.17.14, 2.17.16, and 2.21.4.2.

#### **8.7.3.16 Governors and Governor Ropes.**

Where alterations are made to governors or where they are added, they shall conform to 8.7.2.19.

#### **8.7.3.17 Change in Type of Service.**

Where an alteration consists of a change in type of service from freight to passenger or passenger to freight, the installation shall conform to

- (a) requirements 2.11.1, 2.11.2, 2.11.3, and 2.11.5 through 2.11.8, except that emergency doors meeting the requirements of 2.11.1 are only required to be installed in the blind portion of the hoistway
  - (1) for all elevators where car or counterweight safeties are used
  - (2) for elevators where safeties are not used, emergency doors are not required on elevators where a manually operated valve is provided that will permit lowering the car at a reduced speed in case of power failure or similar emergency
- (b) requirements 2.12 and 2.13
- (c) requirements 2.22 and 3.22.2, except 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11
- (d) requirements 3.14, 3.15, 3.17, 3.21, and 3.23
- (e) requirement 2.18, where governors are provided, except that the pitch diameters of existing governor sheaves and tension sheaves are not required to conform to 2.18.7
- (f) requirements 3.16, 3.18, 3.19, 3.20, 3.24, 3.25, 3.26, and 3.27.

#### **8.7.3.18 Change in Class of Loading.**

Where the class of loading of a freight elevator is changed, it shall conform to 2.16.2 as modified by 3.16.

#### **8.7.3.19 Carrying of Passengers on Freight Elevators.**

Where the alteration consists of a change in type of service from a freight elevator to a freight elevator permitted to carry passengers, the elevator shall conform to 3.16.4.

#### **8.7.3.20 Increase in Rated Load.**

Where an alteration involves an increase in the rated load, the installation shall conform to 2.26.1.4, 2.26.1.5, 2.26.5, 3.14 through 3.17, 3.20, and 3.21 through 3.23 (see also 8.7.3.23.4).

### **8.7.3.21 Increase in Deadweight of Car.**

Where an alteration results in an increase in the deadweight of the car that is sufficient to increase the sum of the deadweight and rated load, as originally installed, by more than 5%, the installation shall conform to 3.14 through 3.17, 3.20, and 3.21 through 3.23 (see also 8.7.3.23.4).

#### **8.7.3.21★1 (171/02)**

Where an alteration results in a cumulative decrease in the deadweight of the car by less than 5% of car and capacity as originally installed, or causes a cumulative increases to the deadweight of the car by 115 kg (255 lbs.) or less including all weight changes since the car was originally installed the requirements of shall 8.7.2.15 ★1 apply.

#### **8.7.3.21★2 (171/02)**

Where an alteration results in a cumulative increase in the deadweight of the car by more than 115 kg (255 lbs.) but less than 5% of car and capacity as originally installed including all weight changes since the car was originally installed the requirements of 8.7.2.15 ★2 shall apply.

### **8.7.3.22 Change in Rise or Rated Speed**

#### **8.7.3.22.1 Increase or Decrease in Rise.**

Where an alteration involves an increase or decrease in the rise without any change in the location of the driving machine, it shall conform to the following:

- (a) The terminal stopping devices shall be relocated to conform to 3.25.
- (b) Where the increase in rise is at the lower end of the hoistway, bottom car and counterweight clearances and runbys shall conform to 3.4.1, 3.4.2, and 3.4.3, and existing top car and counterweight clearances and runbys that are less than as required by 3.4 shall not be decreased.
- (c) Where the increase in rise is at the upper end of the hoistway, top car and counterweight clearances, runbys, and refuge spaces shall conform to 3.4, and existing bottom car and counterweight clearances and runbys that are less than as required by 3.4 shall not be decreased.
- (d) The plunger shall conform to 3.18.2.
- (e) Where the decrease is at the lower end of the rise, the installation shall conform to 2.2.4, 2.2.5, and 2.2.6.

#### **8.7.3.22.2 Increase in Rated Speed.**

Where an alteration increases the rated speed, the installation shall conform to the following:

- (a) Requirement 2.5.
- (b) Requirement 3.4.
- (c) Requirements 3.21 and 3.22.2, except that existing buffers, where retained, are not required to conform to referenced 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11.
- (d) Car doors or gates shall be provided at all car entrances. Where new car doors or gates are installed, they shall conform to the applicable requirements of 3.14.
- (e) Car and counterweight safeties and governors, where provided, shall conform to 3.17, except that the pitch diameters of existing governor sheaves and tension sheaves are not required to conform to 2.18.7.
- (f) Requirement 3.16.
- (g) Requirement 3.25.
- (h) Requirements 3.26.1 through 3.26.6.
- (i) Requirement 3.20.

#### **8.7.3.22.3 Decrease in Rated Speed.**

When the alteration involves a decrease in the rated speed, it shall conform to the following:

- (a) If the bottom runbys and the top clearances for cars and counterweights are less than as required by 3.4, they shall not be decreased by the speed reduction.
- (b) The tripping speed of the car speed governor and the counterweight speed governor, where provided, shall be adjusted to conform to 2.18.2 for the new rated car speed.
- (c) The capacity and loading shall conform to 3.16.

- (d) Capacity and data plates shall conform to 3.16.3(b), except the information required by 2.16.3.2.2(d) shall include the name of the company doing the alteration and the year of the alteration.
- (e) New electrical equipment and wiring shall conform to 2.26.4.1 and 2.26.4.2.

### **8.7.3.23 Hydraulic Equipment**

#### **8.7.3.23.1 Hydraulic Jack.**

Where a hydraulic jack is installed, altered, or replaced, it shall conform to 3.18.

#### **8.7.3.23.2 Plungers.**

Where a new plunger is installed or an existing plunger is altered, it shall conform to 3.18.1.2 and 3.18.2.

#### **8.7.3.23.3 Cylinders.**

Where a cylinder is installed, replaced, altered, or sleeved, it shall conform to 3.18.3. If the plunger is not equipped with a stop ring conforming to 3.18.4.1, the installation shall also conform to 3.18.1.2 and 3.18.2.

#### **8.7.3.23.4 Increase in Working Pressure.**

Where an alteration increases the working pressure by more than 5%, the installation shall conform to 3.18, 3.19, and 3.24.1 through 3.24.4. Requirements 3.18.3.8 and 3.19.4.6 do not apply to existing equipment.

#### **8.7.3.23.5 Change in Location of Hydraulic Jack.**

Where location of the hydraulic jack is changed, the installation shall conform to Part 3.

#### **8.7.3.23.6 Relocation of Hydraulic Machine (Power Unit).**

Where the hydraulic machine is relocated so that the top of the cylinder is above the top of the storage tank, the installation shall conform to 3.26.8.

#### **8.7.3.23.7 Plunger Gripper.**

Where the alteration consists of the addition of a plunger gripper, the following conditions must be met:

- (a) the plunger gripper must comply with 3.17.3
- (b) requirement 3.1.1(b) shall apply
- (c) when buffers are compressed solid or to a fixed stop in accordance with 3.22.1, the plunger gripper shall not strike the car structure.

#### **8.7.3.23.7★1 Plunger Gripper.**

Where the alteration consists of the removal of a plunger gripper, the following conditions must be met:

- (a) the cylinder must conform to 3.18.3
- (b) an overspeed valve shall be installed in conformance with the requirements of 3.19.4.7
- (c) bottom car runby shall conform to 3.4.2.1

### **8.7.3.24 Valves, Pressure Piping, and Fittings.**

- (a) Where an existing control valve is replaced with a valve of a different type, **make or model**, it shall conform to 3.19.
- (b) Where relief or check valves or the supply piping or fittings are replaced **as part of an alteration**, the components replaced shall conform to the applicable requirements of 3.19.
- (c) Where electrically operated control valves are installed in place of existing mechanically operated control valves, for rated speeds of more than 0.5 m/s (100 ft/min), existing terminal stopping devices consisting of an automatic stop valve independent of the normal control valve and operated by the movement of the car as it approaches the terminals, where provided, shall be permitted to be retained.

### **8.7.3.25 Suspension Ropes and Their Connections**

#### **8.7.3.25.1 Change in Ropes.**

Where the material, grade, number, or diameter of ropes is changed, the new ropes and their fastenings shall conform to 3.20. When existing sheaves are retained using ropes different from those originally specified, the original elevator

manufacturer or a licensed professional engineer shall certify the sheave material to be satisfactory for the revised application.

**8.7.3.25.2 Addition of Rope Equalizers.**

Where rope equalizers are installed, they shall conform to 2.20.5.

**8.7.3.26 Counterweights.**

Where alterations are made to counterweights, they shall conform to 8.7.2.22 and 3.21. Where counterweights are added to a previously uncounterweighted elevator, it shall conform to 3.4, 3.6, 3.14, 3.15, 3.17.2, 3.18, 3.20, and 3.21. See also 8.7.3.3.

**8.7.3.27 Car Buffers and Bumpers.**

Where alterations are made to car buffers or bumpers, the installation shall conform to ~~3.21~~ 3.22.1 and 3.22.2. Existing buffers are not required to conform to 2.22.4.5(b), 2.22.4.7, 2.22.4.10, and 2.22.4.11.

**8.7.3.28 Guide Rails, Supports, and Fastenings.**

Where alterations are made to car and counterweight guide rails, guide-rail supports, or guide-rail fastenings, or where the stresses have been increased by more than 5%, the installation shall conform to 3.23 and 3.28.

**8.7.3.29 Tanks.**

Where a new tank is installed ~~as part of an alteration~~ or altered, the tank shall conform to 3.24.

**8.7.3.29★1 Addition of Oil Cooler**

Where an oil cooler is installed or altered, the following requirements apply:

- (a) 8.7.3.8
- (b) 2.7.2 for the installed equipment
- (c) 3.10 for the installed equipment

**8.7.3.30 Terminal Stopping Devices.**

Where an alteration is made to any terminal stopping device, the installation shall conform to 3.25.

**8.7.3.31 Operating Devices and Control Equipment**

**8.7.3.31.1 Top-of-Car Operating Devices.**

Where there is an alteration to, or addition of, a top-of-car operating device, it shall conform to 3.26.2.

**8.7.3.31★1**

Where there is an alteration to or addition of any type of inspection operation (see 2.26.1.4.1(a)), the alteration shall conform to the applicable requirements in 2.26.1.4.

**8.7.3.31★2**

Where there is an addition of a top-of-car operating device, the requirements of 2.26.1.4 apply. See CAD 3.8.3. Requirement 8.7.2.15★1 or 8.7.2.15★2 applies.

**8.7.3.31.2 Car Leveling or Truck Zoning Devices.**

Where there is an alteration to, or addition of, a car leveling device or a truck zoning device, it shall conform to 3.26.3.2.

**8.7.3.31★3**

Where there is an alteration to or addition of car door bypass or hoistway door bypass switches, the alteration shall conform to 2.26.1.5.

#### 8.7.3.31★4

Where there is an alteration to or addition of a system to monitor and prevent automatic operation of the elevator with faulty door contact circuits on power-operated car doors that are mechanically coupled with the landing doors while the car is in the landing zone, the alteration shall conform to the requirements in 2.26.5.

#### 8.7.3.31.3 Anticreep Leveling Device.

Where there is an alteration or replacement of an anticreep leveling device, it shall conform to 3.26.3.1.

#### 8.7.3.31.4 Change in Power Supply.

Where an alteration consists of a change in power supply at the mainline terminals of the elevator motion controller or motor controller involving

- (a) change in voltage, frequency, or number of phases;
- (b) change from direct current to alternating current, or vice versa; or
- (c) change to a combination of direct or alternating current.

