



# Memorandum

Date: September 9, 2020

To: Christina Shupe, Executive Officer  
Occupational Safety and Health Standards Board  
2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833

From: Eric Berg, Deputy Chief of Health  
Division of Occupational Safety and Health

Subject: Evaluation of Petition No. 589 to amend title 8 section 1604 through 1604.30  
Construction Personnel Hoists.

## 1.0 INTRODUCTION

On March 25, 2021, the Division of Occupational Safety and Health (Cal/OSHA) received a petition originating from Ronald High (petitioner), consultant for the elevator and escalator conveyance industry. The petitioner requests to amend title 8 Article 14 Construction Hoists in the Construction Industry Safety Orders. Specifically, the petitioner proposes to include a reference within title 8 section 1604 to the 2016 edition of the American National Standards Institute A10.4.

Labor Code Section 142.2 permits interested persons to propose new or revised standards concerning occupational safety and health, and requires the Occupational Safety and Health Standards Board (Standards Board) to consider such proposals and render a decision no later than six months following receipt.

## 2.0 PETITIONER REQUESTS AND BASIS FOR CHANGES TO TITLE 8

The petitioner asserts Article 14 sections 1604 through 1604.30 are based on the 1973 version of ANSI A10.4 and thus do not reflect the safety standards and practices related to equipment, responsibilities, and safety that were adopted over the past 43 years of the ANSI A10.4 standard's existence. The petitioner did not propose any specific regulatory language but requests to include references to the following sections of ANSI A10.4-2016 within Article 14 Construction Hoists of the title 8 Construction Industry Safety Orders:

ANSI/ASSP A10.4-2016 Safety Requirements for Personnel Hoists and  
Employee Elevators on Construction and Demolition Sites

\* \* \* \* \*

## 5. CONSTRUCTION OF TOWERS, MASTS AND HOISTWAY ENCLOSURES

\* \* \* \* \*

5.1.1 A personal fall arrest/protection plan shall be in place in accordance with local, state, or federal regulations. See ANSI/ASSE Z359.1, Safety for Personal Fall Arrest Systems, Subsystems and Components, and ANSI/ASSE A10.32, Fall Protection Systems for Construction and Demolition Operations.

5.5.1.1 Hoist personnel are those persons performing installation, jumping, alterations, maintenance, removal, repairs and/or testing of the equipment covered by this standard. Hoist personnel shall, by verifiable documented training and experience, be familiar with the operation and safety functions of the hoist, hoist component or equipment to be constructed, maintained, repaired, or tested. Training and experience shall include, but not be limited to:

1. Recognizing the safety hazards that are created during the construction, maintenance, repair or testing procedures to which they are assigned.
2. Ability to recognize the compatibility of replacement components, and subsystems in conformance to this standard.
3. Performing the construction, alteration, maintenance, repair or testing procedures to which they are assigned in conformance with the requirements of this standard.
4. Working knowledge of mechanical principles as applied to structures, machines and mechanisms.
5. Working knowledge of hydraulic principles as applied to the operation of buffers or other hydraulic hoist equipment on the site.
6. Working knowledge of the hoists covered by this standard, their uses and limitations, and any special problems or applications likely to be encountered during construction, maintenance, alteration, repair or testing procedures.
7. Must have field, on-the-job, classroom, guild, apprenticeship or other exposure to and instruction from a person skilled or knowledgeable in the hoists covered by this standard or similar conveyances before working alone, performing tests in the presence of an inspector or supervising other person(s).
8. Identifying existing and potential hazards in the surroundings, or work conditions which are unsanitary, hazardous or dangerous to employees and others, and taking prompt corrective measures to eliminate, mitigate or avoid the hazard(s).
9. The safety practices required by the employer and the authority having jurisdiction.
10. Hoist personnel shall obtain site-specific training related to the special conditions and/or unusual hazards to be encountered prior to beginning work.

\* \* \* \* \*

## 5.6 Landings.

\* \* \* \* \*

5.6.3 Overhead Protection. All landing platforms where people may be exposed to falling objects shall be provided with solid overhead protection made of 2 inch (5.08cm) planking or the equivalent.

\* \* \* \* \*

## 15. COUNTERWEIGHTS

\* \* \* \* \*

15.2 Design. The weight of the counterweight shall be as specified by the hoist manufacturer or a registered professional engineer.

\* \* \* \* \*

## 17. CAR ENCLOSURES

\* \* \* \* \*

17.1 Material for Enclosures and Enclosure Linings. Materials for car enclosures and car enclosure linings shall be made of metal or fire-retardant material.

