

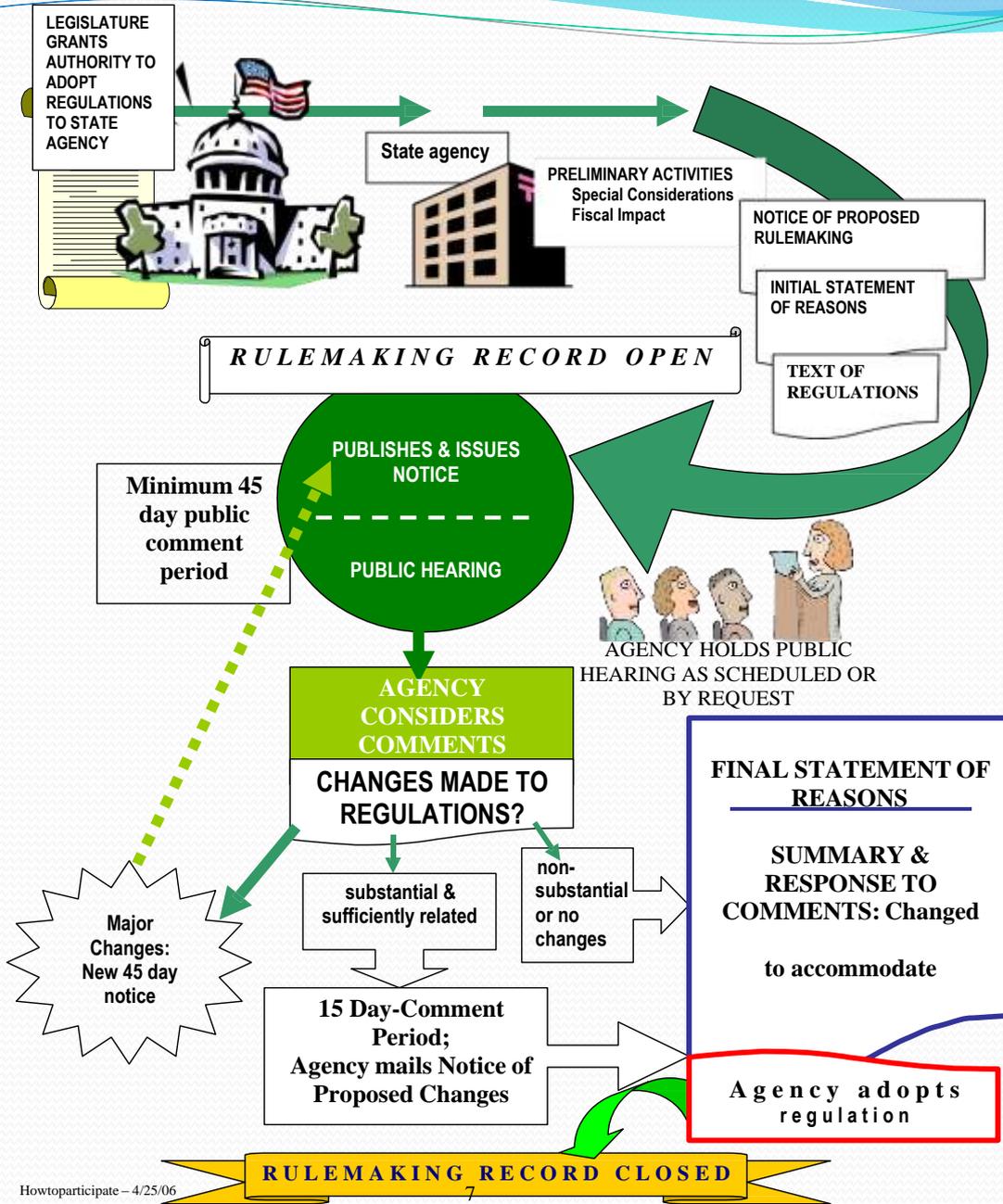
State of California
Division of Occupational Safety & Health

Elevator Safety Order
Advisory Committee Meeting

December 18, 2012

Oakland CA

The Rulemaking Process



Agenda

- Firefighters' Emergency Operation
- Elevator Control and Machine Rooms
- Suspension Means Standards
- Car Top Railings
- Definitions (Supervision)

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Firefighters' Emergency Operation

- 1206 Maintenance

1206.7 Maintenance of Firefighters' Service

All elevators provided with firefighters' service shall be subjected monthly to Phase I recall and a minimum of one-floor operation on Phase II to assure the system is maintained in proper operating order. A written record of findings on the operation shall be made and kept on the premises of said operation.

Ref. ASME A 17.1-1996

- 8.6.10 Special Provisions

8.6.10.1 Firefighters' Emergency Operation.

All elevators provided with firefighters' emergency operation shall be subjected monthly 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.

Ref. ASME A17.1-2004

Firefighters' Emergency Operation

- 8.6.11.1 Special Provisions

8.6.11.1 Firefighters' Emergency Operation.

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. Ref. ASME A17.1-2010

California Labor Code (in part)

- 7311.1. (a) On and after June 30, 2003, no conveyance subject to this chapter shall be erected, constructed, installed, materially altered, tested, maintained, repaired, or serviced by any person, firm, or corporation unless the person, firm, or corporation is certified by the division as a **certified qualified conveyance company**.....
- 7311.2. (a) On and after June 30, 2003, except as provided in subdivisions (b) and (c) of Section 7301.5, any person who, without supervision, erects, constructs, installs, alters, tests, maintains, services or repairs, removes, or dismantles any conveyance covered by this chapter, shall be certified as a **certified competent conveyance mechanic** by the division.....

Firefighters' Emergency Operation

- Group II or III

§3000.(h)(1) ~~Alterations~~, Repair, replacements, and maintenance of devices listed in section 3000(c) shall comply with Part XII of ASME A17.1-1996; except for Rule 1200.1, Rule 1200.5a, Rule 1206.1b, Rule 1206.1c, **1206.7**, Rule 1206.10, section 1214, section 1215, section 1216 and section 1217; which is hereby incorporated by reference.

All elevators provided with firefighters' emergency operation shall be subjected monthly to an operational test of Phase I recall by use of the key switch, and a minimum of one-floor operation on Phase II (if provided). The test shall include as a minimum the testing of the door reopening devices, door operations, in-car stop switch(s) and the in-car audible and visual signaling devices. These tests shall be performed by a Certified Competent Conveyance Mechanic.

All results shall be recorded by the CCCM performing the test on the monthly log for each elevator. If deficiencies are identified they shall be corrected. The log and findings shall be readily available on site to elevator personnel and the authority having jurisdiction. If the log is not maintained in the conveyance machine/control room, its location shall be conspicuously posted in the machine/control room.

Firefighters' Emergency Operation

- Group IV

§3141.1. Maintenance, Repair, and Replacement.

Maintenance, repairs, and replacements of conveyances shall comply with ASME A17.1-2004, section 8.6; except sections 8.6.3.2, 8.6.3.3, 8.6.3.4, 8.6.4.1, 8.6.4.2 and **8.6.10.1**

All elevators provided with firefighters' emergency operation shall be subjected monthly to an operational test of Phase I recall by use of the key switch, and a minimum of one-floor operation on Phase II (if provided). The test shall include as a minimum the testing of the door reopening devices, door operations, in car stop switch(s) and the in car audible and visual signaling devices. These tests shall be performed by a Certified Competent Conveyance Mechanic.

All results shall be recorded by the CCCM performing the test on the monthly log for each elevator. If deficiencies are identified they shall be corrected. The log and findings shall be readily available on site to elevator personnel and the authority having jurisdiction. If the log is not maintained in the conveyance machine/control room, its location shall be conspicuously posted in the machine/control room.