Electrical equipment shall conform to 3.26.1, 3.26.4, 3.26.5, and 3.26.6 (not including 2.26.4.4).

#### 8.7.3.31★5 Addition of Soft Start

Where there is an addition of a soft start feature the follow shall apply;

- (a) 2.26.4.1 and 2.26.4.2 for the new equipment,
- (b) 3.26.5

#### 8.7.3.31★6 Addition of Power Efficiency Devices

Where there is an addition of power efficiency increasing devices the follow shall apply;

- (a) 2.26.4.1 and 2.26.4.2 for the new equipment,
- (b) B44.1 certification for the new equipment.

#### 8.7.3.31.5 Controllers

- (a) Where a motion controller or operation controller is installed without any change in the type of operation control or motion control, it shall conform to the following:
  - (1) Terminal stopping devices shall conform to 3.25.
  - (2) The operating devices and control equipment shall conform to 3.26. Requirements of 2.26.1.1, 2.26.1.3, and 2.26.12 do not apply.
  - (3) Requirement 2.27.2 applies when emergency power is provided.
  - ~~(4) In jurisdictions not enforcing NBCC, 3.27.1 through 3.27.4 and 2.27.3 through 2.27.9 apply~~
    - ~~(a) when travel is 8 m (25 ft) or more above or below the designated landing; or~~
    - ~~(b) on installations when firefighters' emergency operation was required or provided at the time of the installation.~~
  - (5) In jurisdictions enforcing NBCC, 3.27.1 through 3.27.4 and 2.27.3 through 2.27.9 ~~apply only if firefighters' emergency operation was required or provided at the time of installation.~~
- (b) Where a controller for the operation of hoistway doors, car doors, or car gates is installed, all new and modified equipment and wiring shall conform to 2.26.4.1 and 2.26.4.2.
- (c) Where a controller for the elevator operation on emergency or standby power systems or firefighters' emergency operation is installed, all new and modified equipment and wiring shall conform to 2.26.4.1 and 2.26.4.2.
- (d) Equipment and floors shall be identified as required by 2.29.

#### 8.7.3.31★7

Where an elevator controller is relocated and requires disconnection and reconnection of field wiring, requirement 2.8.2 applies. The installation shall be tested to verify functionality of all circuits impacted by the relocation.

#### 8.7.3.31.6 Change in Type of Motion Control.

Where there is a change in the type of motion control, the installation shall conform to the following:

- (a) The protection of the hoistway landing openings shall conform to 2.11.1 through 2.11.13 except 2.11.11.9,
  - (1) 2.11.1 except:



- (a) existing entrance openings less than 2030 mm in height or 800 mm in width are permitted to be retained
- (b) requirement 2.11.1.4
- (2) 2.11.2 through 2.11.6, except 2.11.6.3
- (3) 2.11.8, 2.11.9
- (4) 2.11.11.8 for horizontally sliding center opening and single speed entrances
- (5) 2.11.12.8  
through 2.11.13, except 2.11.11.9, as modified by 3.11.1,
- (6) and conform to 3.12.1 except
  - (a) requirement 2.12.2.4.3 to allow a minimum engagement of 6 mm
  - (b) 2.12.4, and
- (7) 3.13.
- (b) Car enclosures and car doors or gates shall conform to 3.14, the loading requirements specified by 2.14.1.6, and the requirements of 2.14.1.7 including the provisions of 2.14.1.7.5 for non standard guardrails, as specified in the CAD, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:
  - (1) requirements 2.14.1.3, 2.14.1.5.1, and 2.14.1.8, 2.14.1.9 and 2.14.1.10
  - (2) requirements 2.14.2.1, 2.14.2.3 through 2.14.2.6, and 2.14.2.4
  - (3) requirement 2.14.3
  - (4) requirements 2.14.4.2.5, 2.14.4.3, 2.14.4.5.1(c) and 2.14.4.6
  - (5) requirements 2.14.5.1, 2.14.5.6 through 2.14.5.8
  - (6) requirements 2.14.7.1.3, 2.14.7.1.4 and 2.14.7.2 through 2.14.7.4
- (c) The car safety (where provided) and the counterweight safety (where provided) shall conform to 3.17, and the governor (where provided) shall conform to 2.18, except that:
  - (1) where the safety factors required by 2.17.12.1 cannot be ascertained, performance testing shall be accepted, and
  - (2) the pitch diameter of speed-governor sheaves and governor tension sheaves are not required to conform to 2.18.7.
- (d) The capacity and loading shall conform to 8.7.2.27.5(d) ~~3.16~~.
- (e) The terminal stopping devices shall conform to 3.25.
- (f) The operating devices and control equipment shall conform to 3.26. Requirements of 2.26.4.2 and 2.26.4.4 shall not apply to electrical equipment unchanged by the alteration.
- (g) ~~In jurisdictions not enforcing NBCC, emergency operation and signaling devices shall conform to 3.27.~~  
In jurisdictions enforcing NBCC, emergency operation and signaling devices where required by NBCC shall be provided and shall conform to 2.27.
- (h) Equipment and floors shall be identified as required by 2.29.

### 8.7.3.31.7 Change in Type of Operation Control.

Where there is a change in the type of operation control, the installation shall conform to the following:

- (a) The protection of the hoistway landing openings shall conform to 2.11.1 through 2.11.13 as modified by 3.11.1, and conform to 3.12.1 and 3.13.
- (b) Car enclosures and car doors or gates shall conform to 3.14, except that where existing car enclosures and/or car doors or gates are retained, conformance with the following requirements is not required:
  - (1) requirements 2.14.1.3, 2.14.1.5.1, and 2.14.1.8
  - (2) requirements 2.14.2.1, 2.14.2.3, and 2.14.2.4
  - (3) requirement 2.14.3
  - (4) requirements 2.14.4.3 and 2.14.4.6
- (c) The capacity and loading shall conform to 3.16.
- (d) The terminal stopping devices shall conform to 3.25.
- (e) The operating devices and control equipment shall conform to 3.26. The requirements of 2.26.4.2, 2.26.4.3, and 2.26.4.4 shall not apply to electrical equipment unchanged by the alteration.
- (f) Emergency operation and signaling devices shall be provided and shall conform to 3.27.
- (g) Equipment and floors shall be identified as required by 2.29.

(h) requirement 2.7.9.2

**8.7.3.31★8**

Where a Patient Wandering feature is added, doors shall close per 2.13.5.3 and the activation of phase 1 recall shall not be prevented per 2.27.3.1.6(l).

**8.7.3.31.★9**

Where security / floor lockout systems are added the follow shall apply:

- (a) egress floor shall not be restricted when on FEO,
- (b) door open buttons shall remain operative,
- (c) requirement 2.11.6.2
- (d) travel to all serviced landing shall be possible per 2.27.3.3.1(i).

**8.7.3.31.8 Emergency Operation and Signaling Devices**

- (a) Where an alteration is made to car emergency signaling devices, the installation shall conform to 2.27.1.
- (b) Where an alteration is made to, or consists of the addition of, an emergency or standby power system, the installation shall conform to the requirements of 2.27.2.
- (c) Where an alteration is made to, or consists of the addition of, firefighters' emergency operation, the installation shall conform to 3.27.

**8.7.3.31★10 (175/02)**

Where the method of recall is being upgraded from manual to automatic recall, FEO features are permitted to operate as required at the time of the original FEO installation. Where the main recall level is not sprinklered, alternate floor recall shall be provided.

**8.7.3.31★11 (60/88) (105/93) (219/07)**

Where a firecode retrofit was required but not provided, and conformance to provide FEO is now being sought, the FEO features shall be as required by CAD **3.20**.

**8.7.3.31.9 Auxiliary Power Lowering Operation.**

Where auxiliary power lowering operation is installed or altered, it shall conform to 3.26.10.

**8.7.3.31.10 In-Car Stop Switch.**

On passenger elevators equipped with nonperforated car enclosures, the emergency stop switch, including all markings, shall be permitted to be removed if an in-car stop switch conforming to 2.26.2.21, 2.26.4.3, 2.26.9.3.1(a), and 3.26.4.2 is provided.

**8.7.3.31.11 Electrical Protective Devices.**

Where there is an alteration to or addition of an electrical protection device, it shall conform to 3.26.4 for that device.

**8.7.4 Alterations to Elevators With Other Types of Driving Machines**

**8.7.4.1 Rack and Pinion Elevators.**

Where any alteration is made to a rack-and-pinion elevator, the entire installation shall comply with 4.1.

**8.7.4.2 Screw-Column Elevators.**

Where any alteration is made to a screw-column elevator, the entire installation shall comply with 4.2.

**8.7.4.3 Hand Elevators**

**8.7.4.3.1 Hoistway Enclosures and Machinery Space.**

Where an alteration is made to any portion of a hoistway enclosure or machinery space, the altered portion shall conform to 4.3.1 and 4.3.4.

#### **8.7.4.3.2 Top Car and Counterweight Clearances.**

No alteration shall reduce any clearances or runby below that required by 4.3.3 or below the minimum clearances as originally installed.

#### **8.7.4.3.3 Hoistway Entrances.**

Where new entrances are installed, the new entrances shall conform to 4.3.6, 4.3.7, and 4.3.8.

#### **8.7.4.3.4 Car Enclosures.**

Where an alteration is made to a car enclosure, it shall conform to 4.3.9 and 4.3.11.

#### **8.7.4.3.5 Car Frame and Platform.**

Where an alteration is made to a car frame or platform, the frame or platform shall conform to 4.3.11, 4.3.12, 4.3.13, and 4.3.16.

#### **8.7.4.3.6 Capacity and Loading.**

No alteration shall reduce the rated load below that required by 4.3.14.1 and 4.3.14.2. Where the alteration involves an increase in rated load, the driving machine sheave shall comply with 4.3.19.1, 4.3.19.2, and 4.3.16.

#### **8.7.4.3.7 Increase in Rise.**

Where the alteration involves an increase in the total rise to exceed 4 600 mm (15 ft), it shall conform to 4.3.3.1, 4.3.3.2, 4.3.15, and 4.3.16.

#### **8.7.4.3.8 Guide Rails and Fastenings.**

Where an alteration involves the installation of guide rails, the guide rails and fastenings shall comply with 4.3.18.1, 4.3.18.2, and 4.3.18.3.

#### **8.7.4.3.9 Overhead Beams and Supports.**

Where the alteration involves a change in the arrangement of or load on the overhead beams and sheaves, the new arrangement shall conform to 4.3.5.1 and 4.3.5.2, except that wood shall be permitted to be retained if it is structurally sound.

#### **8.7.4.3.10 Power Attachments.**

No alteration shall implement the use of a power other than hand power.

### **8.7.5 Alterations to Special Application Elevators**

#### **8.7.5.1 Inclined Elevators.**

Where any alteration is made to an inclined elevator, the entire installation shall comply with 5.1.

#### **8.7.5.2 Limited-Use/Limited-Application Elevators.**

Reserved.

#### **8.7.5.2.★1 Alterations to Electric Limited-Use/Limited-Application Elevators**

Alterations to Limited-Use/Limited-Application Elevators, shall conform to 8.7.2 and the requirements of Part 2 except as modified in section 5.2.

#### **8.7.5.2.★2 Alterations to Hydraulic Limited-Use/Limited-Application Elevators**

Alterations to Limited-Use/Limited-Application Elevators, shall conform to the 8.7.3 and the requirements of Part 3 except as modified in section 5.2.

### **8.7.5.3 Private Residence Elevators**

**8.7.5.3.1** When a building code occupancy classification of a private residence is changed in which a private residence elevator is located, the elevator shall comply with the applicable requirements in Parts 2, 3, 4, or Section 5.2.