\* \* \* \* \*

17.8 Guardrails. A guardrail shall be provided on top of cantilever-type cars. The guardrail shall be approximately 42 inches (1.07m) in height and shall have an intermediate rail and a 4 inch (10.1cm) toeboard.

\* \* \* \* \*

17.10 Car Lighting. The car shall have minimum lighting of five foot candles (5-fc) measured at the threshold.

\* \* \* \* \*

## 19. CAR AND COUNTERWEIGHT SAFETIES

\* \* \* \* \*

19.5 Safeties to Stop Ascending Cars or Counterweights. Safeties may be used to stop an ascending car or counterweight providing it operates independent of the car's regular safety device.

\* \* \* \* \*

19.10.2 Rack-and-Pinion Safeties. For rack-and-pinion safeties, the travel of the car measured from the governor-tripping time to the full-stop time shall not exceed, based on rated speed, and the values in Table 4.

\* \* \* \* \*

Table 4				
Maximum Speeds for Governor Trip & Down Switch Operation,				
with Maximum and Minimum Stopping Distances for Other than Instantaneous Safeties				
CAR	MAXIMUM	STOPPING DISTANCES		MAXIMUM SPEED AT
RATED TRAVEL SPEED	GOVERNOR-TRIP			WHICH GOVERNOR
	SPEED	feet-inches (mm)		OVERSPEED SWITCH
ft/min (m/s)	ft/min (m/s)	Minimum	Maximum	OPERATES DOWN
0 - 125 (0 - 0.63)	175 (0.88)	0' - 3.17" (80.5)	5' - 4.54" (1,642.1)	175* (0.88*)
150 (0.76)	210 (1.06)	0' - 4.57" (116.0)	5' - 7.07" (1,703.6)	210* (1.06*)
175 (0.89)	250 (1.37)	0' - 6.47" (164.3)	5' - 10.52" (1,791.2)	250 (1.37)
200 (1.01)	280 (1.42)	0' - 8.12" (206.2)	6' - 1.50" (1,866.9)	280 (1.42)
225 (1.14)	308 (1.56)	0' - 9.82" (249.4)	6' - 4.59" (1,945.4)	308 (1.56)
250 (1.27)	337 (1.71)	0' - 11.76" (298.7)	6' - 8.09" (2,034.3)	337 (1.71)
300 (1.52)	395 (2.00)	1' - 4.15" (410.2)	7' - 4.05" (2,236.5)	395 (2.00)
350 (1.77)	452 (2.30)	1' - 9.15" (537.2)	8' - 1.11" (2,466.6)	452 (2.30)
400 (2.03)	510 (2.59)	2' - 2.03" (661.2)	8' - 11.52" (2,731.0)	510 (2.59)
450 (2.28)	568 (2.89)	2' - 9.40" (848.4)	9' - 11.29" (3,030.0)	568 (2.89)
500 (2.54)	625 (3.18)	3' - 4.44" (1,027.2)	10' - 2.00" (3,098.8)	625 (3.18)
600 (3.04)	740 (3.76)	4' - 8.69" (1,439.9)	13' - 5.48" (4,101.6)	740 (3.76)
* Governor overspeed switch not required on car governors				

## 20. SPEED GOVERNORS

\* \* \* \* \*

20.9 Permanently Enclosed Governors. Speed governors that cannot be internally inspected through an inspection plate shall be replaced by the owner in accordance with instructions on the manufacturer's data plate. The plate shall state: REPLACE UNIT BY (Month, Day, Year)

\* \* \* \* \*

## 21. CAPACITY AND LOADING

\* \* \* \* \*

21.5 Overload Detection Devices. Overload devices, when provided, shall be sealed and give a clear signal in the hoist and prevent normal operation, in the event the rated hoist load is exceeded. The overload is considered to occur when the rated load is exceeded by a maximum of 20%. There shall be no provision for the operator to cancel the warning.

## 22. DRIVING-MACHINES, SHEAVES AND DRUMS

\* \* \* \* \*

22.10 Use of Couplings. A positive engagement type of coupling may be used between the motor and the drive gearing. An elastomeric type of coupling, if used, shall be so constructed that it will not allow disengagement of the motor if the elastic portion should fail.

\* \* \* \* \*

22.11 Use of Chain Drives. The use of chain drives shall be prohibited.

\* \* \* \* \*

## 25. HOISTING AND COUNTERWEIGHT ROPES AND ROPE CONNECTIONS

\* \* \* \* \*

25.5 Suspension-Rope Equalizers. Suspension-rope equalizers must be used.

\* \* \* \* \*

## 26. INSPECTIONS AND TESTS OF PERSONNEL HOISTS

\* \* \* \* \*

26.4 Periodic Inspections and Tests  
of All Installations.

26.4.1 Requirement for Periodic Inspections and Tests. All operating installations shall be subjected to regular inspections and tests as defined by this standard and in conformance with manufacturer's recommendations. The object of these inspections is to determine that the equipment is in safe operating condition.