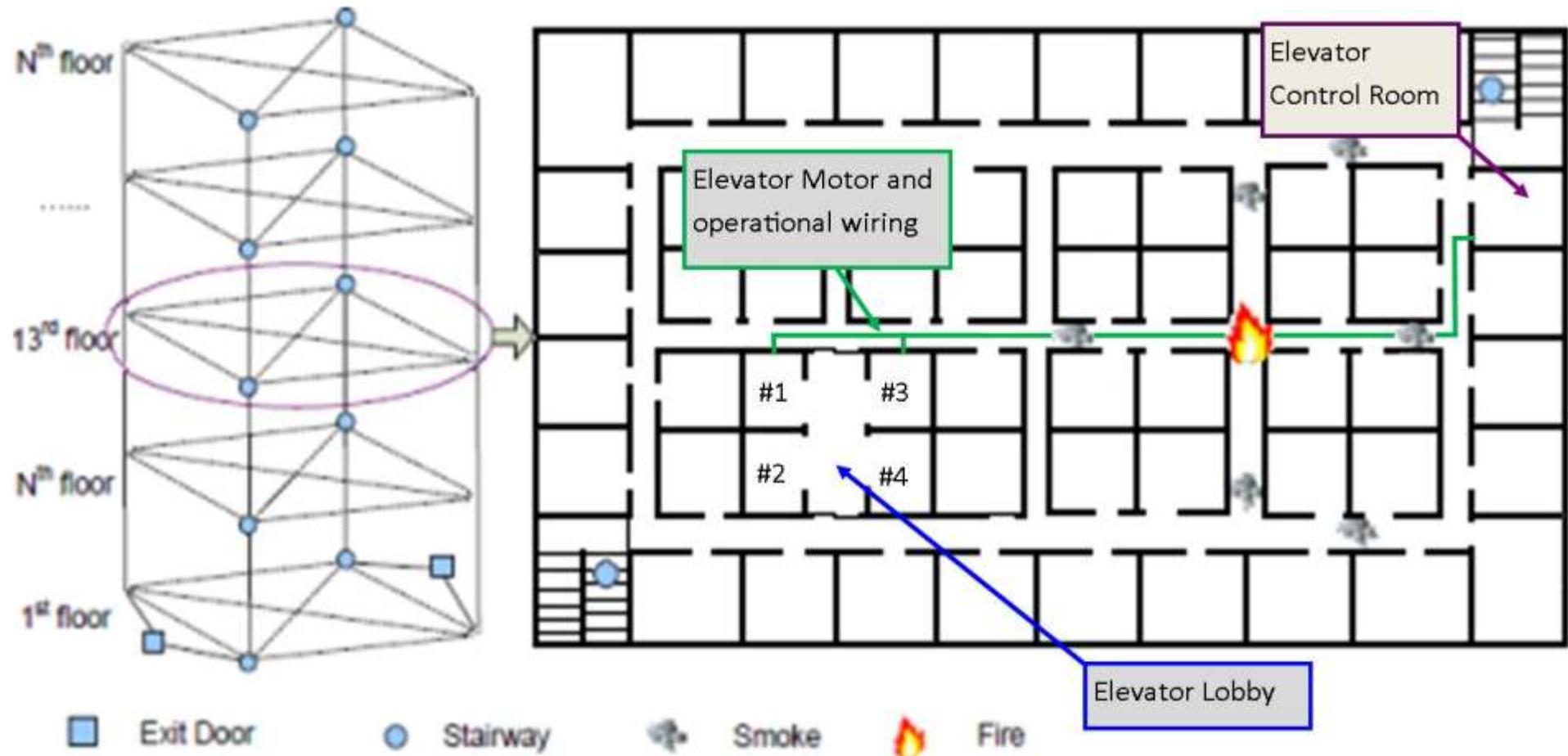
Firefighters' Emergency Operation

- Firefighters' Service Alternate Language

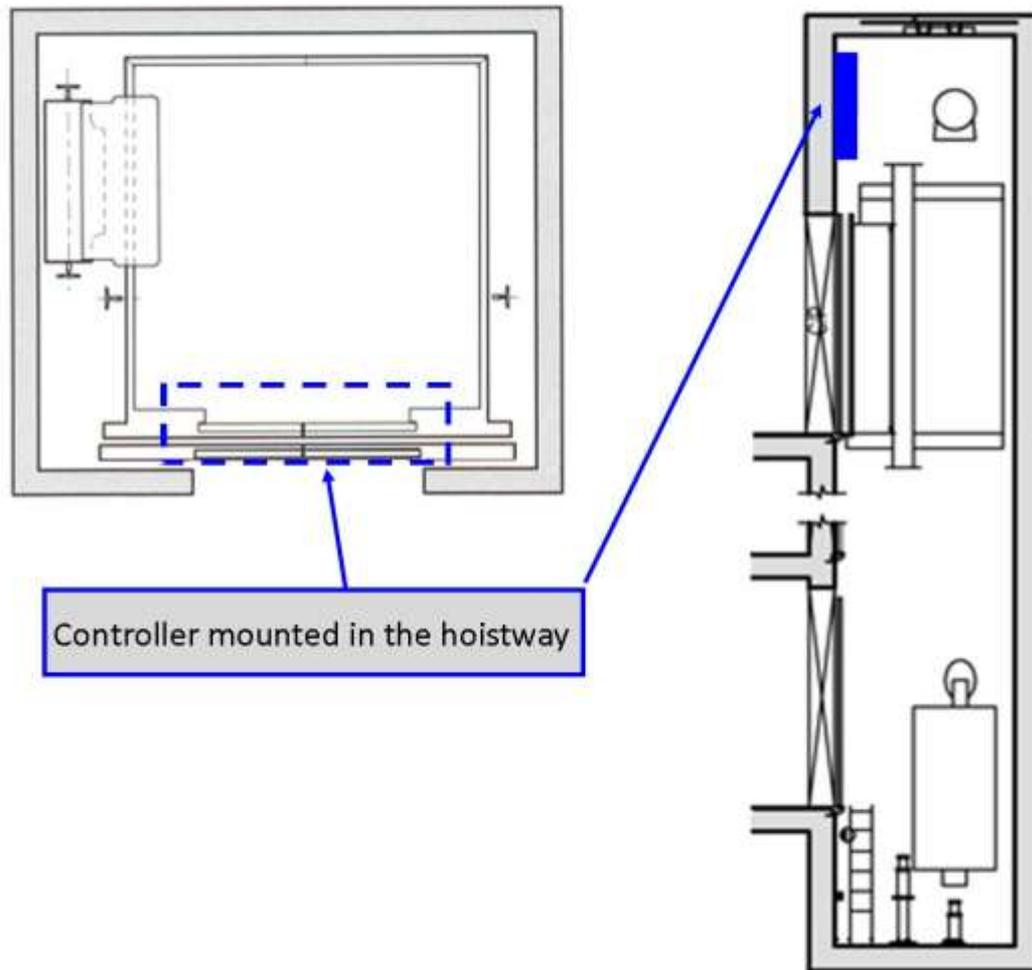
All elevators provided with firefighters' emergency operation shall be subjected monthly to a check of Phase I recall by use of the key switch, and a minimum of one-floor operation on Phase II. The check may be performed by authorized personnel that have been instructed in the operation of the equipment. Quarterly (every 3 Months) all elevators provided with firefighters' emergency operation shall be subjected to an operational test of Phase I and Phase II. The test shall include as a minimum the testing of the door reopening devices, door operations, in-car stop switch(s) and the in-car audible and visual signaling devices. These tests shall be performed by a Certified Competent Conveyance Mechanic.

All results shall be recorded by the personnel performing the check/test on the monthly log for each elevator. If deficiencies are identified a Certified Qualified Conveyance Company shall be contacted immediately in order to make corrections. The date and time that the CQCC was notified of the deficiencies shall also be recorded on the log. The log and findings shall be readily available on site to elevator personnel and the authority having jurisdiction. If the log is not maintained in the conveyance machine or control room, its location shall be conspicuously posted in the machine or control room.