### **8.7.5.4 Private Residence Inclined Elevators**

**8.7.5.4.1** When a building code occupancy classification of a private residence is changed in which a private residence inclined elevator is located, the elevator shall comply with the applicable requirements in Parts 2, 3, 4, or Section 5.1.

### **8.7.5.5 Power Sidewalk Elevators**

#### **8.7.5.5.1 Changes in Electrical Wiring or Electrical Equipment.**

Where electrical wiring or equipment is installed as part of an alteration, it shall conform to 5.5.1.8.

#### **8.7.5.5.2 Sidewalk Door.**

Where a sidewalk door is installed as part of an alteration, it shall conform to 5.5.1.11.2, 5.5.1.11.3, and 5.5.1.11.4.

#### **8.7.5.5.3 Change in Car Enclosure, Car Doors, and Gates.**

Where the car enclosure, car door, or car gate is installed as part of an alteration, it shall conform to 5.5.1.14.

**8.7.5.5.4 Bow Irons and Stanchions.** Where the bow iron and stanchion is installed as part of an alteration, it shall conform to 5.5.1.15.2.

#### **8.7.5.5.5 Increase in Rated Load.**

Where the alteration consists of an increase in rated load, the bottom and top clearances and runbys shall conform to 5.5.1.16, 5.5.1.18, 5.5.1.21, and 5.5.1.25.4.

#### **8.7.5.5.6 Increase in Rated Speed.**

Where the alteration consists of an increase in rated speed, the capacity and loading shall conform to 5.5.1.15, 5.5.1.16, 5.5.1.19, and 5.5.1.22.

#### **8.7.5.5.7 Existing Driving Machine.**

Where the driving machine is installed as part of an alteration, it shall conform to 5.5.1.8, 5.5.1.9, 5.5.1.23, and 5.5.1.25.

#### **8.7.5.5.8 Change in Type of Operating Devices and/ or Control Equipment.**

Where the alteration consists of a change in the existing type of operation or control equipment, or both, the new operating devices and control equipment shall conform to 5.5.1.8 and 5.5.1.25.

### **8.7.5.6 Rooftop Elevators.**

Where any alteration is made to a rooftop elevator, the entire installation shall comply with 5.6.

### **8.7.5.7 Special Purpose Personnel Elevators.**

Where any alteration is made to a special purpose personnel elevator, the entire installation shall comply with 5.7.

### **8.7.5.8 Shipboard Elevators.**

Where any alteration is made to a shipboard elevator, the entire installation shall comply with 5.8.

### **8.7.5.9 Mine Elevators**

#### **8.7.5.9.1 General Requirements.**

Where any alteration is made to a mine elevator, the alteration shall conform to the requirements of 8.7.1 and 8.7.2, except as modified by 5.9.

#### **8.7.5.9.2 Ascending Car Overspeed and Unintended Car Movement Protection.**

Ascending car overspeed and unintended car movement protection shall be provided and shall conform to 2.19.

**8.7.5.9.3 Car Top Protection.** The car top access panel size requirements in 5.9.14.1(b) do not apply where the existing car top is retained. The dimensions of the existing car top access panel shall not be reduced by the alteration.

## **8.7.6 Alterations to Escalators and Moving Walks**

### **8.7.6.1 Escalators**

#### **8.7.6.1.1 General Requirements.**

A change in component parts that are interchangeable in form, fit, and function is not considered an alteration and need not comply with the requirements in this Section. See 8.6.3.1. The addition of a component or a device that was not part of the original design is an alteration and must conform to the requirements of 8.7.6.1 for that device or component. When multiple driving machines per escalator are utilized, operating and safety devices required by 8.7.6.1 shall simultaneously control all driving machines. The requirements of 6.1.3.6.5 do not apply to existing escalators that were not required to comply with this requirement at the time of the original installation.

#### **8.7.6.1.2 Relocation of Escalator.**

- (a) Where an escalator is relocated, it shall comply with 6.1. The requirements of 6.1.7.4.2 do not apply to electrical equipment unchanged by the relocation. The requirements of 6.1.3.6.5 do not apply to existing escalators that were not required to comply with this requirement at the time of the original installation.
  
- (b) Where an escalator is repositioned within the same building, CAD requirement 3.18 applies and the installation shall conform to the following;
  - (1) requirement 6.1.3.3.11, 6.1.3.3.12, 6.1.3.3.13
  - (2) requirement 6.1.3.4.3
  - (3) requirement 6.1.3.6.3, 6.1.3.6.4
  - (4) requirement 6.1.3.12
  - (5) requirement 6.1.3.13
  - (6) requirement 6.1.6.9
  - (7) requirement 6.1.7.4.1 and
  - (8) requirement 8.7.6.1.3

#### **8.7.6.1.3 Protection of Floor Openings.**

Any alteration to the floor openings in escalators shall comply with 6.1.1.1.

#### **8.7.6.1.4 Protection of Trusses and Machinery Spaces Against Fire**

Any alteration to the sides and/ or undersides of escalator trusses and machinery spaces shall conform to 6.1.2.1.

#### **8.7.6.1.5 Construction Requirements**

- (a) Angle of Inclination. No alteration of an escalator shall change the angle of inclination, as originally designed, by more than 1 deg.
- (b) Geometry. Any alteration to the geometry of the escalator components shall conform to 6.1.3.2.
- (c) Balustrades. Any alteration to the balustrades shall conform to 6.1.3.3 for the altered components.
- (d) Skirt Deflector Devices. Any alteration or addition of skirt deflector devices shall conform to 6.1.3.3.10

NOTE [8.7.6.1.5(c)]: The balustrade does not include the handrail.

NOTE [8.7.6.1.5(d)]: The vertical dimensions on existing skirt panels may not allow full compliance. See 1.2.

**8.7.6.1.6 Handrails.** Any alteration to the handrails or handrail system shall require conformance with 6.1.3.2.2, 6.1.3.4.1 through 6.1.3.4.4, 6.1.3.4.6, 6.1.6.3.12, and 6.1.6.4.

#### **8.7.6.1.★1 Addition of Handrail Advertizing**

The addition of handrail advertizing is not permitted per 6.1.6.9.2, unless otherwise permitted by a variance request.

#### **8.7.6.1.7 Step System**

- (a) Any alteration to the step system shall require conformance with 6.1.3.3.5, 6.1.3.5 [except as specified in 8.7.6.1.7(b)], 6.1.3.6, 6.1.3.8, 6.1.3.9.4, 6.1.3.10.4, 6.1.3.11, 6.1.6.3.3, 6.1.6.3.9, 6.1.6.3.11, 6.1.6.3.14, and 6.1.6.5.
- (b) Steps having a width less than 560 mm (22 in.) shall not be reduced in width by the alteration.

#### **8.7.6.1.8 Combplates.**

Any alteration of the combplates shall require conformance with 6.1.6.3.13.

#### **8.7.6.1.9 Trusses and Girders.**

Any alterations or welding, cutting, and splicing of the truss or girder shall conform to 8.7.1.4. Alterations shall result in the escalator's conforming to 6.1.3.7, 6.1.3.9.1, and 6.1.3.10.1. The installation of a new escalator into an existing truss shall conform to all of the requirements of 6.1.

#### **8.7.6.1.10 Step Wheel Tracks.**

Any alteration to the tracks shall result in the escalator's conforming with 6.1.3.8, 6.1.3.9.4, 6.1.3.10.1, and 8.7.1.4.

#### **8.7.6.1.11 Rated Load and Speed.**

Any alteration that increases the rated load or rated speed or both shall result in the escalator's conforming with 6.1.

#### **8.7.6.1.12 Driving Machine, Motor, and Brake**

- (a) Driving Machine. An alteration to the driving machine shall result in the escalator's conforming to 6.1.3.9.2, 6.1.3.10.3, 6.1.4.1, 6.1.5.1, 6.1.5.2, 6.1.5.3.1, 6.1.5.3.2, 6.1.6.3.4, and 6.1.6.3.8.
- (b) Driving Motor. An alteration to the drive motor shall result in the escalator's conforming to 6.1.3.9.2, 6.1.3.10.3, 6.1.4.1, 6.1.5.2, 6.1.5.3.1, 6.1.5.3.2, 6.1.6.3.2, 6.1.6.3.8, and 6.1.6.3.10.
- (c) Machine Brake. An alteration to the machine brake shall result in the escalator's conforming to 6.1.3.9.3, 6.1.3.10.2, and 6.1.5.3.1.

#### **8.7.6.1.13 Operating and Safety Devices.**

Any alteration to or addition of operating and or safety devices shall conform to 6.1.6 for that device.

#### **8.7.6.1.★2 Removal of Step Demarcation Lights (226/07)**

The removal of step demarcation lights, shall be permitted if the device complies with the following:

- (a) requirement 6.1.3.3.5,
- (b) requirements 6.1.3.5.4, 6.1.3.5.5, 6.1.3.5.6, and
- (c) requirement 6.1.3.6.2.

#### **8.7.6.1.14 Lighting, Access, and Electrical Work.**

An alteration to or addition of lighting, access, or electrical work shall conform with the specific requirements within 6.1.7 for that change.

#### **8.7.6.1.15 Entrance and Egress.**

Any alteration to the entrance or egress end shall comply with 6.1.3.6.1 through 6.1.3.6.4.

#### **8.7.6.1.16 Controller.**

Where a controller is installed as part of an alteration, it shall conform to 6.1.6.10 through 6.1.6.15, and 6.1.7.4.

#### **8.7.6.1.★3 Controller Replaced (226/07)**

Where a controller is replaced it shall conform to 8.7.6.1.16.

#### **8.7.6.1.★4 Relocation of Controller (226/07)**

Where an escalator controller is relocated and requires disconnection and reconnection of field wiring, requirement 2.8.2 applies. The installation shall be tested to verify functionality of all circuits impacted by the relocation.

**8.7.6.1. ★5 Addition of Soft Start (226/07)**

Where there is an addition of a soft start feature the follow shall apply;

- (a) for control systems built to B44-00 and later, 6.1.7.4, 6.1.6.10.1, 6.1.6.10.2, 6.1.6.10.3
- (b) for control systems built prior to B44-00 6.1.7.4.

**8.7.6.1. ★6 Power Efficiency Devices**

Where there is an addition of power efficiency increasing devices the follow shall apply;

- (a) 2.26.4.1 and 2.26.4.2 for the new equipment,
- (b) B44.1 certification for the new equipment.

**8.7.6.2 Moving Walks**

**8.7.6.2.1 General Requirements.**

A change in component parts that are interchangeable in form, fit, and function is not considered an alteration and need not comply with the requirements in this Section. See 8.6.3.1.

The addition of a component or a device that was not part of the original design is an alteration and must conform to the requirements of 8.7.6.2 for that device or component. When multiple driving machines per moving walk are utilized, operating and safety devices required by 8.7.6.2 shall simultaneously control all driving machines.

**8.7.6.2.2 Relocation of Moving Walk.**

Where a moving walk is relocated, it shall comply with 6.2.

**8.7.6.2.3 Protection of Floor Openings.** Any alteration to the floor openings for moving walks shall comply with 6.2.1.1.

**8.7.6.2.4 Protection of Trusses and Machinery Spaces Against Fire.**

Any alteration to the sides or undersides, or both, of movingwalk trusses and machinery spaces shall conform to 6.2.2.1.

**8.7.6.2.5 Construction Requirements**

- (a) Angle of Inclination. Alteration of a moving walk that increases the angle of inclination shall require conformance with 6.2.
- (b) Geometry. Any alteration to the geometry of the moving walk components shall require conformance with 6.2.3.2.
- (c) Balustrades. Any alteration to the balustrades shall require conformance with 6.2.3.3.

NOTE [8.7.6.2.5(c)]: The balustrade does not include the handrail.