26.4.2 Persons Authorized to Make  
Periodic Inspections and Tests. Periodic inspections shall be performed by an inspector. Inspectors and inspection supervisors should be certified in accordance with the requirements of ASME QEI-1, *Standard for the Qualification of Elevator Inspectors*. Tests shall be performed by hoist personnel.

26.4.3 Inspection and Test Periods. Periodic inspections and tests of hoists shall be made at intervals not to exceed three months.

26.4.4 Periodic Inspections and Tests. All parts of the equipment shall be inspected and, where necessary, tested to determine they are in safe operating condition and that parts subject to wear, such as ropes, bearings, gears, car safety and governor parts and buffers, have not worn to such an extent as to affect the safe operation of the installation. Any such worn parts shall be adjusted or replaced.

26.4.5 Car and Counterweight Safety,  
Governor and Oil Buffer Periodic Inspections and Tests. Safeties, governors and oil buffers shall be inspected to insure the conformity with the requirements given in 26.4.6 through 26.4.9 at intervals not to exceed three months.

26.4.6 Inspection of Safety Parts. All working parts of car and counterweight safeties shall be inspected to determine that they are in satisfactory operating condition and that the distance between the guide member gripping faces of the safety parts is not less than the following:

1. For new hoists having Type A, B or C safeties, the distance specified in 19.9.
2. For existing hoists having steel-guide safeties, not less than the thickness of the guide members plus 0.093-inch (2.4mm). Type B safeties shall be operated by hand until the safety jaws contact the guide members, after which the inspection specified in 26.4.6.1 and 26.4.6.2 shall be made.

26.4.6.1 For Type B drum-operated safeties that require continual unwinding of the safety drum to fully apply the safety, the number of turns remaining on the car safety drum shall be checked and shall be sufficient to ensure proper operation of the safety on the maintenance test or in the event the safety operates on overspeed. The requirements given under 19.10 specify that three turns shall remain on the drum after application of the safety at overspeed with rated load in the car.

26.4.6.2 For all Type B safeties, the movement of the governor rope necessary to bring the safety jaws into contact with the guide member surfaces shall be measured and shall not exceed the distance specified in 19.10.1.

*Note: When resetting drum-operated safeties with the wrench in the car, sufficient tension shall be kept in the drum rope to prevent the rope from kinking and to ensure that it is wound evenly and uniformly in the drum grooves. The drum must be rewound until no slack remains in the safety rope between the drum and the car-releasing carrier.*

26.4.7 Inspection of Governor. Governors shall be inspected at intervals not to exceed three months. They shall be operated by hand to determine that all parts, including the rope-grip jaws, operate freely. All bearings, governor rope-grip jaws and rubbing surfaces shall be checked to make sure they are not worn excessively and are free of paint. A test of the governor-tripping speed is not required unless the seal on the governor has been disturbed or the inspection indicates that a retest is necessary for other reasons. If a retest is performed, the governor shall be resealed after the test. In lieu of an inspection, an overspeed test may be performed to determine proper governor operation.

26.4.8 Test of Safeties. Safeties shall be subjected to a running test with no load in the car, as specified in 26.4.8.1 and 26.4.8.2.

26.4.8.1 Governor-Operated Safeties. All governor-operated safeties shall be periodically tested without any person in or on the car. *Exception: The person performing the test may activate a hand-operable governor from within the car with the car running at the slowest operating speed.*

26.4.5 Car and Counterweight Safety, Governor and Oil Buffer Periodic Inspections and Tests. Safeties, governors and oil buffers shall be inspected to insure the conformity with the requirements given in 26.4.6 through 26.4.9 at intervals not to exceed three months.

26.4.6 Inspection of Safety Parts. All working parts of car and counterweight safeties shall be inspected to determine that they are in satisfactory operating condition and that the distance between the guide member gripping faces of the safety parts is not less than the following:

1. For new hoists having Type A, B or C safeties, the distance specified in 19.9.
2. For existing hoists having steel-guide safeties, not less than the thickness of the guide members plus 0.093-inch (2.4mm). Type B safeties shall be operated by hand until the safety jaws contact the guide members, after which the inspection specified in 26.4.6.1 and 26.4.6.2 shall be made.