Elevator Control and Machine Rooms

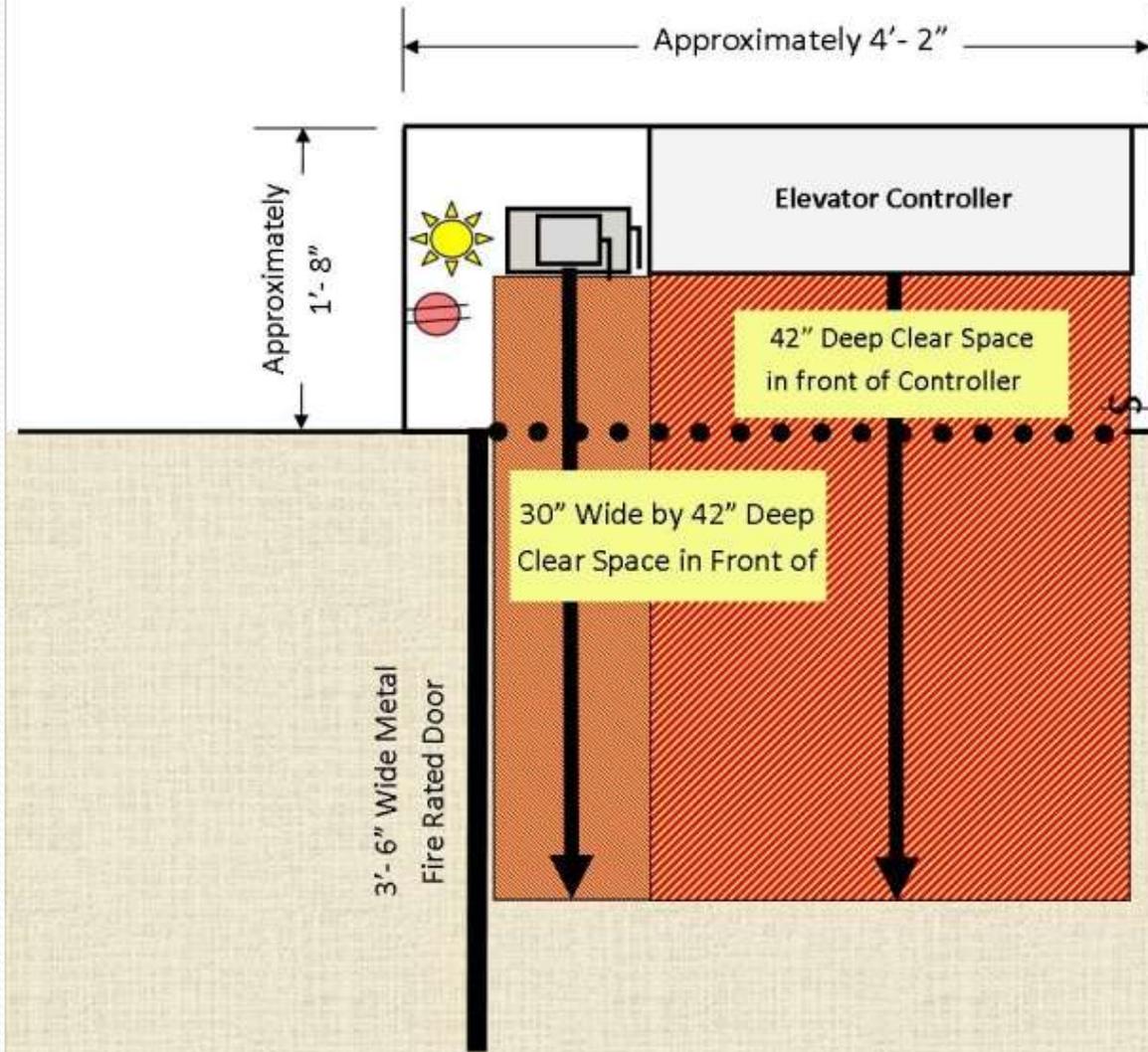


Elevator Control and Machine Rooms



Elevator Control and Machine Rooms

Control Space (Closet) Clearances



Hallway or Public Space

Elevator Control and Machine Rooms

2010 California Electric Code (CCR Title 24, Part 3), Article 620 - Elevators

Some parts of the Code have been paraphrased to simplify the language for this presentation

620.4 Live Parts Enclosed. All live parts of electrical apparatus in all locations shall be enclosed to protect against accidental contact. (FPN: See 110.27 for guarding of live parts.)

110.27 Guarding of Live Parts.

(A) Live Parts Guarded Against Accidental Contact.

Live parts > 50 volts shall be guarded against accidental contact by approved enclosures or by any of the following means:

- (1) By location **in a room, vault, or similar enclosure** that is accessible only to authorized persons.
- (2) **By suitable permanent, substantial partitions or screens arranged so that only qualified persons have access to the space within reach of live parts.** Any openings in such partitions or screens shall be sized and located so that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them.
- (3) By location on a suitable balcony, gallery, or platform elevated and arranged so as to exclude unqualified persons.
- (4) By elevation of 8 ft. or more above the floor or other working surface.

Elevator Control and Machine Rooms

620.5 Working Clearances. Working space shall be provided about controllers, disconnecting means, and other electrical equipment. The minimum working space shall be not less than that specified in 110.26 (A).

110.26 (A) Working Space. Equipment operating at 600 volts nominal or less and likely to require examination, adjustment, servicing, or maintenance while energized shall comply with these dimensions:

- (1) **Depth of Working Space.** As conditions of this section dictate, either 3 ft., 3 ft. 6 in., or 4 ft. clear from exposed live parts or from the enclosure or opening if live parts are enclosed.
- (2) **Width of Working Space.** The width of the equipment or 30", whichever is greater.
- (3) **Height of Working Space.** Minimum 6' - 6" above the work space floor.

620.5 Working Clearances (cont.). Where conditions of maintenance and supervision ensure that only qualified persons examine, adjust, service, and maintain the equipment, the clearance requirements of 110.26 (A) shall be waived as permitted in 620.5 (A) through (D).

620.5

(A) **Flexible Connections to Equipment.** 6 ft. flexible cords or cables may be used to allow electrical equipment in certain spaces to be repositioned to meet the clear working space requirements of 110.26 (A).

(B) **Guards.** Live parts are suitably guarded and the equipment can be examined, adjusted, service, or maintained while energized without removal of this protection.

(C) **Examination, Adjusting, and Servicing.** Electrical equipment is not required to be examined, adjusted, serviced, or maintained while energized.

(D) **Low Voltage.** Low voltage parts may be uninsulated.

Elevator Control and Machine Rooms

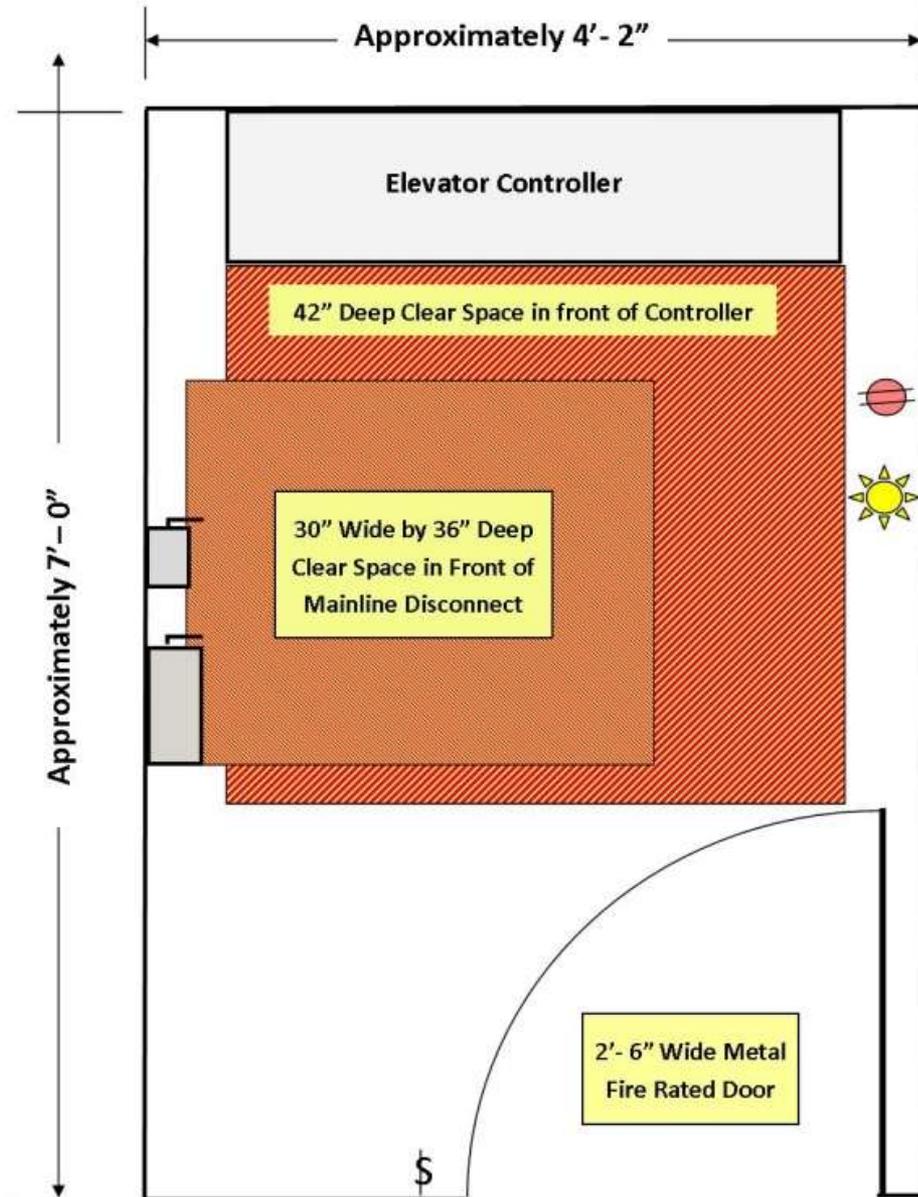
Excerpt from Part II, Department of Labor, Occupational Safety and Health Administration, 29 CFR Part 1910, Electrical Standard; Final Rule.