**8.7.6.2.6 Handrails.**

An alteration to the handrails or handrail system shall require conformance with 6.2.3.2.3, 6.2.3.4, 6.2.6.3.10, and 6.2.6.4.

**8.7.6.2.7 Treadway System**

- (a) An alteration to the treadway system shall require conformance with 6.2.3.2.3, 6.2.3.3.5, 6.2.3.3.6, 6.2.3.5, 6.2.3.6 [except as specified in 8.7.6.2.7(b)], 6.2.3.8, 6.2.3.9, 6.2.3.10.4, 6.2.3.11.4, 6.2.3.11.5, 6.2.3.12, 6.2.6.3.3, 6.2.6.5, and 6.2.6.3.9.
- (b) The minimum width of the moving walk shall be permitted to be less than that required by 6.2.3.7. The existing width, if less than required by 6.2.3.7, shall not be decreased by the alteration.

**8.7.6.2.8 Combplates.**

An alteration of the combplates shall require conformance with 6.2.3.8 and 6.2.6.3.11.

**8.7.6.2.9 Trusses and Girders.**

Any alterations or welding, cutting, and splicing of the truss or girder shall conform to 8.7.1.4. Alterations shall result in the moving walk's conforming to 6.2.3.9, 6.2.3.10.1, and 6.2.3.11.1. The installation of a new moving walk into an existing truss shall conform to all of the requirements of 6.2.

**8.7.6.2.10 Track System.**

Any alteration to the tracks shall result in the moving walk's conforming to 6.2.3.9, 6.2.3.10, 6.2.3.11.1, and 8.7.1.4.

**8.7.6.2.11 Rated Load and Speed.**

Any alteration that increases the rated load or rated speed or both shall result in the moving walk's conforming to 6.2.

**8.7.6.2.12 Driving Machine, Motor, and Brake**

- (a) Driving Machine. An alteration to the driving machine shall result in the moving walk's conforming to 6.2.3.10.2, 6.2.3.11.2, 6.2.3.11.3, 6.2.3.14, 6.2.3.15, 6.2.4, 6.2.5.1, 6.2.5.3.1, 6.2.5.3.2, 6.2.6.3.4, and 6.2.6.3.8.
- (b) Drive Motor. An alteration to the drive motor shall result in the moving walk's conforming to 6.2.3.10.2, 6.2.3.11.2, 6.2.3.11.3, 6.2.4, 6.2.5.2, 6.2.5.3.1, 6.2.6.3.2, 6.2.6.3.7, and 6.2.6.3.8.
- (c) Machine Brake. An alteration to the machine brake shall result in the moving walk's conforming to 6.2.3.10.3, 6.2.3.11.2, 6.2.3.11.3, ~~6.2.3.12.3~~, 6.2.5.3.1, and 6.2.5.3.2.

**8.7.6.2.13 Operating and Safety Devices.**

An alteration to or addition of operating and/or safety devices shall conform with the specific requirements within 6.2.6 for that device.

**8.7.6.2.14 Lighting, Access, and Electrical Work.**

An alteration to or addition of lighting, access, or electrical work shall conform with the specific requirements within 6.2.7 for that change.

**8.7.6.2.15 Controller.**

Where a controller is installed as part of an alteration, it shall conform to 6.2.6.9 through 6.2.6.14, and 6.2.7.4.

**8.7.6.2.★1 Controller Replaced (226/07)**

Where a controller is replaced it shall conform to 8.7.6.1.16.

**8.7.6.2.★2 Relocation of Controller (226/07)**

Where an escalator controller is relocated and requires disconnection and reconnection of field wiring, requirement 2.8.2 applies. The installation shall be tested to verify functionality of all circuits impacted by the relocation.

**8.7.6.2.★3 Addition of Soft Start (226/07)**

Where there is an addition of a soft start feature the following shall apply:

- (a) for control systems built to B44-00 and later, 6.1.7.4, 6.1.6.10.1, 6.1.6.10.2, 6.1.6.10.3
- (b) for control systems built prior to B44-00 6.1.7.4.

**8.7.6.2.★4 Power Efficiency Devices**

Where there is an addition of power efficiency increasing devices the following shall apply:

- (a) 2.26.4.1 and 2.26.4.2 for the new equipment,
- (b) B44.1 certification for the new equipment.

**8.7.7 Alterations to Dumbwaiters and Material Lifts**

**8.7.7.1 Dumbwaiters and Material Lifts Without Automatic Transfer Devices**

**8.7.7.1.1 General.** When any alteration is made to a dumbwaiter or material lift, all work performed as part of the alteration shall comply with 7.1 through 7.6.



#### **8.7.7.1.2 Increase in Rated Load.**

Where an alteration involves an increase in the rated load, the installation shall conform to either of the following:

- (a) requirement 7.2, except 7.2.1 for hand and electric dumbwaiters
- (b) requirement 7.3, except 7.3.4.1 for hydraulic dumbwaiters
- (c) requirement 7.4
- (d) requirement 7.5
- (e) requirement 7.6.

#### **8.7.7.★1 Alteration to Freight Platform Lifts Type A**

Where an alteration is made to a Type A freight platform lift, the alteration shall conform to the applicable requirements of 7.4, 7.5 and 7.6 for Type B material lifts, except any reference to in-car operating devices and riders shall not apply.

#### **8.7.7.★2 Alteration to Freight Platform Lift Type B**

Where an alteration is made to a Type B freight platform lift, the alteration shall conform to the applicable requirements of 7.4, 7.5 and 7.6 for Type B material lifts.

#### **8.7.7.2 Addition of Automatic Transfer Device.**

Where an automatic transfer device is installed on an existing elevator or dumbwaiter, the resultant combination of material lift or dumbwaiter with automatic transfer device shall conform to Part 7.

#### **8.7.7.3 Material Lifts and Dumbwaiters With Automatic Transfer Devices**

**8.7.7.3.1** Where any alteration is made to a material lift or dumbwaiter with an automatic transfer device, the entire installation shall comply with 7.7 through 7.10.

**8.7.7.3.2** Where an automatic transfer device is removed from a dumbwaiter or material lift and is not replaced, the installation shall conform to 7.1 to 7.3 for dumbwaiters and 7.4 to 7.6 for Materials Lift Without Transfer Device.

**8.7.7.3.3** Where a material lift is altered to be an elevator, it shall comply with Part 2 or Part 3.

**8.7.7.3.4** Where a material lift or dumbwaiter with an automatic transfer device is altered to a dumbwaiter, it shall comply with 7.1 through 7.3.

### **3.5 Rated Load**

3.5.1 For the purpose of this Document and subsection 31.(3) of the Regulation, “rated load” in the code adopted in subsection 3.1, means “maximum capacity”.

### **3.6 Rope Clips**

3.6.1 Rope clip fastenings shall not be used when suspension ropes are changed on an existing elevator.

### **3.7 Access to Machine Rooms and Spaces**

3.7.1 Every elevator shall have a safe and convenient access to its machine room and machinery space. [CAD Amendment 246-11]

### **3.8 Requirements for Existing Passenger and Freight Elevators (245/10) (173/02)**

- 3.8.1 Notwithstanding section 4 of the Regulation, every existing passenger and freight elevator that was installed before the 1<sup>st</sup> day of May, 1981 and that does not have car safeties, a speed governor, a braking system and hoistway-door interlocks or hoistway-door locks and contacts conforming to the requirements of CSA B44, Safety Code for Elevators – edition 1975 as amended in 1977 and 1980, or any subsequent edition, shall conform to the applicable requirements of CSA B44, Safety Code for Elevators – edition 1975 as amended in 1977 and 1980, or any subsequent edition. [CAD Amendment 246-11]
- 3.8.2 Not later than **May 1**, 2014, all elevators equipped with a car top that is intended to serve as a platform for a worker, “where the perpendicular distance between the edges of the car enclosure top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance and on sides where there is no hoistway enclosure”, shall be equipped with a guardrail in conformance with 2.10.2 as modified by 2.14.1.7 of the code adopted in **3.1** [CAD Amendment 250-11]
- 3.8.3 All existing passenger and freight elevators with full or partial car tops shall be equipped with a car top maintenance station and a structurally sound working surface. [CAD Amendment 250-11]

### **3.9 Requirements for Existing Dumbwaiters or Freight Platform Lifts (253/12)**

- 3.9.1 Every existing power dumbwaiter or freight platform lift that was installed before the 1<sup>st</sup> day of May, 1981 and that does not have hoistway-door interlocks or hoistway-door locks and contacts shall be provided with a locking device that shall prevent the device from moving until the door or gate is closed and that shall prevent the door or gate from being opened unless the device is at the corresponding landing. [CAD Amendment 246-11]
- 3.9.2 All type ‘A’ and type ‘B’ freight platform lifts and type ‘B’ material lifts utilizing hoistway door mechanical lock and contracts shall have their mechanical lock and contacts upgraded to interlocks by **May 1, 2014**. New or modified circuits relevant to this upgrade shall be arranged such as to comply with A17.1-2010/B44-10, requirement 2.26.9.3.1(a) and (b). When a single ground or failure as specified in 2.26.9.3.1 occurs, the car shall not be permitted to restart.

### **3.10 Platform Apron Requirements (166/01)**

- 3.10.1 Every passenger elevator installed before the 1<sup>st</sup> day of May, 1981 and currently operated in an apartment building, condominium apartment building or educational institution and every passenger elevator installed after that date in any building, shall be provided at the entrance side with a smooth apron made of metal not less than 1.5 millimetres thick, or made of material of equivalent strength and stiffness, reinforced and braced to the car platform such that:
- (a) it does not extend less than the full width of the widest hoistway door opening;
  - (b) it has a straight vertical face, extending below the floor surface of the car-platform, of not less than 1,200 millimetres, except that for an existing elevator this may be reduced where the hoistway pit is not deep enough to accommodate a larger vertical face;
  - (c) its lower portion is bent back at an angle not less than 60 degrees and not more than 75 degrees from the horizontal; and
  - (d) it is securely braced and fastened in place to withstand a constant force of 500 newtons applied at right angles to and:

- (1) at 450 millimetres from the top without deflecting more than six millimetres, or
  - (2) at 1,150 millimetres from the top without deflecting more than 50 millimetres,
- and without permanent deformation.

3.10.2 Every passenger elevator referred to in subsection **3.10.1** shall have a pit deep enough to accommodate the apron required in subsection **3.10.1**, and to provide a minimum twenty-five millimetres clearance between the bottom edge of the apron and the pit floor when the car is on fully compressed buffers.

3.10.3 Traction drive Limited-Use/Limited-Application (LULA) elevators serving 3 or more floors shall conform to **3.10.1** and **3.10.2**, otherwise 2 stop traction, hydraulic or roped hydraulic drive Lulas' are exempt from these requirements provided that;

- (a) a supplementary owners report for Lula elevators has been filed with the Director and;
- (b) a permanent and readily visible sign viewable from the hall landing has been provided on the apron in lettering not less than 16 mm in height, that advises;
  - (1) of a potential fall hazard below the car,
  - (2) to lower the car prior to rescue and,
  - (3) that lower and rescue shall be undertaken by trained personnel only. [CAD Amendment 246-11]

### **3.11 Door Safety Retainers for Single Slide Doors (61/88, 97/92, 109/93)**

3.11.1 Every existing passenger elevator with single slide landing doors shall be equipped with safety retainers and shall ensure that;

- (a) the retainer shall withstand without detachment or permanent deformation, a force of 1000 Newtons applied upward at any point along the width of the door panel and, while this force is maintained, an additional force of 1000 Newtons applied perpendicular to the door at its centre over an area of 300 x 300 mm
- (b) the installation of retainers was done in accordance with instructions supplied by the manufacturer of the door safety retainers. [CAD Amendment 246-11]

### **3.12 Low Pressure Switch (160/01)**

3.12.1 Every hydraulic elevator where the top of the cylinder when at its highest elevation is above the storage tank, shall be equipped with a low pressure switch to prevent operation of the lowering valve(s) and other requirements specified by the code at time of installation or alteration. [CAD Amendment 246-11]

### **3.13 Hoarding Between Hoistways Required**

3.13.1 No elevator shall be operated where it is located adjacent to a hoistway of another elevating device in which installation or alteration work is being performed and where the operation of the elevator may be hazardous to the persons performing the work or persons inside the elevator, unless the hoistways are separated by a structure supported and braced so as to not deflect into the code required running clearance of the adjacent operating car or its counterweight [CAD Amendment-261-13].