26.4.6.1 For Type B drum-operated safeties that require continual unwinding of the safety drum to fully apply the safety, the number of turns remaining on the car safety drum shall be checked and shall be sufficient to ensure proper operation of the safety on the maintenance test or in the event the safety operates on overspeed. The requirements given under 19.10 specify that three turns shall remain on the drum after application of the safety at overspeed with rated load in the car. In this test, the safety shall bring the car to rest promptly. In the case of Type B and rack and-pinion safeties, the stopping distance is not required to conform to 19.2. In the case of Type A and Type C safeties employing rollers or dogs for application of the safety, the rollers or dogs are not required to operate over their full travel (see note to 26.4.6.2).

26.4.9 Periodic Tests of Car Oil Buffers. Periodic tests of oil buffers shall be performed as specified in 26.3.

\* \* \* \* \*

26.5 Re-Inspection of Installation. When Travel is Increased. When the height of the hoist is changed, the installation shall be re inspected and tested in accordance with the requirements given in 26.1 and witnessed, if required, by the enforcing authority before the hoist is placed in normal service. A full load safety test is not required when the height has changed.

26.6 Product Specific Testing. If a device on a hoist cannot be tested by means available at the site, the person or firm installing and/or maintaining the hoist shall provide a written check out procedure that demonstrates that the device complies with the requirements of this standard, or provide documentation from the manufacturer that the device complies with the requirements of this standard, including expiration date of the documentation, if applicable.

\* \* \* \* \*

## 27. MAINTENANCE

\* \* \* \* \*

27.3 Replacements. Where a listed/ certified device or component is replaced, it shall be subject to the applicable engineering or type test as specified in the requirements of CAN/CSA B44.1 ANSI/ASME A17.5. The device or replacement component shall be labeled by the certifying organization. For a replacement device or component to be used, it must be included in the original manufacturer's directions or specifications listed as an acceptable replacement part or equivalent.

\* \* \* \* \*

### 30. OPERATION

\* \* \* \* \*

30.3 The user shall be responsible for insuring that authorized personnel assigned to the hoist are knowledgeable of the duties outlined in the maintenance, operating and inspection manuals and are capable of recording such activity in their log.

\* \* \* \* \*

## 3.0 APPLICABLE TITLE 8 REGULATIONS

Title 8 addresses the requirement for construction personnel hoists in Article 14 of the Construction Industry Safety Orders. Section 1604 includes a reference to the 1973 edition of the ANSI A10.4.

### Subchapter 4. Construction Safety Orders

#### Article 14. Construction Hoists

##### §1604. Personnel Hoists.

Sections 1604.1 through 1604.30 are taken, with revisions necessary to conform to State codification numbering requirements and existing laws, from ANSI 10.4-1973 American National Standard Safety Requirements for Personnel Hoists.

## 4.0 APPLICABLE FEDERAL OSHA REGULATIONS

Federal OSHA regulations address the requirements for construction personnel elevators in 29 CFR Subpart N of the Construction Safety Orders. Subsection 1926.552(c)(16) incorporates the 1963 edition of ANSI A10.4 by reference.

### 1926 Safety and Health Regulations for Construction

\* \* \* \* \*

#### Subpart N. Helicopters, Hoists, Elevators, and Conveyors

\* \* \* \* \*

##### §1926.552(c)(16)

All personnel hoists used by employees shall be constructed of materials and components which meet the specifications for materials, construction, safety devices, assembly, and structural integrity as stated in the American National Standard A10.4-1963, Safety



Requirements for Workmen's Hoists. The requirements of this paragraph (c)(16) do not apply to cantilever type personnel hoists.

\* \* \* \* \*

Unlike title 8 section 1604 which informs the reader that Article 14 orders are taken from ANSI A10.4, 29 CFR subsection 1926.552(c)(16) includes an incorporation by reference that personnel hoists must be constructed of materials and components which meet the specifications for materials, construction, safety devices, assembly, and structural integrity as required by ANSI A10.4-1963.

## **5.0 BACKGROUND OF TITLE 8 SECTION 1604**

Cal/OSHA reviewed the February 27, 1986 rulemaking documents related to title 8 section 1604. Central to the rulemaking was the proposal to move section 1604 through 1604.30 from the construction safety orders into the elevator safety orders. The amendments proposed by the petitioner was not discussed during the 1986 rulemaking.