II. Background

B. Nature of Electrical Accidents

“Electrical accidents, when initially studied, often appear to be caused by circumstances that are varied and peculiar to the particular incidents involved. However, further consideration usually reveals the underlying cause to be a combination of three possible factors: work involving unsafe equipment and installations; **workplaces made unsafe by the environment**; and unsafe work performance (unsafe acts). The first two factors are sometimes considered together and simply referred to as unsafe conditions. Thus, electrical accidents can be generally considered as being caused by unsafe conditions, unsafe acts, or, in what is usually the case, combination of the two. It should also be noted that inadequate maintenance can cause equipment or installations that were originally considered safe to deteriorate, resulting in an unsafe condition.”

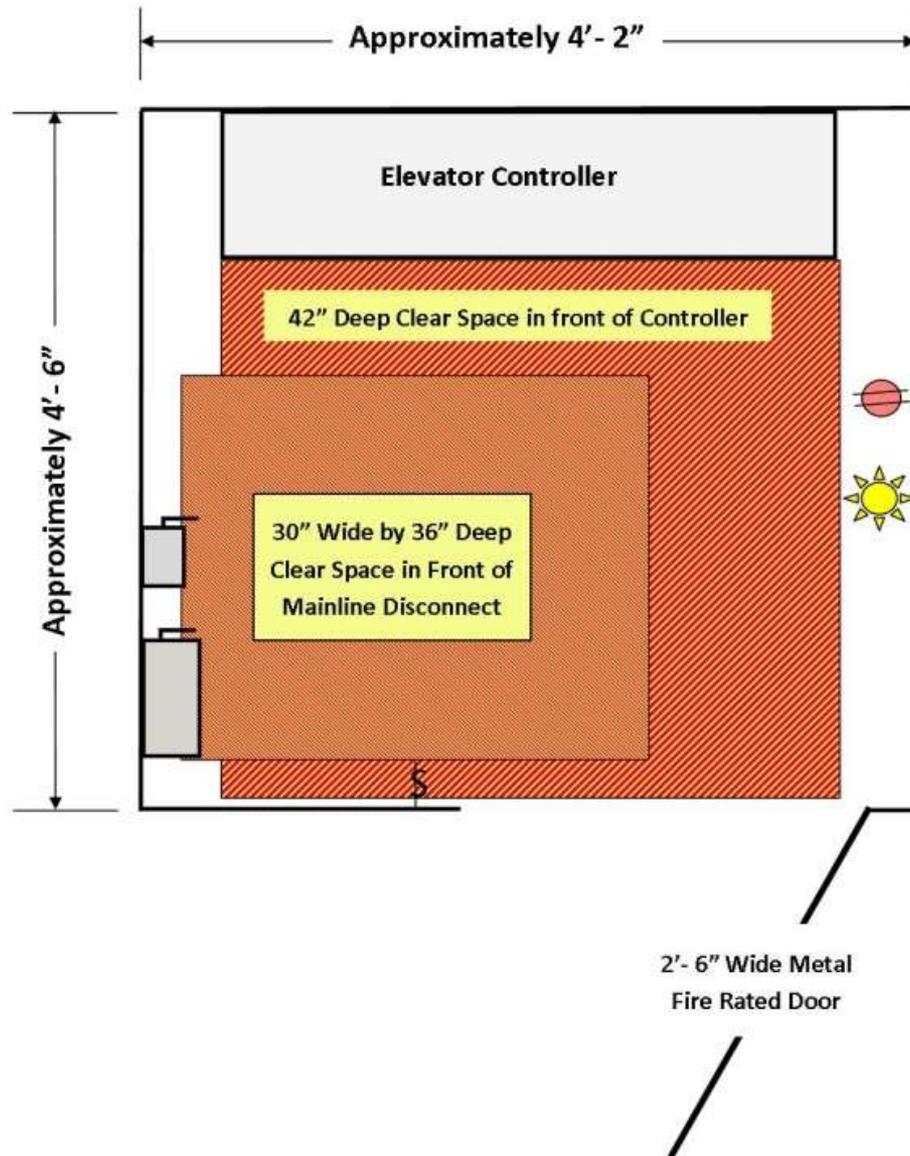
Control Room Clearances—Door Swings In



Elevator Control and Machine Rooms

Elevator Control and Machine Rooms

Control Room Clearances



Elevator Control and Machine Rooms

- Group IV

§3141.7 General Requirements

Conveyances shall comply with the following general requirements:

(22) Elevator motion controls shall be placed in a control room or machine room constructed in conformance with the CBC and set aside for that purpose. The control or machine room shall be located no more than 10 feet from one side of the hoistway. All electrical clearances shall be maintained with the door in the closed position and the door shall not swing into the required electrical clearances. The door shall meet all requirements of ASME A17.1-2004 section 2.7.3.4. and shall be labeled "ELEVATOR EQUIPMENT" with letters not less than 51 mm (2 in) high on a contrasting background. The room shall be arranged so that passage through the room is not necessary to gain access to other equipment or other parts of the building. Access to the room shall not be through a restroom, dressing rooms or a locked tenant/ owner space.

A permanent sign shall be mounted no less than 1219 mm (48 inches) and no greater than 1981 mm (78 inches) high on the elevator entrance jamb of all conveyances at their main recall floor and at the fire control panel, which will read "ELEVATOR CONTROL ROOM LOCATED *****". The sign shall be a minimum of 6.35 mm (1/4 inch) high on a contrasting background. If all the conveyances in a lobby share a common control or machine room a single sign at the fire recall switch may be permitted.

Suspension Means

- Group II and III

§3000.(h)(1) ~~Alterations,~~ Repair, replacements, and maintenance of devices listed in section 3000(c) shall comply with Part XII of ASME A17.1-1996; except for Rule 1200.1, **Rule 1200.5a, Rule 1206.1b, Rule 1206.1c**, Rule 1206.7, Rule 1206.10, section 1214, section 1215, section 1216, and section 1217; which is hereby incorporated by reference.

Suspension Means Replacement and maintenance shall be in accordance with ASME A17.1-2010 section 8.6.2.5, section 8.6.3.1, section 8.6.3.2, section 8.6.3.3, section 8.6.3.4, section 8.6.4.1 and section 8.6.4.2 . Section 8.6.3.4.3 reference to section 8.11.2.3.2(b) shall be replaced with section 8.6.4.20.2(b). All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group III inspection

§3128. Periodic and Acceptance Inspections and Tests.

Periodic and acceptance inspections and tests shall comply with Part X of ASME A17.1-1996; except for Rules 1001.1, **Rule 1001.2(c)(26)**, **Rule 1001.2(c)(28)**, **Rule 1001.2(c)(29)**, **Rule 1001.2(c)(30)**, Rule 1004.1, Rule 1005.3b, Rule 1010.2, Rule 1010.8, Rule 1010.11, Rule 1010.13, and section 1011; which is hereby incorporated by reference.

Suspension Means, suspension fastening, hitch plate, and compensation ropes and chains shall be tested and inspected in accordance with ASME A17.1-2010 section 8.11.2.1.3(z), section 8.11.2.1.3(bb), section 8.11.2.1.3(cc), and section 8.11.2.1.3(dd). The reference in Section 8.6.3.4.3 to section 8.11.2.3.2(b) shall be replaced with section 8.6.4.20.2(b). All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group IV new installation

§3141. Scope.

Conveyances covered by ASME A17.1-2004, section 1.1, Scope, and Article 41 of Title 8 shall comply with ASME A17.1-2004, Safety Code for Elevator and Escalators, except sections 1.1.3, 2.2.2.5, 2.7.6, 2.11.1.2, 2.11.1.4, 2.12.6, 2.14.2.2(f), and 2.14.2.6; apart from these exceptions, ASME A17.1-2004 is hereby incorporated by reference.

ASME A17.1-2004, section 2.20 and Section 2.24 shall apply to conveyances covered by these sections for which the installation contract was signed on or after May 1, 2008 and before XX/XX/2013.

ASME A17.1-2010, section 2.20 and section 2.24 are incorporated by reference, except section 2.24.2.2(c) and section 2.24.2.3.2. These sections shall apply to conveyances for which the installation contract was signed on or after XX/XX/2013.

Suspension Means

- Group IV new installation continued

The section 2.20.8.3 reference to “means” shall be a device that continuously monitors the residual strength of each suspension-member. The monitoring device must be properly installed and functional. A functioning device may be removed only after a determination has been made that the residual strength of each suspension-member exceeds 60%. These findings and the date of removal are to be conspicuously documented in the elevator machine room. The removed device must be replaced or returned to proper service within 30 days. If upon routine inspection, the monitoring device is found to be in a non-functional state, the date and findings are to be conspicuously documented in the elevator machine room. If upon inspection by the Division, the monitoring device is found to be non- functional or removed, and the required documentation is not in place, the elevator will be removed from service. If the device is removed to facilitate the replacement of suspension-member, it must be properly installed and functional before the elevator is returned to service.