3.13.2 Where the separating structure referred to in subsection **3.13.1** is made of perforated material, it shall reject a ball 25 millimetres in diameter. [CAD Amendment-261-13].

### **3.14 Installation Number**

3.14.1 Every elevator shall have its installation number engraved or painted on the car crosshead or other conspicuous location on the top of the car, visible from the point of access.

### **3.15 Attendant Operation**

3.15.1 Where an elevator is controlled from one location only, an attendant shall be stationed at the controls while the elevator is available for operation.

### **3.16 Persons Permitted to Ride**

3.16.1 Except for a freight elevator-P, no person other than an attendant(s) or freight handler(s) shall ride or be permitted to ride in a freight elevator.

3.16.2 No person other than an attendant(s) or a designated freight handler(s) shall ride or be permitted to ride in a freight platform lift-Type B or a material lift Type-B. [CAD Amendment 246-11]

3.16.3 No person shall ride or be permitted to ride on a freight platform lift-Type A or a material lift Type-A. [CAD Amendment 246-11]

3.16.4 Despite **3.16.1** and **3.16.2**, a person(s) may remain inside a motor vehicle that is on an elevating device if the device is designated as a Class B- motor vehicle loading, and the device is operated by a trained attendant or operator. [CAD Amendment 246-11]

### **3.17 Escalator Caution Signs**

3.17.1 Every escalator installed prior to March 23, 2002 shall be fitted with a caution sign that meets the requirements of clause **8.10** of CSA B44-94; Safety Code for Elevators, as amended by Supplements B44S1-97 and B44S2-98. [CAD Amendment 246-11]

### **3.18 Repositioning of an Escalator**

3.18.1 Despite subsection **2.5** of this Document repositioning of an escalator within the same building or premises shall not constitute a new installation.

### **3.19 Escalator Brake Requirements (85/91) (247/11)**

3.19.1 Escalators installed under B44-M90 or later editions of the code shall have a data tag as required by the code at the time of the installation. Escalators installed under a prior code edition shall have a data tag in conformance with **3.19.2**.

3.19.2 Every escalator shall have a permanent and readily visible data plate affixed to the brake or machine, indicating:

- (a) the method of checking the brake setting and as a minimum shall include:
  - (1) the minimum torque, or
  - (2) the maximum spring length, or
  - (3) other checking method; and
- (b) the maximum no-load stopping distance as related to the torque, spring length, or other method, and
- (c) the testing procedure and interval. [CAD Amendment 246-11]

3.19.3 Every escalator shall have device specific brake adjustment procedures or instruction that provides instruction for the maintenance mechanics to correctly adjust and check the escalator brake(s).

3.19.4 The instructions or procedures shall

- (a) be posted or made otherwise available in the upper escalator pit;
- (b) include detailed instructions for setting the escalator brake;
- (c) include all information provided on the existing brake data tag;
- (d) be of durable material such that the information contained therein will remain legible;
- (e) as a minimum include the maximum no-load stopping distance as related to the manufacturer's specified brake torque, spring length etc. Where this information is missing and cannot be obtained from the original manufacturer, it is acceptable for a professional engineer in the province of Ontario to determine the no-load stopping distance; and
- (f) include the method of checking the brake setting such as the 'minimum torque', or the 'maximum spring length', or other method.

### **3.20 Fire Code Retrofits (60/88, 105/93, 127/96, 149/99, 219/07)**

3.20.1 Where an alteration is in response to a Fire Code Retrofit order, **all** elevators in the group, affected by the retrofit order shall be provided with:

- (a) manual phase one recall operation
- (b) automatic phase one recall operation **if required by the Ontario Building Code at time of installation.**
- (c) phase two in-car operation
- (d) Firefighter's Emergency Operation conforming to any code edition after and including CAN/CSA – B44-00 Update No. 2 Safety Code for Elevators, but in no case shall the code edition be less than the code under which the device was originally installed.
- (e) FEO-K1 keys for all FEO switches.
- (f) An FEO-K1 key for each switch location. [CAD Amendment 250-11]

3.20.2 Where Fire Alarm Initiating Devices need to be added to facilitate recall their installation shall be as required in 2.27.3.2.2(a) through (c) as revised in this CAD.

Note: Where a yellow hat designation was provided on an elevator that received an FCR upgrade, the yellow hat designation is required to remain, even if a subsequent alteration occurred that introduced a newer form of FEO Operation, switch markings however shall be upgraded from yellow to red.

**3.21 Escalator Stopping Distance Check (247/11)**

- 3.21.1 All escalators shall have a “Daily Stopping Distance Check” sign posted at each end of the escalator near the stop button or start switch.
- 3.21.2 The check sign shall communicate the following:
  - (a) Stop the empty running escalator. If the escalator travels more than “ X” step(s) before stopping, do not restart. Barricade and call for service.
    - (1) The value of “X” in 3.21.2(a) shall be replaced with 1 or 2, and shall indicate the permitted number of steps, rounded to the nearest whole number, that was determined by the elevator contractor, that reflects the needed no load stopping distance required by the escalator brake.
- 3.21.3 The person(s) authorized by the owner to carry out the daily prestart checks of the escalator shall also perform the daily stopping distance check to verify the escalator braking capability aligns with the information contained on the stopping distance check sign. [CAD Amendment-261-13]

**Summary of Pending Compliance Due Dates**

<b>Subject</b>	<b>Reference</b>	<b>Due Date</b>
MCP for all existing devices (B44.2 no longer applicable)	CAD 3.3.2(b)	March 31, 2014
Single bottom cylinders	CAD 3.3.4 see 8.6.5.9	May 1, 2015
Escalators to meet Step/Skirt Performance Index	CAD 3.3.4 see 8.6.8(b)	May 1, 2015
Car top railing requirements	CAD 3.8.2	May 1, 2014
Material lifts/Freight platform lifts require interlocks	CAD 3.9.2	May 1, 2014

## Part 4

### 4 MANLIFTS

#### 4.1 Applied Code

- 4.1.1 Every newly installed or altered manlift shall conform to the requirements of CSA Standard B311-02 (R2018), Safety Code for Manlifts and any applicable changes set out in this document.
- 4.1.2 Conformance to Appendix A, B, & C is mandatory.
- 4.1.3 Section 7.32.9 of B311 applies to all Power-Type Manlifts. Top-of-car operating stations are not limited to lifts with wireless control and shall be provided on each power-type manlift.
- 4.1.4 Section 7.32 of B311: Note that requirements of section 7.36, Control and Operating Circuits, apply to "Wireless Control" as well. [CAD Amendment 246-11]

#### 4.2 Top of Car Requirements for Power Type Manlift

- 4.2.1 Every power type manlift shall be provided with,
  - (a) a top-of-car operating device; and
  - (b) a protective guard railing on the top of the car.

#### 4.3 Inspection and Testing of Safety Brake

- 4.3.1 The inspection and testing of a safety brake on an endless belt type manlift required in subsection 33.(2) of the Regulation shall ensure compliance with clause 5.2.2.3 of CSA Standard B311-M1979, Safety Code for Manlifts and Supplement No. 1 1984.
- 4.3.2 The inspection and testing of a safety device and overspeed governor on a counter-balanced or power type manlift required in subsection 33.(3) of the Regulation shall ensure compliance with clause 6.11.8 or 7.6.8.2, as the case may be, of CSA Standard B311-M1979, Safety Code for Manlifts and Supplement No. 1 1984.

#### 4.4 Authorized Persons

- 4.4.1 No person shall use a manlift except those persons designated by the owner of the manlift as being properly trained in its operation and use.

#### 4.5 Maintenance Log Book

- 4.5.1 The log book shall, as a minimum, contain the following information :
  - (a) Building name and/or address,
  - (b) TSSA or MCCR installation number,
  - (c) Contractor's and Owner's name,

- (d) Year and month when a specific task is performed,
- (e) The code section, reference or clause number associated with a maintenance task, a description of the task performed and the prescribed maintenance frequency of the task,
- (f) The printed name and signature of the persons who completed the required maintenance task. [CAD Amendment 246-11]

4.5.2 Where a part directly affecting the safety of the operation is found to be defective, the record of the maintenance task shall not be signed off until the defect is adjusted repaired or replaced. [CAD Amendment 246-11]

#### **4.6 Location of the Log Book**

4.6.1 The log book will be retained in the machine room or at the device location. If it is kept in another location in the building, a notice will be posted in the machine room indicating the alternate location. [CAD Amendment 246-11]



## Part 5

### 5 PASSENGER ROPEWAYS AND PASSENGER CONVEYOR

#### 5.1 Applied Code

- 5.1.1 Every new or altered passenger ropeway and passenger conveyor shall conform to the applicable requirements of CSA-Z98-14, Passenger ropeways and passenger conveyors, and any additional applicable requirements set out in this document.
- 5.1.2 Annexes “A, B, C, D, E, F, G, H, I, J and K” referenced in the CSA-Z98-14 standard are also adopted.
- 5.1.3 Existing installations shall conform to CSA-Z98-14 clause 1.4, Annexes A through K as applicable, any requirements applicable at the time of the original installation or subsequent alteration and any applicable requirements set out in this document .

#### 5.2 General Technical Requirements for Passenger Ropeways and Passenger Conveyors

- 5.2.1 The general technical requirements in Part 2 of the Code Adoption Document do not apply to passenger ropeways and passenger conveyors.
- 5.2.2 Passenger Ropeways and Passenger Conveyors shall conform to the following general technical requirements,
  - (a) Electrical equipment shall conform to the Ontario Electrical Safety Code as amended from time to time;
  - (b) In addition to CSA-Z98-14 requirements, welding on a passenger ropeway or passenger conveyor shall conform to the requirements of CSA W59 Welded Steel Construction (Metal Arc Welding);
  - (c) Where a passenger ropeway or passenger conveyor is relocated it shall meet the requirements of 5.1.

#### 5.3 Definitions

- 5.3.1 In Part 5 of this document,
  - (a) “safety circuits” means E/E/PES of a passenger ropeway or passenger conveyor having an ability to carry out the functions necessary for mitigation of unacceptable failures by preventing movement or limiting speed of passenger ropeway or conveyor.  
NOTE:
    - 1) Preventing movement may require a passenger ropeway or conveyor to stop or to prevent unwanted start-up
    - 2) Limiting speed may require appropriate acceleration, deceleration or speed.
  - (b) “electrical/electronic/programmable electronic system” or “(E/E/PES)” means a system for control, protection, or monitoring based on one or more electrical/electronic/programmable electronic (E/E/PE) devices, including all elements of the system such as power supplies, sensors and other input devices, data highways and other communication paths, and actuators and other output devices.
  - (c) “electrical/electronic/programmable electronic” or “(E/E/PE)” means that based on electrical (E), and/or electronic (E), and/or programmable electronic (PE) technology.