The 2003 rulemaking in for the amendment of sections 1604.5 and 1604.6 was also reviewed by Cal/OSHA for this petition evaluation. Section 1604.5 is related to language changed to avoid confusion and section 1604.6 is related to hoist car door design strength requirements. The 2003 rulemaking was initiated by Cal/OSHA, arising from a hoist car door failure accident. The intent of the 2003 rulemaking was to update section 1604.5 and 1604.6 to provide a higher level of safety by aligning with the 1990 edition of ANSI A10.4-1990. The amendments proposed under petition No. 589 were not discussed during the 2003 rulemaking.

Additionally, Cal/OSHA reviewed the 2008 rulemaking of Article 14 in which sections 1604.24 and 1604.26 were amended. Section 1604.24 contains provisions for operating a personnel hoist. The proposed change to section 1604.26 involved adding "operations" to the section title. This rulemaking was initiated by Cal/OSHA to address accidents investigated by Cal/OSHA. The 2007 edition of ANSI A10.4-was referenced during this rulemaking. The amendments proposed under petition No. 589 was not discussed during the 2008 rulemaking.

## **6.0 ANALYSIS**

### **6.1 ANSI A10.4-2016 Section 5.1.1**

Section 5.1.1 of ANSI A10.4-2016 requires a personal fall arrest/protection plan in accordance with local, state, or federal regulations and includes a reference directing the reader to ANSI/ASSE Z359.1, Safety for Personal Fall Arrest Systems, Subsystems and Components, and ANSI/ASSE A10.32, Fall Protection Systems for Construction and Demolition Operations. Title 8 section 1670 currently addresses the requirements of personal fall protection for construction sites including all operations related to personnel hoists. Additionally, title 8 subsection 1671.1(a) allows for fall protection plans only when it can be shown that the use of conventional fall protection is impractical or creates a greater hazard.

§1671.1. Fall Protection Plan.

(a) This section applies to all construction operations when it can be shown that the use of conventional fall protection is impractical or creates a greater hazard.

Incorporating section 5.1.1 into Article 14 would not only be duplicative but would reduce the safety of current title 8 regulations by allowing for fall protection plans.

## **6.2 ANSI A10.4-2016 Section 5.5.1.1**

Section 5.5.1.1 of ANSI A10.4-2016 requires hoist personnel who perform installation, jumping, alterations, maintenance, removal, repairs and/or testing to have training and experience verified with documentation. The training and experience include recognition of safety hazards, components compatibility, familiarity and working knowledge with the hoist, knowledge of hydraulic principles, and on the job training.

Title 8 subsection 1604.26(b)(1) requires employees performing inspections and tests to be designated by the employer and qualified to perform the required service.

### **§1604.26. Inspection and Tests of Personnel Hoists.**

\* \* \* \* \*

(b) Periodic Inspections and Tests. All existing installations, and all new installations after being placed in service, shall be subjected to periodic inspections and tests at regular intervals of not more than 3 months for construction hoists and not more than one week for bridge construction elevators to determine that the equipment is in safe operating condition and has not been altered. All parts subject to wear shall be inspected and those worn to such an extent as to affect the safe operation of the installation shall be adjusted or replaced. Whenever the hoisting equipment installed on bridges is exposed to winds exceeding 35 miles per hour, it shall be inspected and put into operable condition before use. The employer shall prepare a certification record which includes the date the inspection and test of all functions and safety devices was performed; the signature of the person who performed the inspection and test; and a serial number or other identifier for the hoist that was inspected and tested. The most recent certification record shall be maintained on file at the job site.

(1) Periodic Inspections. Periodic inspections and tests as recommended by the hoist manufacturer shall be performed by a person designated by the employer and qualified to perform such service. Records shall be maintained and kept on file at the job site for the duration of the job.

\* \* \* \* \*

However, title 8 regulations do not currently include specific qualification criteria for inspection and tests performed on construction hoists nor address any qualification requirements for employees who install, remove, jump, alter or repair them.

Including the requirements of section 5.5.1.1 of ANSI A10.4-2016 would enhance worker safety by providing more precise and clear guidance regarding the qualification for employees performing any work related to construction hoists.

### **6.3 ANSI A10.4-2016 Section 5.6.3**

Section 5.6.3 of ANSI A10.4-2016 requires two-inch thick wood planking for overhead protection at all landing platforms where someone may be exposed to falling objects. Title 8 subsection 3273(e) of the General Safety Orders requires protection from falling objects.

§ 3273. Working Area.

\* \* \* \* \*

(e) Protection from falling objects:

(1) Where there is employee exposure below an elevated work area, one or more of the following safeguards shall be implemented:

(A) Provide toeboards, screens, or guardrail systems in accordance with Article 2 of these Orders to prevent objects from falling from higher levels; or,

(B) Provide a canopy structure to protect employees from falling objects; or,

(C) Provide a physical barrier such as, but not limited to, fencing, barricades or other equivalent means or methods, to prevent entry into the area to which objects could fall.