All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group IV Maintenance, Repair, and Replacement
§3141.1. Maintenance, Repair, and Replacement.

Maintenance, repairs, and replacements of conveyances shall comply with ASME A17.1-2004, section 8.6.2, **except sections 8.6.3.2, 8.6.3.3, 8.6.3.4, 8.6.4.1, 8.6.4.2 and 8.6.10.1**

Suspension means maintenance shall comply with the sections of ASME A17.1-2010, section 8.6.3.2, 8.6.3.3, 8.6.3.4, 8.6.4.1, and 8.6.4.2 after the effective date of this amendment XX/XX/2013. The section 8.6.3.4.3 reference to section 8.11.2.3.2(b) shall be replaced with section 8.6.4.20.2(b). All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group IV inspection and test

§3141.4. Acceptance Inspections and Tests.

Acceptance inspections and tests shall comply with the parts of ASME A17.1-2004, section 8.10, that are applicable to the type of conveyance installed or altered. Private residential conveyances installed, or that have undergone major alterations, located in a multi-unit residential building serving no more than two dwelling units and not accessible to the public, shall be inspected for safety and compliance with applicable provisions in ASME A17.1-2004, sections 5.3 and 5.4, in addition to the acceptance inspections and tests specified in section 3141.4(a).

Acceptance Inspections and tests of ASME A17.1-2010, section 8.10.2.2.2(cc)(3)(c), and 8.10.2.2.2(ss) shall apply to conveyances covered by this section for which the installation contract was signed on or after XX/XX/2013. All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group IV

§3141.5. Periodic Inspections.

Periodic inspections shall comply with ASME A17.1-2004, section 8.11, except section 8.11.1.1, **8.11.2.1.3(z), section 8.11.2.1.3(cc) and section 8.11.2.1.3(dd)** applicable to the type of conveyance inspected.

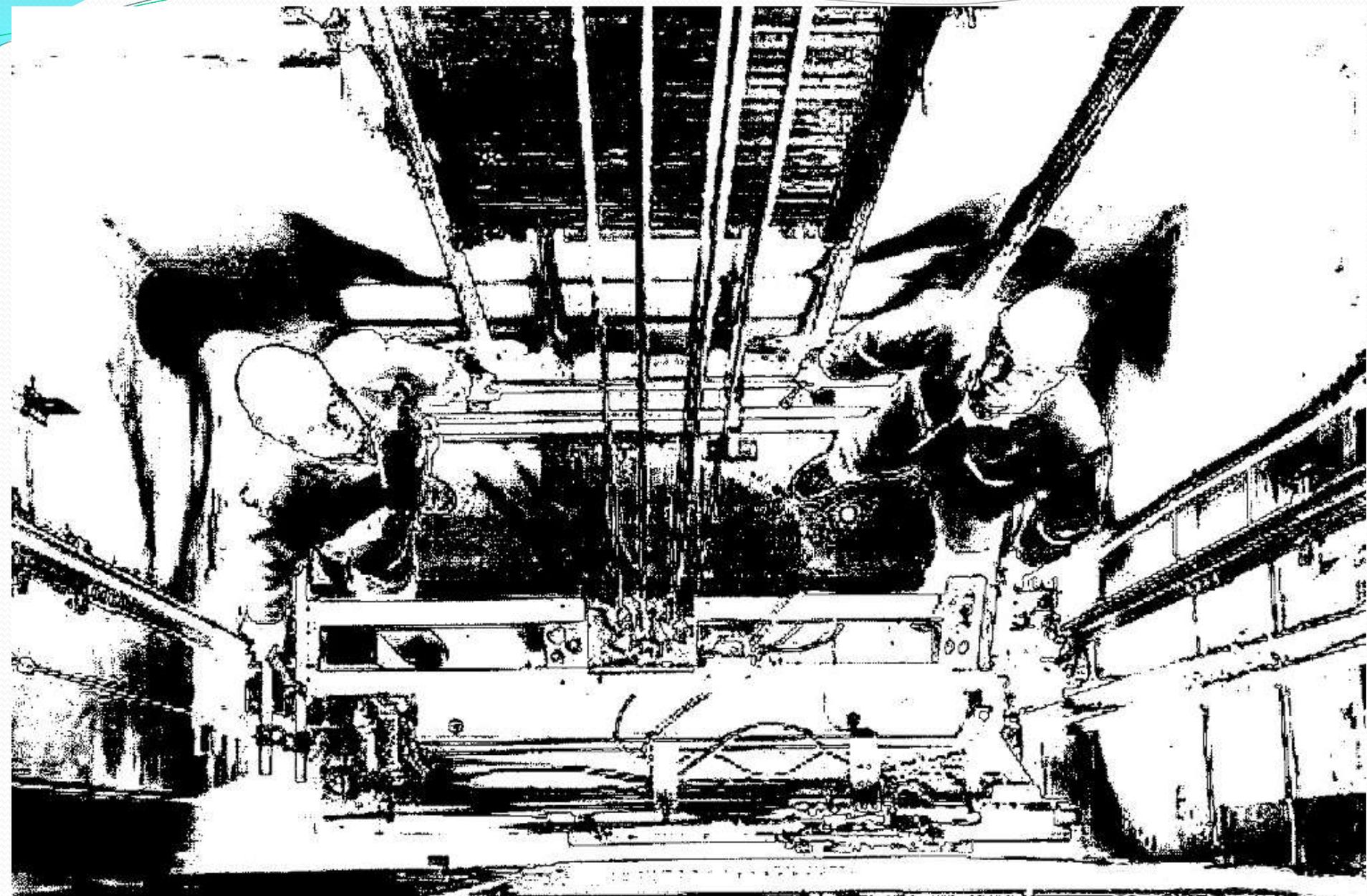
ASME A17.1-2010, section 8.11.2.1.3(z), section 8.11.2.1.3(cc) and section 8.11.2.1.3(dd) shall apply to all applicable conveyance types covered by this section. All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).

Suspension Means

- Group IV testing

§3141.6. Periodic Testing.

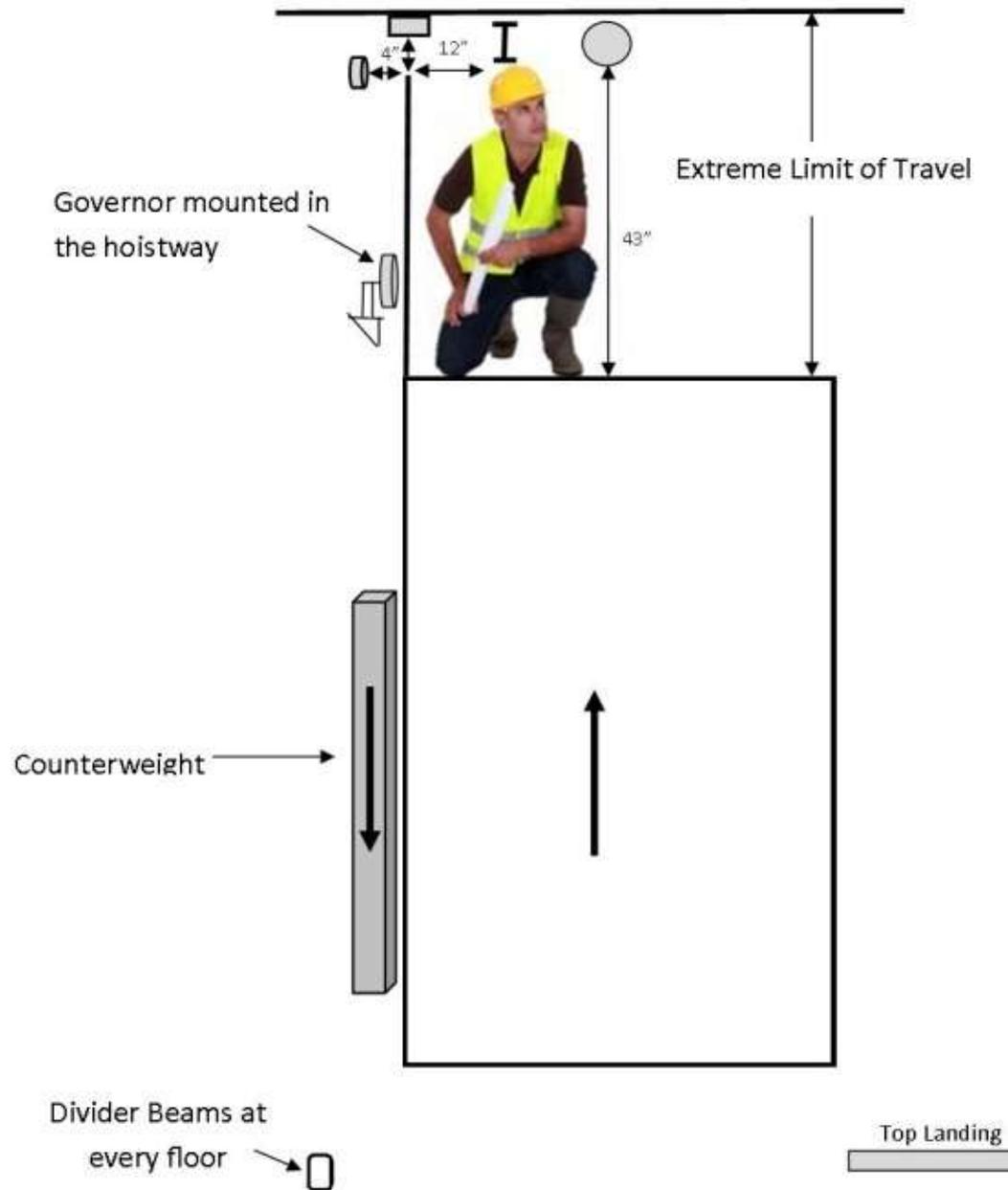
(h) ASME A17.1-2010, section 8.6.4.19.12, and section 8.6.4.19.13, except section 8.6.4.19.12(b) shall apply to all conveyances covered by this section for which the installation contract was signed on or after XX/XX/2013 and all conveyances for which these devices are installed. If relative motion between the drive sheave and suspension means will result in material damage, it is permissible to relieve the tension between the two devices prior to demonstrating conformance with 8.6.4.19.12(a). All references within the above adopted sections of ASME A17.1-2010 shall be to ASME A17.1-2010 and ASME A17.6-2010 except part 2 (Aramid Fiber ropes are not permitted).