“programmable electronic” or “(PE)” means that based on computer technology which may be comprised of hardware, software, and of input and/or output units

#### 5.4 Amendments to Z98-14

5.4.1 The requirements of 4.23.2.5 are supplemented as follows;

**4.23.2.5** For conveyors, surface and above-surface ropeways, the brake shall be actuated by a device independent of the emergency brake overspeed device if the line velocity exceeds the design maximum speed by 10%.

5.4.2 The requirements of 4.23.3.2(c) are amended as follows;

**4.23.3.2(c)** 10% to 15% overspeed, as detected from the speed of the drive sheave or haul rope; and

5.4.3 The requirements of 4.29.1.10 are amended as follows;

**4.29.1.10** Safety circuits shall incorporate redundancy and monitoring mechanisms to detect system failure. Monitoring of redundancy incorporated in safety circuits shall be done as a minimum, once per day. Relays and contactors used in safety circuits shall have force guided, mirrored, or mechanically linked contacts for monitoring purposes. Redundancy in safety circuits using software systems shall use diversification to avoid common mode failure.

5.4.4 The requirements of 4.29.8.3 are supplemented as follows;

**4.29.8.3** Photoelectric safety switches shall be

- a) approved by their manufacturer for use in safety-related systems for persons; and
- b) used in accordance with the manufacturer's instructions, or
- c) as qualified in 5.9 and 5.10 of this CAD.

#### 5.5 Z98 clauses 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations” (General Applicability)

5.5.1 The general applicability of clauses 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations” shall not apply if all applicable prescriptive requirements of the code are met.

5.5.2 Any variance to or deviation from the prescriptive requirements related to the design of safety circuits (see definitions) shall comply with clauses 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations”.

5.5.3 New configurations or novel designs which cannot be precisely classified in CSA Z98-14, shall ensure that their safety circuit designs comply with 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations”.

5.5.4 Where feature(s) of safety circuits for a passenger ropeway or conveyor is not specified in CSA Z98-14, safety circuits shall comply with 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations”.

#### 5.6 Z98 clauses 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations” (Compliance to)

5.6.1 Where conformance to clauses 4.29.1.7 “Safety levels” and 4.29.1.8 “Safety Considerations” is required as specified in 5.5, compliance shall be demonstrated as required in 5.6.2 or 5.6.3.

5.6.2 Safety circuits function shall conform to:

- (a) a SIL 3 rating in accordance with the applicable requirements of IEC 61508-2:2010 (Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems); and

- (b) IEC 61508-3:2010 (Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements) or

5.6.3 *Safety circuits* function shall conform to:

- (a) EN 12929:2015 (Safety requirements for cableway installations designed to carry persons. General requirements. Requirements for all installations);
- (b) EN 13243:2015 (Safety requirements for cableway installations designed to carry persons. Electrical equipment other than for drive systems); and
- (c) EN 13223:2015 (Safety requirements for cableway installations designed to carry persons. Drive systems and other mechanical equipment); or
- (d) Equivalent requirements as acceptable to the director.

## 5.7 Single Failure Protection

- 5.7.1 Every passenger ropeway installed before June 1, 2001 shall be so constructed and installed that the failure of any single, magnetically operated switch, contactor containing metal-to-metal contacts or relay to release does not prevent the passenger ropeway from stopping in response to an emergency stopping device nor permit the passenger ropeway to start or run if any emergency stopping device is activated.
- 5.7.2 Every passenger ropeway installed on or after June 1, 2001 shall be so constructed and installed that none of the following events prevents the passenger ropeway from stopping in response to an emergency stopping device nor permits the passenger ropeway to start or run if any emergency stopping device is activated;
  - (a) the occurrence of a single ground;
  - (b) the failure of a single magnetically operated switch, contactor or relay;
  - (c) the failure of a single solid-state device; or
  - (d) a software system failure.
- 5.7.3 The devices used to satisfy the requirements of 5.7.2 shall be checked prior to starting of the passenger ropeway, as a minimum, once per day.
- 5.7.4 Where a single ground is detected as set out in clause 5.7.2(a) or an event referred to in 5.7.2(b) to 5.7.2(d) is detected, the passenger ropeway shall not restart.
- 5.7.5 Implementation of redundancy in a passenger ropeway by a software system is permitted provided that there is diversification to avoid common mode failure.

## 5.8 Log Books

- 5.8.1 In addition to data specified in section 34 of the Regulation, the log book of a passenger ropeway or passenger conveyor shall contain,
  - (a) all data required in the code adopted in section 5.1 of this document;

- (b) all data on any increases or decreases to the mass of the carriers;
- (c) a record of all pre-season inspections carried out in accordance with section 5.9 of this document;
- (d) a record of all major and minor alterations; and
- (e) a record of all five-year periodic tests referred to in 12.17 and Annex H.

5.8.2 In addition to the requirements of subsection 34.(2) of the Regulation,

- (a) non-destructive testing (NDT) records shall be kept from a historical reference date of October 1, 2001 or from the date any passenger ropeway or passenger conveyor was commissioned if after October 1, 2001, until the passenger ropeway or passenger conveyor is dismantled.
- (b) major and minor alteration records shall be kept until the passenger ropeway or passenger conveyor is dismantled.
- (c) a record of all engineering and assessment reports referred to in 5.10 of this document shall be kept until the above-surface passenger ropeway is dismantled.

## 5.9 Preseason Inspection (168/02)

- 5.9.1 The holder of a licence for a passenger ropeway shall perform a preseason inspection prior to the start of each ski season to ensure that the lift is in compliance with requirements as set out in part 5 of this document.
- 5.9.2 The results of the inspection shall be recorded in a form acceptable to the director.

## 5.10 Aging Ski Lift Assessment

- 5.10.1 Every above-surface passenger ropeway shall be subjected periodically to a complete engineering review and assessment to ensure its continued operational safety in accordance with guidelines set by the director. Note: see Director's guideline 224/07.

## 5.11 Requirements to Limit Tube Tow Detachment (178/03 & 182/03)

- 5.11.1 The word "tube(s)" has the same meaning as "secondary carrier(s)" used in Z98.
- 5.11.2 Tube tows shall comply with the requirements of 5.11.3 through 5.11.7
- 5.11.3 The designer shall specify the method to verify the haul rope tension.
- 5.11.4 Connection of Tubes to Towing Attachments
  - (a) Manufacturers/designers of tube tows shall verify that the type of tube attachment connection is compatible for their towing attachment design.
  - (b) Manufacturers/designers of tube tows must allow for a safety margin that will ensure that the tubes will not detach as a result of changes in the tension force on the tether connecting the towing attachment to the tube. Changes of tension force on tether due to uneven tow path, foreseeable movement of

passengers in tubes, passengers feet dragging on snow while seated in an acceptable position in tubes and acceleration/deceleration feature of tube tows shall be considered.

- (c) For tube tows with automatic detachment at a predetermined unloading point, manufacturers/designers of tube tows shall specify minimum and maximum weight restrictions of tube users.

#### 5.11.5 Tubes

- (a) Tube sizes shall match tow path design so that a detached tube will slide clear of the uphill path of any of the following tubes.
- (b) Tubes shall be designed to accommodate the passenger size.

#### 5.11.6 Towing attachments

- (a) The length of tube towing attachment shall be designed to maintain a minimum operational clearance from the snow along the tube tow-path and hauling rope while the tube is being hauled along the tow path.
- (b) Factor of safety of all attachments to the haul rope and components for pulling tubes shall be based upon their impact strength at low temperatures.
- (c) The designer/manufacture shall specify the maximum tension force on all attachments to the haul rope and components for pulling tubes along their tow path.
- (d) The designer/manufacture shall specify procedures for inspection of all attachments to the haul rope and components for pulling tubes to verify their safety. Inspection procedures shall include criteria to evaluate the necessity of their replacement.

#### 5.11.7 Tow Path, Crossfall and Containment Barriers

- (a) Means to protect passenger in a tube against contacting any part of tube tow including grips shall be provided along the entire length of the tow path.
- (b) Means shall be provided to keep tubes on the pre-defined tow path.

### 5.12 Alterations

5.12.1 Where an alteration is made to a passenger ropeway or passenger conveyor the altered components and functions and those components and functions that are affected by the alterations shall conform to the requirements of [5.1](#).

5.12.2 One or more of the following actions on a passenger ropeway or passenger conveyor shall constitute a major alteration:

- (a) an increase or decrease in,
  - (1) the rated speed of the carriers,
  - (2) the maximum capacity of the ropeway;
- (b) an increase or decrease by more than ten per cent, or an accumulated increase or decrease by more than ten per cent, of the dead weight of the carriers or counter-weight system;

(c) an increase or decrease in the length or rise of the travel of the passenger ropeway;

(d) a change,

- (1) in the carrier design or manufacturer,
- (2) in the line sheaves and sheave assemblies design,
- (3) in the type of power supply to the machine,
- (4) in the type of driving machine,
- (5) in the location of a machine or tensioning system,
- (6) in the type of tensioning system,
- (7) that would result in a reclassification of the passenger ropeway,
- (8) in tower length or an addition of a new tower.

(e) a change in,

- (1) the method or type of operation,
- (2) the method or type of motion control
- (3) location of the controller

(f) a replacement of the controller,

(g) an alteration to the controller, other than an alteration to the motor starters.

5.12.3 Any action or work performed on a passenger ropeway that results in a change to the original design or the operational characteristics of the passenger ropeway or affects the inherent safety of the passenger ropeway and not listed in subsection 5.12.2 shall constitute a minor alteration.

5.12.4 Minor alterations shall be reported and inspected as required by section 19 of the Regulation.

### **5.13 Manufacturers/Designers Bulletins**

5.13.1 Manufacturer(s) of passenger ropeway(s) or conveyor(s) shall inform owners about the requirements associated with their safety bulletins or alerts in addition to the requirement of Section 35 of the Regulation.

5.13.2 In addition to the requirement of Section 35 of the Regulation, owner(s) of passenger ropeway(s) or conveyor(s) shall inform manufacturer(s) about findings which may require the issuing of a safety bulletin or alerts.

5.13.3 Owners are responsible to carry out the requirements of manufacturer's safety bulletin or alerts.

## Part 6 [No Changes from 261-13r1]

### 6 CONSTRUCTION HOISTS

#### 6.1 Applied Code [CAD Amendment 216-07]

6.1.1 Every construction hoist shall conform to the following:

- (a) workers' rail guided construction hoists shall conform to CAN/CSA Standard Z185-M87(R2001), Safety Code for Personnel Hoists; [CAD Amendment 216-07]
- (b) workers' rope-guided construction hoist shall conform to, American National Standard ANSI/ASSE A10.22 – 2007 Safety Requirements for Rope-guided and Non-guided Workers' Hoist; and [CAD Amendment 216-07]
- (c) material construction hoist, CSA Standard Z 256-M87(R2006), Safety Code for Material Hoists, [CAD Amendment 216-07]

and any applicable changes set out in this document. [CAD Amendment 246-11]

#### 6.2 Rated Load

6.2.1 For the purpose of this Document and subsection 31.(3) of the Regulation, "rated load" or "rated loading" in the codes referred to in section 6.1 means "maximum capacity".

#### 6.3 Continuously Controlled by Power

6.3.1 Every construction hoist shall be so designed that the car movement in both the up and down direction is continuously controlled by power.

#### 6.4 Broken Rope Safety

6.4.1 A material construction hoist that is equipped with a broken rope type safety shall not be registered unless a type test indicates that the safety is capable of stopping the car when it is free falling with its rated load.

#### 6.5 Limitation on Speed

6.5.1 Where the load-carrying unit of a workers' rope-guided construction hoist passes through a restricted area at a platform or floor, a control device that positively and automatically lowers the speed of the load-carrying unit to that specified in the related design submission while the load-carrying unit passes through the restricted area shall be installed on the hoist, except where the design submission indicates that no speed limitation is required.