\* \* \* \* \*

The option for overhead protection in Title 8 section 3273(e)(1)(A) is less protective than Section 5.6.3 of ANSI A10.4-2016 as objects being carried or hauled can fall through or over guardrails. The option for overhead protection in 3273(e)(1)(B) does not specify any minimum specifications for a canopy structure making it unclear to employers what is needed and difficult for Cal/OSHA to enforce. Cal/OSHA believes that the incorporation of ANSI A10.4-2016 section 5.6.3 of will enhance safety.

### **6.4 ANSI A10.4-2016 Section 15.2**

Section 15.2 of ANSI A10.4-2016 requires the weights of counterweights to be specified by the hoist manufacturer or registered professional engineer. Proper counterweight is important in elevator installations to ensure proper speed and motion of the car. Incorrect counterweights can cause the elevator car to move in an unexpected direction and/or speed as well as increase wear and tear on hoist motors which can cause failure and reduced service life. Title 8 Construction Safety Orders Article 14 Construction Hoists does not contain similar requirements as ANSI A10.4-2016 Section 15.2 except for section 1604.15(b), which limits counterweights to no more than the total weight of the elevator car plus 50% of the rated load.

Cal/OSHA believes that the incorporation of section 15.2 of the ANSI standard will enhance employee safety provided that the maximum limit of counterweights in title section 1604.15(b) is maintained.

## **6.5 ANSI A10.4-2016 Section 17.1**

Section 17.1 of ANSI A10.4-2016 requires the materials used for car enclosures to be metal or fire-retardant material. Title 8 section 1604.17(a) currently requires enclosure materials to be wood or metal. As wood is not a fire-retardant material, section 17.1 of ANSI A10.4-2016 is more protective than current title 8 requirements. Cal/OSHA believes that the requirement for car enclosures to be of fire-retardant materials would enhance worker safety and would be prudent to include in Article 14 to mitigate potential fire hazards.

## **6.6 ANSI A10.4-2016 Section 17.8**

Section 17.8 of ANSI A10.4-2016 requires guardrails for cantilever-type hoist cars, specifying the top rail to be 42 inches with a midrail and a toeboard. Existing title 8 sections 1620 and 1621 of the Construction Safety Orders currently include dimensions, construction and strength requirements for guardrails in construction that are more effective than section 17.8 of the ANSI standard.

### **§1620. Design and Construction of Railings.**

Railings required by these Orders, except as otherwise provided, shall conform to the following standards:

(a) Railings shall be constructed of wood or in an equally substantial manner from other materials, and shall consist of the following:

(1) A top rail not less than 42 inches or more than 45 inches in height measured from the upper surface of the top rail to the floor, platform, runway or ramp.

(2) A mid-rail shall be halfway between the top rail and the floor, platform, runway or ramp when there is no wall or parapet wall at least 21 inches (53 cm) high.

(A) Screens, mesh, intermediate vertical members, solid panels or equivalent members, may be used in lieu of a mid-rail subject to the following:

1. Screens and mesh, when used, shall extend from the top rail to the floor, platform, runway or ramp and along the entire opening between top rail supports.

2. Intermediate vertical members (such as balusters), when used between posts, shall be installed such that there are no openings greater than 19 inches (48 cm) wide.

3. Other intermediate members (such as solid panels, or equivalent members) shall be installed such that there are no openings that are more than 19 inches (.5 m) wide.

(b) Wood railings.

(1) "Selected lumber" (see definitions), free from damage that affects its strength, shall be used for railings constructed of wood.

(2) Wood posts shall be not less than 2 inches by 4 inches in cross section, spaced at 8-foot or closer intervals.

(3) Wood top railings shall be smooth and of 2-inch by 4-inch or larger material. Double, 1-inch by 4-inch members may be used for this purpose, provided that one member is fastened in a flat position on top of the posts and the other fastened in an edge-up position to the

inside of the posts and the side of the top member. Mid-rails shall be of at least 1-inch by 6-inch material.

(4) The rails shall be placed on that side of the post which will afford the greatest support and protection.

(c) All railings, including their connections and anchorage, shall be capable of withstanding without failure, a force of at least 200 pounds applied to the top rail within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge.

(1) When the 200 pound test load is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches above the walking/working level.

(d) Mid-rails, screens, mesh, intermediate vertical members, solid panels, and equivalent members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the mid-rail, screen, mesh, or other intermediate member.