Car Top Railings

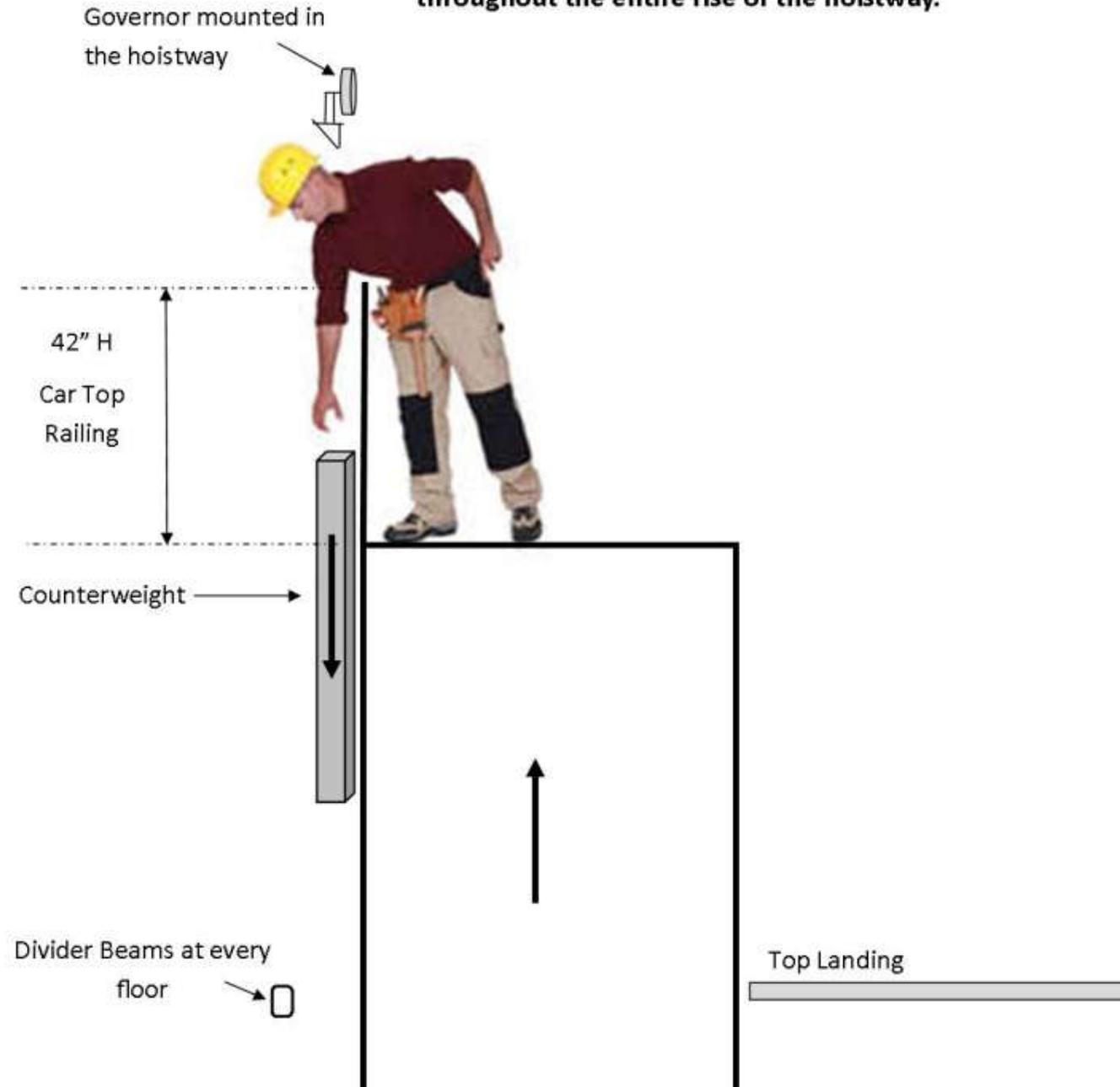
ASME 2010 Vertical and Horizontal

Car Top and Railing Clearances



Car Top Railings

Current Horizontal Railing Clearances throughout the entire rise of the hoistway.