6.5.2 In lieu of the control device referred to in subsection 6.5.1, an operator utilizing a system of signals may be used to manually control the speed of the hoist.

## 6.6 Attendant Operation

- 6.6.1 Every workers' rail-guided construction hoist, shall while in operation, be attended by an attendant who shall be stationed in the load-carrying unit, and who shall operate the construction hoist and also supervise the loading, passage and unloading of persons and freight.
- 6.6.2 Every material construction hoist shall while in operation be,
- (a) attended by one or more attendants stationed at each location where freight is being loaded or unloaded; and
  - (b) operated by,
    - (1) an attendant stationed at the location of the operating devices, provided that the operating devices can be automatically rendered inoperative should an unsafe condition for operation of the construction hoist exist, or
    - (2) an operator stationed at the driving unit where the driving unit and its operating devices cannot automatically be rendered inoperative should an unsafe condition for operation of the construction hoist exist.
- 6.6.3 Subsections 6.6.1 and 6.6.2 apply with necessary modifications to the providing of attendants and operators for workers' rope-guided construction hoists.

## 6.7 Up Overspeed Protection

- 6.7.1 Every workman's construction hoist that is equipped with a counterweight having a mass greater than the mass of the empty car shall be provided with a means for protecting against uncontrolled car speed in the up direction and such means shall conform to the following:
- (a) It shall detect any uncontrolled movement of the car prior to or at least when the car reaches a predetermined overspeed and shall cause the car to stop prior to the time when the counterweight strikes its buffers, or at least reduce car speed to the speed for which the buffers are designed.
  - (b) It shall be capable of performing as required in paragraph (a) without assistance from any hoist component which solely without built in redundancy, controls the speed, or deceleration, or stops the car during normal operation.
  - (c) It shall not develop an average retardation of the car in excess of 9.81 m/sec<sup>2</sup> during the stopping phase.
  - (d) It shall prevent uncontrolled movement of the car through control of the speed of, and acting upon the,
    - (1) car;
    - (2) counterweight;
    - (3) suspension or compensating rope system; and
    - (4) drive sheave, provided that the traction between the suspension ropes and the drive sheave are continuously monitored and the construction hoist is automatically removed from service when the rope slippage exceeds a predetermined amount.



- (e) When it is activated or during the stopping phase, it or another hoist component shall cause the power supply of the driving machine to be interrupted.
- (f) It shall be capable of performing at least ten operations without any adjustments.
- (g) All components that require periodic examination and maintenance for the purpose of maintaining their operational reliability, shall be readily accessible.
- (h) Its performance shall be checked during the initial and periodic inspections unless its performance reliability is substantiated otherwise.
- (i) It shall be provided with a making plate indicating maximum capacity for which it may be used and the speed at which it is set to operate.

## **6.8 Additional Requirements for Workers' Rail Guided Construction Hoists** [CAD Amendment 216-07]

6.8.1 In addition to the requirements of **6.1.1(a)**, workers' rail-guided construction hoists shall conform to the following:

(a) Clause **14.4.2** of CAN/CSA-Z185-M87 (R2001) shall be replaced with the following;

(1) The occurrence of a single ground or a software system failure or the failure of

- a) a switch which does not have contacts that are positively separated;
- b) a contactor;
- c) a relay; or
- d) a solid state device;

shall not render any electrical protective device ineffective.

- (b) Redundant software systems used to satisfy the requirements of **(a)** shall have a level of diversification sufficient to avoid common mode failures.
- (c) Clause **18.1.1(c)** of CAN/CSA-Z185-M87 (R2001) shall be replaced with:

Control equipment incorporating solid state devices and/or software systems in operating and control circuits shall be tested in accordance with the testing requirements of EN 12016:2004 by exposing it to interference levels at the test values specified for "safety circuits." The interference shall not render any electrical protective device ineffective and shall not cause the car to move. If enclosure doors or suppression equipment must remain installed to meet the above requirements, warning signs to that effect shall be posted on the control equipment.

- (d) The normal terminal stopping device and final terminal stopping devices shall not control the same controller devices unless two or more separate and independent controller devices are provided, two of which shall complete both the driving-machine motor and the driving machine brake circuits in either direction of travel.
- (e) Workers' construction hoists employing a two- or three-phase alternating-current driving machine motor, which is not driven from a direct current source through a static inverter, shall be provided with a means to inhibit the flow of alternating-current in each phase. [CAD Amendment 216-07]

## 6.9 Additional Requirements for Workers' Rope-Guided Construction Hoists [CAD Amendment 216-07]

6.9.1 In addition to the requirements of **6.1.1(b)**, workers' rope-guided construction hoists shall conform to the following:

(a) The occurrence of a single ground or a software system failure or the failure of

- (1) a switch which does not have contacts that are positively separated;
- (2) a contactor;
- (3) a relay; or
- (4) a solid state device;

shall not render the, deadman control switch, the limit switches which prevent overtravel, or the automatic friction brake ineffective.

Note: Requirements only apply to the circuits in which the deadman control switch, the limit switches which prevent overtravel, or the automatic friction brake are used and not to the devices themselves.

- (b) Redundant software systems used to satisfy the requirements of **(a)** shall have a level of diversification sufficient to avoid common mode failures.
- (c) Control equipment incorporating solid state devices and/or software systems in operating and control circuits shall be tested in accordance with the testing requirements of EN 12016:2004 by exposing it to interference levels at the test values specified for "safety circuits." The interference shall not render the Deadman Control Switch, Limit Switches, or the Automatic Friction Brake ineffective and shall not cause the cage to move. If enclosure doors or suppression equipment must remain installed to meet the above requirements, warning signs to that effect shall be posted on the control equipment.
- (d) All references to NFPA 70 (Clause **2.1**, Clause **3.24**, and Clause **4.13** of ANSI A10.22-2007) shall be replaced with Ontario Electrical Safety Code as referenced in **2.2.1(b)** of this document. [CAD Amendment 216-07], [CAD Amendment 246-11]

## 6.10 Additional Requirements for Material Construction Hoist [CAD Amendment 216-07]

6.10.1 In addition to the requirements of **6.1.1(c)**, material construction hoists shall conform to the following:

(a) Clause **15.3.2** of CAN/CSA-Z256-M87 (R2006) shall be replaced with the following;

- (1) The occurrence of a single ground or a software system failure or the failure of
  - a) a switch which does not have contacts that are positively separated;
  - b) a contactor;
  - c) a relay; or
  - d) a solid state device;

shall not render any electrical protective device ineffective.

(b) Redundant software systems used to satisfy the requirements of (a) shall have a level of diversification sufficient to avoid common mode failures.

(c) Clause 19.1.3 of CAN/CSA-Z256-M87 (R2006) shall be replaced with:

Control equipment incorporating solid state devices and/or software systems in operating and control circuits shall be tested in accordance with the testing requirements of EN 12016:2004 by exposing it to interference levels at the test values specified for "safety circuits." The interference shall not render any electrical protective device ineffective and shall not cause the car to move. If enclosure doors or suppression equipment must remain installed to meet the above requirements, warning signs to that effect shall be posted on the control equipment.

(d) The normal terminal stopping device and final terminal stopping devices shall not control the same controller devices unless two or more separate and independent controller devices are provided, two of which shall complete both the driving-machine motor and the driving machine brake circuits in either direction of travel.

(e) Material construction hoists employing a two- or three-phase alternating-current driving machine motor, which is not driven from a direct current source through a static inverter, shall be provided with a means to inhibit the flow of alternating-current in each phase. [CAD Amendment 216-07]

#### **6.11 Maintenance Log Book** [CAD Amendment 255-12]

6.11.1 Each elevating device of a type listed in 6.1.1 shall be provided with a maintenance log book as required by O. Reg. 209/01, s. 34 Log books.

6.11.2 Maintenance records in the form of a log book shall document compliance with related construction hoist codes, Code Adoption Document (CAD) requirements and any manufacturer recommended tasks extracted from the manufacturers maintenance and operation manuals, and shall include records on the following activities:

(a) description and dates of maintenance task performed;

(b) description and dates of examinations, tests;

(c) description and dates of adjustments, repairs, and replacements;

(d) description and dates of any tasks noted in the Guideline for Maintenance Logs – Construction Hoists (Guideline 256/12); and

(e) description and dates of all call backs (trouble calls) or reports that are reported to elevator personnel by any means, including corrective action taken.

(f) log records to document compliance with the maintenance, examinations and test activities listed in (a) through (d) shall also include:

(1) Building name and/or address;

(2) TSSA installation number;

(3) Contractor's (owners) name;

(4) Contractor's Registration Number;

(5) the code section, reference, requirement or clause number associated with a task;

(6) a description of the task performed;

(7) the prescribed maintenance frequency of the task;

(8) the date the task was performed; and

(9) upon completion of the task, the printed name, signature, and TSSA certificate number of the person who completed the maintenance, examination or tests.

6.11.3 Where a part of an elevating device which directly affects the safe operation of the device is found to be defective, the record of the relevant maintenance task shall not be signed off by the party performing the task until the defective part is adjusted, repaired or replaced, and the safety of the device restored.

**6.12 Location of the Maintenance Log Book** [CAD Amendment 255-12]

6.12.1 The maintenance log book shall be kept in the machine room or on the device or near the device location or, in the alternative if it is kept at another location on the site, a notice shall be posted in the machine room or device location indicating the alternate location.

6.12.2 Log book data shall be readily available as required by O. Reg. 209/01, s .34.(3)

**6.13 Manufacturers Maintenance and Operation Manual** [CAD Amendment 255-12]

6.13.1 For each construction hoist the manufacturers maintenance and operations manual shall be retained.

6.13.2 The manufacturers maintenance and operation manual shall be kept in the machine room or on the device or near the device location or in the alternative, if it is kept at another location on the site, a notice shall be posted in the machine room or device location indicating the alternate location.

6.13.3 The manufacturers maintenance and operation manual shall be readily available and immediately provided to an inspector upon request.

**6.14 Operator Training** [CAD Amendment 255-12]

6.14.1 Every operator must have the required knowledge and experience to operate an elevating device and owners, licensees and/or lessees, must ensure operators are trained to safely operate such devices and must be satisfied that the operator is aware of potential hazardous situation connected therewith as required by O.Reg 209/01 s.40.

6.14.2 Owners, licensees, lessees providing training or other trainers providers shall develop and maintain written operator training programs and written policies and procedures to ensure compliance with the regulation and **6.14.1**.

6.14.3 Written training programs shall include applicable portions of the manufacturers maintenance and operation manual to address the requirements of the regulation and **6.14.1** and shall include the minimum requirements for operator training as outlined in the Guide for Operator's Logs and Operator Training Requirements – Construction Hoists (Guideline 257/12).

6.14.4 Copies of the documentation required under **6.14.2** shall be kept on site, shall contain current and complete information and shall be readily available and immediately provided to an inspector upon request.

6.14.5 Training records shall be maintained by the training provider ("trainer") and shall include the following information:

- (a) the name of the person(s) who received the operator training;
- (b) the TSSA installation number of the device on which they were trained or the device/ device type(s) on which they were trained and the address associated with the device location;
- (c) the date of training;
- (d) the signature of the trained operator; and,

(e) the signature of the trainer.

6.14.6 A copy of the training records identified in **6.14.5** shall be maintained on site and readily available and immediately provided to an inspector upon request.

6.14.7 Individuals who are trained as operators, and have achieved sufficient competence to operate the device safely shall be issued by the trainer an “Operator’s Proof of Training” document which must certify that the operator is competent to operate the device safely and must specify the following information:

- (a) the operators name;
- (b) the TSSA installation number of the device on which they were trained or the device/ device type(s) on which they were trained and the address associated with the device location;
- (c) the date the training was received; and
- (d) the signature of the trainer.