(e) Railings exposed to heavy stresses from employees trucking or handling materials shall be provided additional strength by the use of heavier stock, closer spacing of posts, bracing, or by other means.

(f) The ends of the rails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.

(g) Railings shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

(h) Steel banding and plastic banding shall not be used as top rails or mid-rails.

Inclusion of section 17.8 of ANSI A10.4-2016 into Article 14 would be duplicative.

#### **6.7 ANSI A10.4-2016 Section 17.10**

Section 17.10 of ANSI A10.4-2016 requires hoist cars to be equipped with minimum lighting of five foot-candles. Title 8 subsection 1523 prescribes illumination levels required for construction activities.

§1523. Illumination.

(a) Construction areas, ramps, corridors, offices, shops and storage areas, etc., shall be lighted to not less than the minimum illumination intensities in the following Table while work is in progress.

Minimum Illumination Intensities In Foot-Candles

Foot-Candles	Area or Operation
3	General construction area lighting low activity.
5	Outdoor active construction areas, concrete placement, excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, stairways, and exit-ways.
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active storerooms, barracks or living quarters, locker or dressing rooms, mess halls and indoor toilets and workrooms).
10	Nighttime highway construction work.
30	First-aid stations, infirmaries, and offices.

Note: For areas or operations not covered above, refer to the recommended illumination values contained in the Illuminating Engineering Society (IES) of North America, Committee on Industrial Lighting, American National Standard, (ANSI/IES) Practice for Industrial Lighting, Publication RP-7-1991.

The function of a construction personnel elevator is to provide access to buildings and structures on construction sites. The table referenced within title 8 subsection 1523(a) requires five foot-candles of illumination for all accessways. As the hoist car serves as an accessway, an illumination level of five foot-candles is already required by subsection 1523(a) and the proposal to include section 17.10 would be duplicative.

## 6.8 ANSI A10.4-2016 Section 19.5

Section 19.5 ANSI A10.4-2016 provides an option to use safeties to stop for overspeed and uncontrolled cars or counterweights. Elevator cars are equipped with safeties that stop a falling car whose braking has failed; however, these devices do not provide protection in the upward direction of movement. The result of an uncontrolled ascending car or counterweight is striking the overhead structures and potential serious or fatal injury to its passengers.

Title 8 subsection 1604.19(e) explicitly prohibits safeties to be utilized when stopping an ascending car or counterweight. This prohibition is possibly due to injury to passengers during the abrupt braking of safeties based on the requirements of Table 2 of title 8 section 1604.19. The stopping distances included in Table 2 are substantially shorter than Table 4 of ANSI A10.4-2016. As illustrated by Table 1 below, the minimum and maximum stopping distance for safeties in Table 4 of ANSI A10.4-2016 range from 2-3 and 2-5 times greater than those included in Table 2 of section 1604.19.

**Table 1. Comparison of Title 8 and ANSI A10.4-2016 Governor Stopping Distances**

Car Rated Travel Speed (ft/min)	Governor Trip Speed (ft/min)	Stopping Distances (ft-in)			
		Minimum		Maximum	
		Title 8	ANSI	Title 8	ANSI
0-125	175	0-1	0-3.17	1-3	5-4.4
150	210	0-2	0-4.57	1-4	5-7.07
175	50	0-3	0-6.47	1-7	5-10.52
200	280	0-4	0-8.12	1-10	6-1.50

225	308	0-5	0-9.82	2-0	6-4.59
250	337	0-6	0-11.76	2-3	6-8.09
300	395	0-8	1-4.15	2-9	7-4.05
350	452	1-0	1-9.15	3-4	8-1.11
400	510	1-1	2-2.03	4-10	8-11.52
450	568	1-5	2-9.40	4-10	9-11.29
500	625	1-8	3-4.44	5-8	10-2.00
600	740	2-4	4-8.69	7-7	13-5.348

As stopping distance is inversely proportional to the amount of acceleration force felt by a passenger in an elevator car, amending Table 2 of section 1604.19 to the values of Table 4 of ANSI A10.4-2016 would reduce the amount of force applied to employees when safeties are engaged. Cal/OSHA believes including section 19.5 would enhance worker safety by providing the option to use safeties with greater stopping distances during uncontrolled ascend of cars and counterweights that would prevent injury of passengers by bringing the elevator car to a more gradual stop.