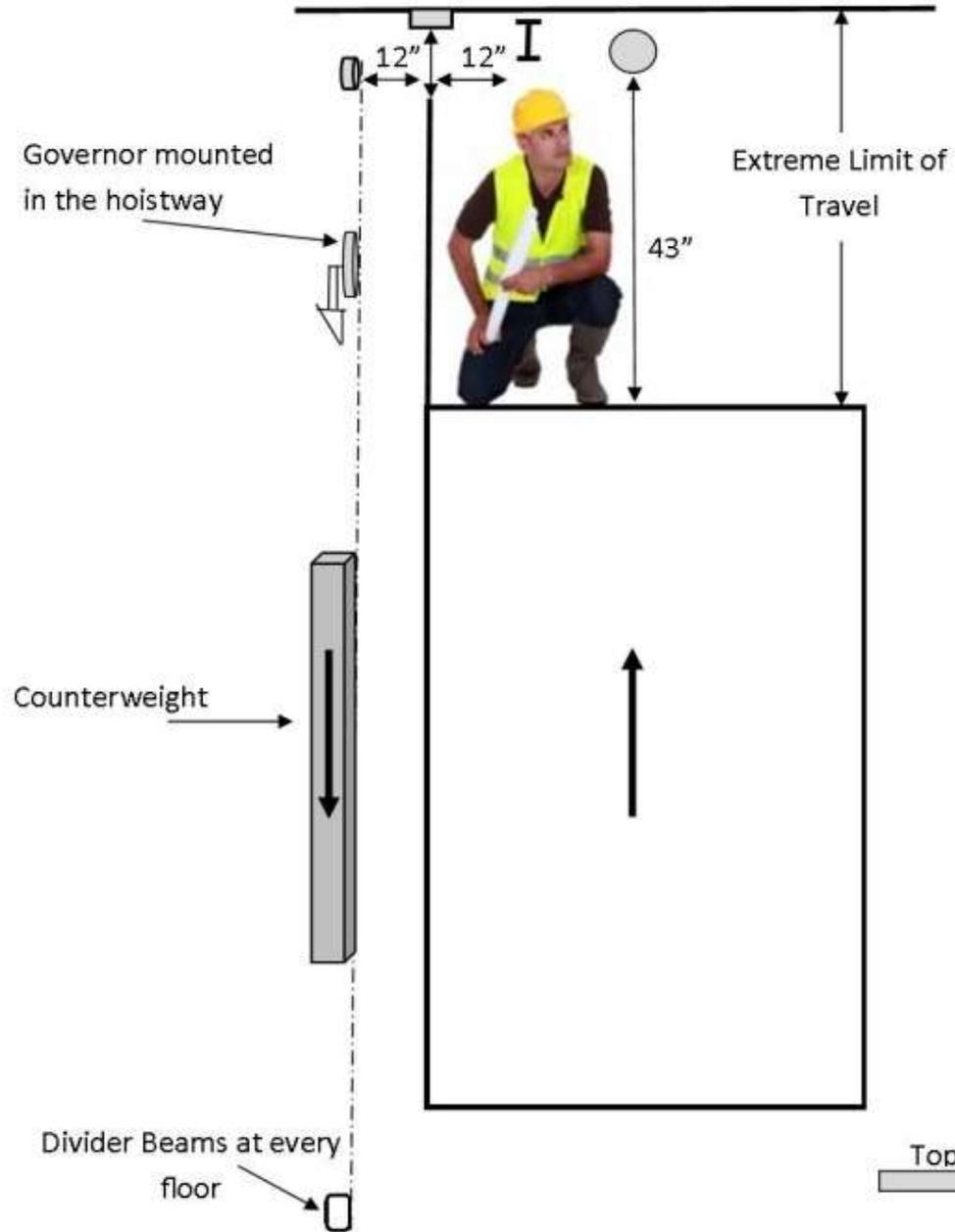


Car Top Railings

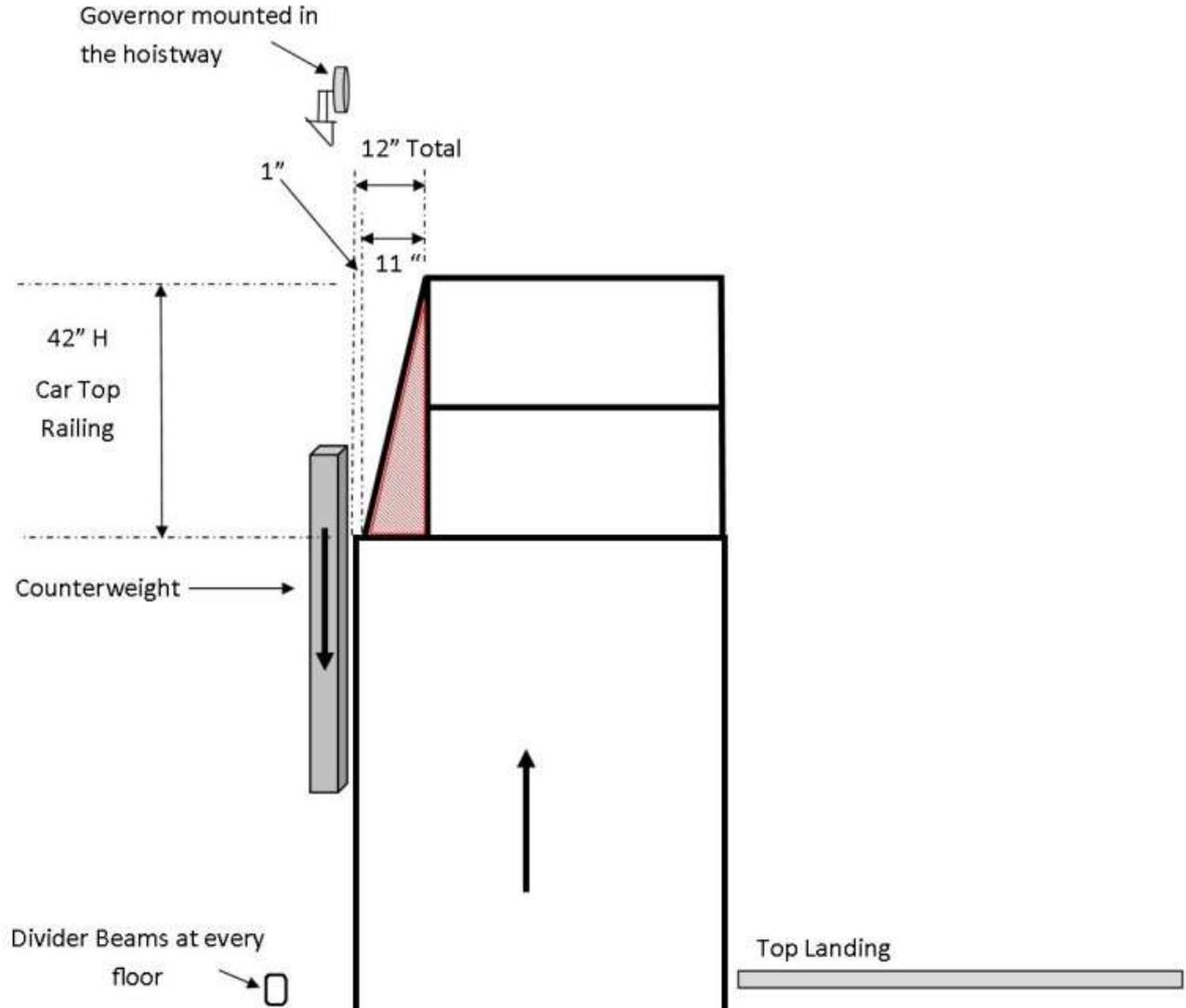
- An elevator technician was riding a top the car, performing lubrication and inspection services. His head became caught between the car top guardrail and a metal plate near the fourth/fifth floor level.
- Two technicians responded to a trouble call on a Personnel Hoist. Employee #1 put on fall protection and positioned himself on the tower to repair the problem. Employee #2 got on top of the car to operate it at inspection speed. As the car began to move in the down direction, Employee #1's arm was crushed between the counterweight and a fixed structural member of the tower.
- An elevator technician was working on top of an elevator when he was crushed between the elevator crosshead and a hoist beam.
- A maintenance technician was repairing an elevator when it suddenly moved pinning him between the elevator car and the hoistway.
- An elevator technician was repairing the elevator from on top of the car when he was crushed between an I-beam and the elevator.

Car Top Railings

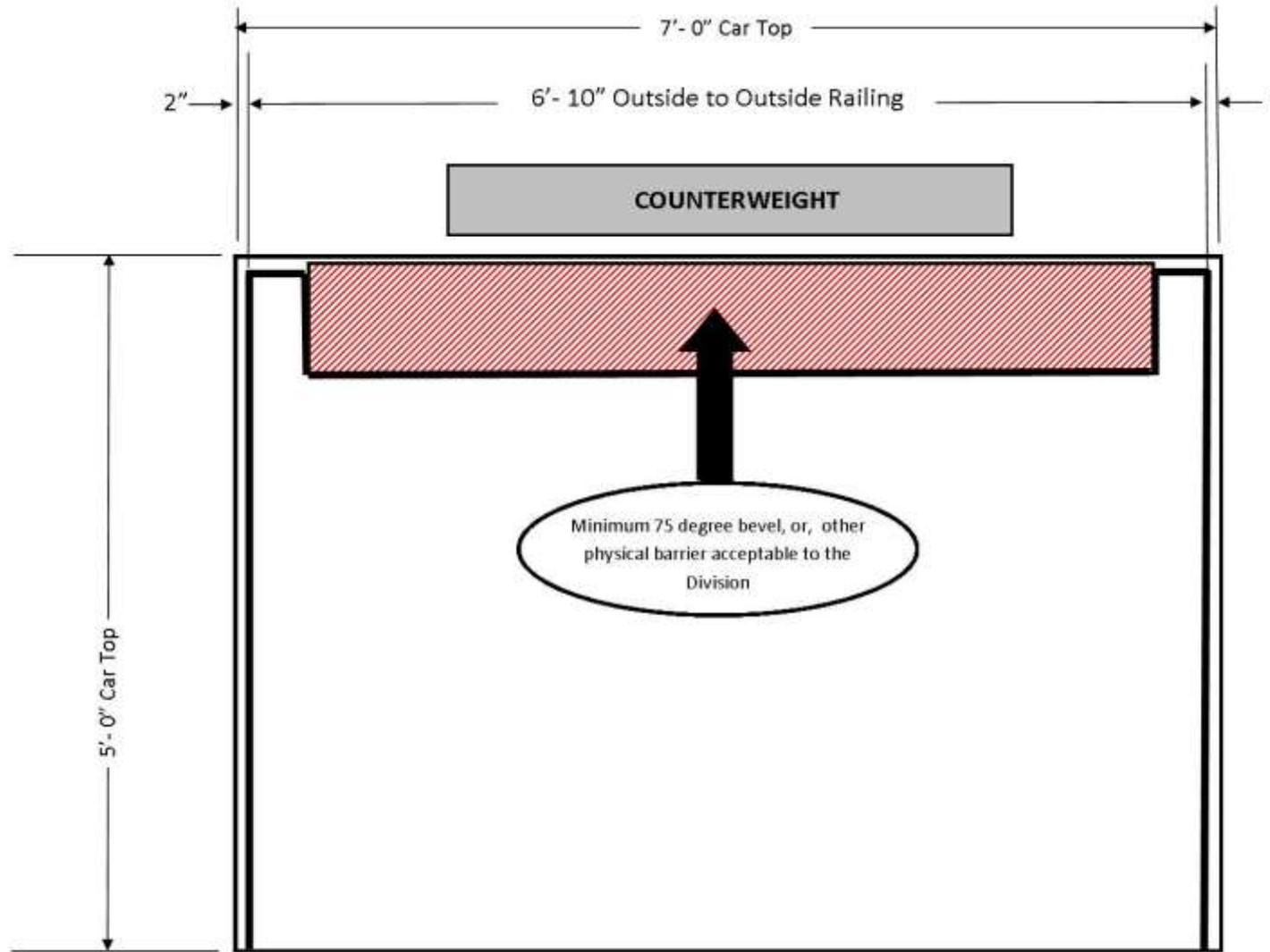
Proposed Vertical and Horizontal
Car Top and Railing Clearances