6.14.8 The trainer shall issue an “Operator’s Proof of Training” document in the form of a letter or wallet card or equivalent as per **6.14.7**.

### **6.15 Operator’s Proof of Training** [CAD Amendment 255-12]

6.15.1 Operators are required to carry their “Operator’s Proof of Training” document whenever they operate an elevating device.

6.15.2 “Operator’s Proof of Training” shall be readily available and immediately provided to an inspector upon request.

6.15.3 An “Operator’s Proof of Training” may be immediately revoked by an Inspector, owner, licensee, lessee or trainer where there is reason to believe that the operator lacks the competence to safely operate the elevating device and the operator may no longer operate the device.

### **6.16 Daily Operator’s Log** [CAD Amendment 255-12]

6.16.1 Each elevating device type listed in **6.1.1** shall have a corresponding “Daily Operator’s Log” in which a current and accurate record of all required start up checks as required by the device manufacturer, owner, licensee, lessee or device operator shall be kept and shall include the minimum requirements for operator’s logs as outlined in the Guideline for Operator’s Logs – Construction Hoists (Guideline 257/12).

6.16.2 Operator’s of a device must satisfy themselves, at the start of each shift, that the device is safe to operate as required by O.Reg 209/01 s.42 by conducting a series of start up checks as outlined in the Guideline for Operator’s Log – Construction Hoists and shall record and sign off these checks in the “Daily Operator’s Log”.

6.16.3 The “Daily Operator’s Log” must contain the following information:

- (a) the Building name and/or address;
- (b) the TSSA device installation number;
- (c) a list of the daily checks as required by **6.16.1**;
- (d) the Operator’s printed name and signature acknowledging completion of all daily checks after the device is found to be in safe working order and the date of such checks.

6.16.4 Where a part of the elevating device which directly affects the safe operation of the device is found to be defective, the log shall not be signed off and the device shall not be put into operation until the defect is adjusted, repaired or replaced, by a registered mechanic.

**6.17 Location of the Daily Operator's Log** [CAD Amendment 255-12]

6.17.1 The "Daily Operator's Log" shall be kept in the machine room, on the device, or near the device location, or in the alternative, if it is kept at another location on the site, a notice will be posted in the machine room or device location indicating the alternate location.

**6.18 Signage** [CAD Amendment 255-12]

6.18.1 Every car, cage or platform shall be equipped with a sign as follows:

- (a) The sign shall display the message, "Only Operators who have their valid "Operator's Proof of Training" card on their person shall operate this device";
- (b) The sign shall be of such material and construction that the letters are stamped, etched, cast or otherwise applied to remain permanently visible; and
- (c) The height of the letters shall not be less than 12 mm (1/2 in.).`

**6.19 Incident and Issue Reporting** [CAD Amendment 255-12]

6.19.1 Incidents shall be reported as required by O.Reg 209/01 s.36. See also Director's Guideline 230/09.

6.19.2 Device operators shall report device incidents and any safety related issues to supervisory personnel who are responsible for taking the appropriate action or following the incident report requirements required by the regulation.

## Part 7 [No Changes from 261-13r1]

### 7 ELEVATING DEVICES FOR PERSONS WITH PHYSICAL DISABILITIES

#### 7.1 Applied Code [CAD Amendment 238-09]

7.1.1 Each newly installed elevating device for persons with physical disabilities shall conform to the requirements of CSA Standard B355-09, Lifts for persons with physical disabilities including and any applicable changes set out in the CAD. [CAD Amendment 238-09]

#### 7.2 Maintenance [CAD Amendment 238-09]

7.2.1 All lifts for persons with physical disabilities shall conform to the maintenance requirements of CSA-B355-09 Lifts for persons with physical disabilities including Annex B and any applicable changes set out in the CAD. [CAD Amendment 238-09]

#### 7.3 Maintenance Log Book [CAD Amendment 238-09]

7.3.1 The log book shall, as a minimum, contain the following information:

- (a) Building name and/or address,
- (b) TSSA or MCCR installation number,
- (c) Contractor's and Owner's name,
- (d) Year and month when a specific task is performed,
- (e) The code section, reference or clause number associated with a maintenance task, a description of the task performed and the prescribed maintenance frequency of the task,
- (f) The printed name and signature of the persons who completed the required maintenance task. [CAD Amendment 238-09]

7.3.2 Where a part directly affecting the safety of the operation is found to be defective, the record of the maintenance task shall not be signed off until the defect is adjusted repaired or replaced. [CAD Amendment 238-09]

#### 7.4 Location of the Log Book [CAD Amendment 238-09]

7.4.1 The log book will be retained in the machine room or at the device location. If it is kept in another location in the building, a notice will be posted in the machine room indicating the alternate location. [CAD Amendment 238-09]

#### 7.5 Access to Lift

7.5.1 Every owner of an unenclosed vertical platform lift and every owner of an unenclosed stair platform lift or stairchair lift shall ensure that the public does not have access to the area where the lift is installed while the lift is in operation.

- 7.5.2 Subsection 7.5.1 does not apply in the case of an unenclosed stair platform lift or stairchair lift where,
- (a) the owner of the lift is able to control and identify persons who will be using the lift or the area where the lift is installed and the owner familiarizes those persons in advance of using the area or lift with the safety rules and procedures concerning the use of the area and the lift; and
  - (b) and the lift meets the requirements of subsection 7.6.

## **7.6 Lift Operation with Persons Nearby**

- 7.6.1 Where an unenclosed stair platform lift or stairchair lift is being operated at the same time that other persons are using the area in which the lift is installed,
- (a) audio-visual signals shall be emitted that warn persons using the lift and persons in the area where the lift is installed at all times when the platform is unfolded and until the lift is parked in a safe position at a terminal; and
  - (b) every leading edge or surface of that portion of the lift and its carriage that carries the passengers in both directions of travel shall be equipped with sensitive devices that meet the requirements of clause 7.2.4. and 8.5.4. of the standard adopted in section 7.1 of this Document and that are operational whenever the carriage is in motion.

## **7.7 Usage of Device**

- 7.7.1 The owner of a lift for persons with physical disabilities shall ensure that,
- (a) the device is used primarily for the transportation of persons with physical disabilities;
  - (b) detailed operating instructions are posted at every operating station;
  - (c) the operation of the device is restricted to attendants designated by the owner or those persons who in the opinion of the owner are able to use the device without an attendant; and
  - (d) the persons using the device receive instruction and training that emphasizes the hazards associated with improper use of the device.

## **7.8 Requirements for Restricted Operation**

- 7.8.1 The operation of a lift for persons with physical disabilities shall be restricted by means of a key-control for the operating device as set out in subsection 7.8.2 and 7.8.3 or by a method acceptable to the director that provides the same degree of safety.
- 7.8.2 A key-control for an operating device may be by means of an on/off lockable switch located near and controlling one or more operating devices or each operating device may be directly key-controlled.
- 7.8.3 The key for a key-control for an operating device shall be removable only when the switch is in an "off" position.
- 7.8.4 Folding down of a platform on a stair platform lift shall be restricted to persons authorized to use the lift, by the following means:



- (a) in the case of a platform that is folded down by power – by means of a key-controlled switch or by a method acceptable to the director; and
- (b) in the case of a platform that is folded down manually – by means of a keyed lock or by a method acceptable to the director.

7.8.5 Lowering of a barrier arm, if provided, shall be restricted to persons authorized to use the lift by means of a keyed switch or lock or by a method acceptable to the director.

## **7.9 Instructions for Use and Owner Requirements**

7.9.1 Every owner of an elevating device for persons with physical disabilities shall,

- (a) ensure that the instructions for the device are posted at the location of each operating device that will inform a person with physical disabilities of the established procedure to gain access to and to use the device and, in the case of unenclosed devices, that such instructions include, but are not limited to, cautioning the user to observe the lift runway for possible obstructions;
- (b) ensure that an attendant is available to operate the device when a person with physical disabilities requires assistance;
- (c) where an attendant is required and is not permanently stationed at the location of the operating device ensure that a notice is posted at the entrance to the elevating device that indicates the procedure to be followed to obtain assistance; and
- (d) provide instruction that an unoccupied platform of an unenclosed stair platform lift should not be called or sent from a landing station unless it is in the raised and folded position. [CAD Amendment 238-09]

7.9.2 A person shall only operate an unenclosed vertical platform lift, an unenclosed stair platform lift or a stairchair lift, if the person is satisfied that only persons using the lift have access to the area where the lift is installed.

7.9.3 Subsection 7.9.2 does not apply to a person operating an unenclosed stair platform lift or a stairchair lift while other persons are using the area in which the lift is installed where,

- (a) the conditions set out in subsection 7.5.2 exist;
- (b) the person operating the lift is an attendant and has, while operating the lift in the folded down position, a clear view of the lift runway in the direction of its movement by walking along with the carriage while it is in motion or has by being stationed at a point, a clear view of the runway;
- (c) the person using the lift has, while using the lift, a clear view of the lift runway in the direction of travel; and
- (d) the audio-visual signals required under subsection 7.6.1(a) are operational.

## **7.10 Notice Required Regarding Restricted Use**

7.10.1 A notice that the use of a lift for persons with physical disabilities is restricted to persons with physical disabilities shall be posted at each location of a device, at landing or runway entrances of the device and at the load-carrying unit of the device.

## **7.11 Supplementary Owners Report**

- 7.11.1 In addition to those requirements set out in sections 15 and 16 of the Regulation, the design submission for a lift for persons with physical disabilities shall include a detailed report, completed on a form provided by the director, from the owner of the elevating device, in which the proposed methods of compliance with sections 7.5 to 7.8 and 7.9.1 of this Document shall be described.

## **7.12 Change of Ownership & Supplementary Owners Report**

- 7.12.1 In addition to the requirements of section 29 of the Regulation, where there is change in the ownership of a lift for persons with physical disabilities or a substantive change in the type of occupancy of a building in which a lift for persons with physical disabilities is installed, the new owner of the lift shall submit to the director, a detailed report on a form provided by the director in which the proposed methods of compliance with sections 7.5 to 7.8 and 7.9.1 of this Document shall be described.

## **7.13 Pressure Sensor Requirement for Vertical Platform Lifts (248/11)**

- 7.13.1 All vertical platforms, where any part of the hydraulic cylinder is above the top of the hydraulic oil storage tank, shall be equipped with a pressure sensor that when activated shall prevent the operation of the lowering valve or valves in conformance with clause 6.6.8 of CSA B355-09 Lifts for Persons with Physical Disabilities [CAD Amendment-261-13]

## Part 8

### 8 WIND TURBINE TOWER ELEVATORS [CAD Amendment 277-19]

#### 8.1 Applied Code

- 8.1.1 Each newly installed wind tower turbine elevator shall conform to the requirements of ASME A17.8-2016 / CSA B44.8-16, Standard for wind turbine tower elevators including any applicable changes set out in the CAD.

#### 8.2 Amendments to ASME A17.8-2016 / CSA B44.8-16

- 8.2.1 The requirements of 2.20.2.10 c) are amended as follows;

2.20.2.10 c) A readily visible hour meter shall be provided on all suspended elevator cars and the suspension steel wire ropes shall be replaced after 250 h of operation. ~~or after 5 years, whichever occurs first.~~

#### 8.3 Maintenance

- 8.3.1 Existing wind tower turbine elevators shall conform to the maintenance requirements of ASME A17.8-2016 / CSA B44.8-16, Standard for wind turbine tower elevators including and any applicable changes set out in the CAD.