Car Top Railings

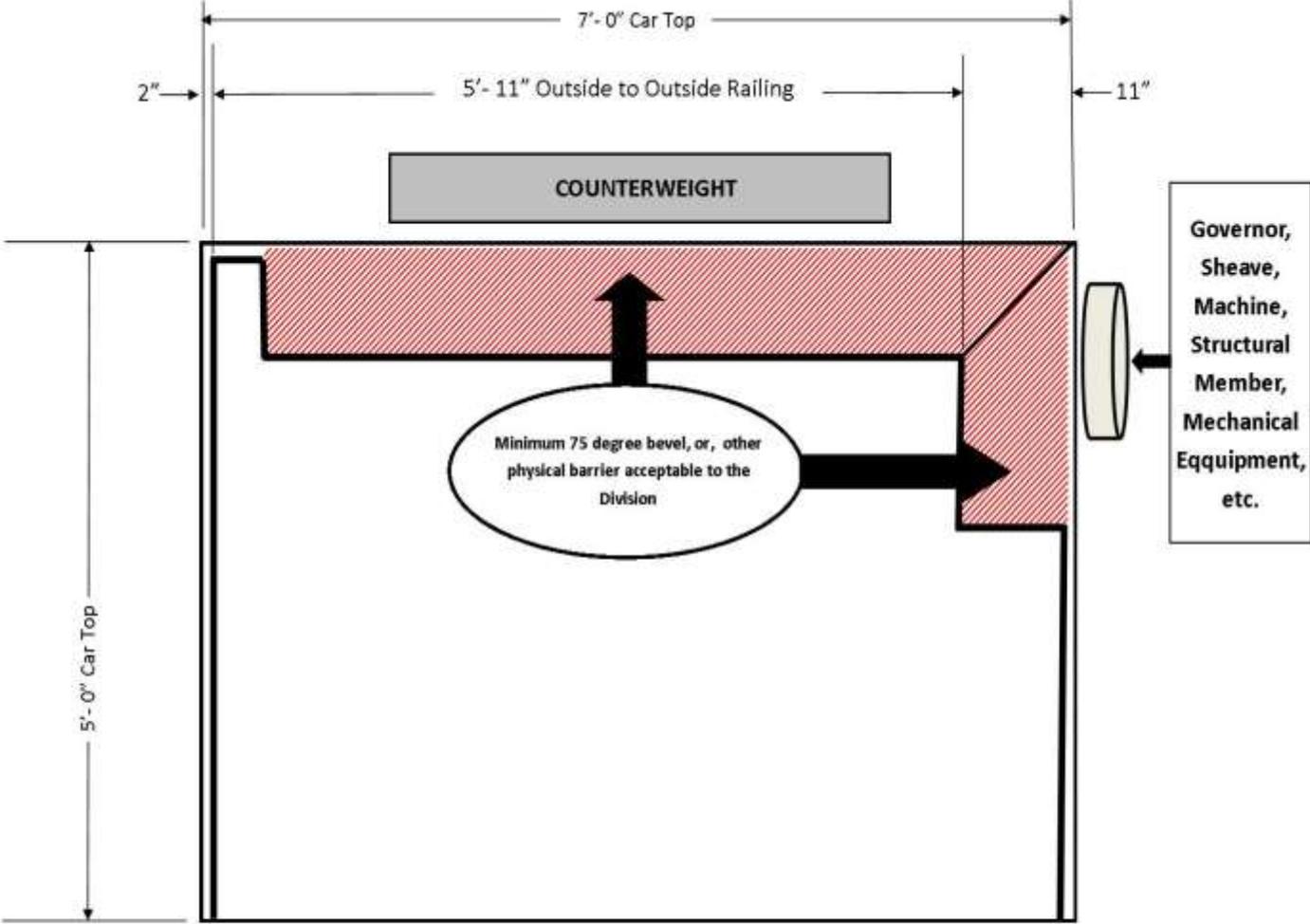


Car Top Railings



Inset Car Top Railing and Bevel

Car Top Railings



Inset Car Top Railings and Bevels

Car Top Railings

- Group IV Alteration

§3141.2. Alterations.

(a) Alterations made to conveyances shall comply with ASME A17.1-2004, section 8.7.

(b) When alterations are made pursuant to ASME A17.1-2004, section 8.7, conveyances shall comply with ASME A17.1-2004, section 8.4-, that are applicable to the alteration.

~~(1) When alterations are made pursuant to ASME A17.1-2004, sections 8.7.2.27.4, 8.7.2.27.5, or 8.7.2.27.6, conveyances shall comply with ASME A17.1-2004, section 8.4.10.~~

(c) Railings added to an existing car top after XX/XX/2013 shall conform to the requirements of 3141.7(a)(19) and (20).

Car Top Railings

- Group IV new installation

§3141.7. General Requirements.

Conveyances shall comply with the following general requirements:

(19) Car top railings

(A) Perimeter railings required by ASME A17.1-2004 Section 2.14.1.7.1 shall be located so that the outer edge of the railing is within 50mm (2 inches) of the outside perimeter of the car top. The railing shall have a minimum vertical and horizontal clearance of not less than 305mm (12 inches) to the hoistway enclosure, counterweight, fixed electrical or mechanical devices, and structural members within the hoistway. Car rail brackets less than 457 mm (18 inches) in horizontal length are exempted from this clearance requirement. The vertical and horizontal clearances to the railings shall be maintained throughout the entire hoistway.

Car Top Railings

- Group IV new installation continued

(B) If the minimum railing clearances cannot be met with the railing at the perimeter of the car top, one of the following provisions shall be met:

(I) When horizontal obstruction(s) protrude into the required railing clearances, screening of the obstruction(s) shall be provided to cover the entire length of the hoistway along the vertical plane. Screening shall be made from wire-mesh material equal to or stronger than .048 inch diameter wire with openings not exceeding 1/2 inch, securely fastened to keep the guard taut and plumb; or

(II) The outside edge of the railings may be inset only as necessary to establish the minimum railing clearances, but no greater than 305mm (12 inches) from the perimeter of the car top and:

(a) The area outside the railing shall be provided with a bevel of not less than 75 degrees extending from the railing to within 50 mm(2 inches) of the car top perimeter or other physical barrier to standing in the area that is acceptable to the Division.

(b) All exposed areas outside the car top railing shall be clearly marked. The markings shall consist of alternating 101mm (4 inch) diagonal red and white strips.

(c) A durable sign in letters not less than 13 mm (1/2 inch) on a contrasting background permanently attached to a railing and visible from the entrance side of the car top shall be provided. The sign shall state:

CAUTION

DO NOT STAND ON OR CLIMB OVER RAILING

(d) Serviceable equipment shall be positioned so that mechanics and inspectors do not have to climb on or over railings to perform adjustments, maintenance, repairs or inspections.

Car Top Railings

- Group IV new installation continued

(20) The railing required by ASME A17.1-2004 section 2.14.1.7.1 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.

California Labor Code (in part)

- 7311.1. (a) On and after June 30, 2003, no conveyance subject to this chapter shall be erected, constructed, installed, materially altered, tested, maintained, repaired, or serviced by any person, firm, or corporation unless the person, firm, or corporation is certified by the division as a certified qualified conveyance company.....
- 7311.2. (a) On and after June 30, 2003, except as provided in subdivisions (b) and (c) of Section 7301.5, any person who, without supervision, erects, constructs, installs, alters, tests, maintains, services or repairs, removes, or dismantles any conveyance covered by this chapter, shall be certified as a certified competent conveyance mechanic by the division.....

Definitions

§3009. (b) List of Definitions. The following definitions shall be accepted as the meaning of the various terms as used in these regulations:

Supervision.- As referred to in the California Labor Code, Division 5, Part 3, Chapter 2 means oversight by an onsite Certified Competent Conveyance Mechanic (CCCM).

State of California
Division of Occupational Safety & Health

Elevator Safety Order
Advisory Committee Meeting

December 18, 2012

Oakland CA