#### **6.9 ANSI A10.4-2016 Section 19.10.2**

Section 19.10.2 of ANSI A10.4-2016 refers to Table 4 that illustrates how quickly a car must come to a stop when an overspeed failure occurs. The purpose of Table 4 requirements is to stop a car gradually so that its passengers are not injured during the braking period of the descending car. ANSI A10.4 Table 4 indicates that cars with a faster rated speed during normal operations require a longer distance during emergency braking. Table 2 of title 8 section 1604.19 contains similar information depicting longer emergency stopping distances for faster rated elevators. As discussed in section 6.8 of this evaluation, A10.4-2016 Table 4 provides from approximately twice to five times the distance for stopping resulting in a gradual and softer stopping of the cars. Cal/OSHA believes including section 19.10.2 would enhance worker safety by reducing the potential force on elevator passengers when safeties are engaged during overspeed failure.

#### **6.10 ANSI A10.4-2016 Section 20.9**

Section 20.9 of ANSI A10.4-2016 requires permanently enclosed speed governors which cannot be inspected to have a plate stating the required replacement date. Article 14 of the title 8 Construction Safety Orders does not currently include an equivalent requirement. Including this requirement in title 8 would enhance worker safety by providing a more effective indication on site when speed governors that cannot be inspected must be replaced rather than having to rely on elevator cycle data or documentation that may not be available on site.

#### **6.11 ANSI A10.4-2016 Section 21.5**

Section 21.5 of ANSI A10.4-2016 requires hoist overload device warnings, when provided, to be sealed such that it cannot be defeated by the operator. Title 8 section 1604.21(e) prohibits the

use of overload devices. Currently the method of preventing an overloaded condition in hoist cars is by limiting the floor area size of the car thus limiting the number of passengers that can board. However, title 8 subsection 1604.28(a) allows personnel hoists to be used to carry materials.

**§1604.28. Use of Hoists for Carrying Materials.**

(a) Personnel hoists may be used for carrying materials provided the hoists are designed and installed for the type of loading to be used.

As building materials can be significantly denser than the human body, limiting overloading by elevator car floor area alone may not be adequate in some circumstances. The use of an overload device prevents an overloaded condition when materials of unknown weight or people board the car. Cal/OSHA believes that the inclusion of hoist overload device requirements of section 21.5 in addition to limits in occupancy would enhance worker safety by adding a level of safety to prevent overloading of hoist cars.

**6.12 ANSI A10.4-2016 Section 22.10**

Section 22.10 of ANSI A10.4-2016 requires a positive-engagement type coupling between the motor and drive gearing if it is used. Additionally, if an elastomeric type of coupling is used, the ANSI standard requires that the elastomeric member to not disengage from the motor. Title 8 regulations do not currently address requirements for positive-engagement or elastomeric couplings for elevator motors. Including these requirements would enhance worker safety by ensuring continuous positive control of elevator cars equipped with motor couplings.

**6.13 ANSI A10.4-2016 Section 22.11**

Section 22.11 of ANSI A10.4-2016 prohibits the use of chain drives. The use of chain drives provides no warning in the event of a catastrophic failure whereas other methods such as the use of wire rope or rack and pinion provide warning during inspections of an impending failure. Title 8 Article 14 Construction Hoists does not contain a similar prohibition for construction elevators. Cal/OSHA believes that the prohibition in the use of chain drives would enhance worker safety by reducing the likelihood of catastrophic failure due to undetected worn or faulty components.

**6.14 ANSI A10.4-2016 Section 25.5**

Section 25.5 of ANSI A10.4-2016 requires the use of suspension-rope equalizers. Section 3.57 of ANSI A10.4-2016 defines suspension rope equalizers as *“devices installed on a hoist car or counter-weight to automatically equalize the tension in the hoisting wire ropes”*. Suspension-rope equalizers function by preventing excessive rope and sheave wear by distributing loads evenly across all working wire rope members. Reduction of wear to hoists ropes and sheaves would also reduce potential failure of these components. Title 8 Article 14 Construction Hoists does not require suspension-rope equalizers. Including the requirements of section 25.5 will enhance worker safety by reducing the risk of catastrophic failure.



**6.15 ANSI A10.4-2016 Section 26.4**

Section 26.4 of ANSI A10.4-2016 contains requirements for periodic inspections and tests such as inspection and testing for car and counterweight type A, B, and C safeties and wear on governor parts. This section also includes a reference to an ASME A17.1 for oil buffer testing.

Title 8 Section 1604.26 requires all parts of an installation to be subject to an inspection and field test prior to being placed in service as well as periodic inspections.

§1604.26. Inspection and Tests of Personnel Hoists.

(a) Acceptance Inspections and Tests of New Installations and Alterations. In order to ensure the safe operation of new hoists, such devices shall, on their completion and before being placed in service, be subjected to an acceptance inspection and tests in the field to determine that all parts of the installation conform to the applicable requirements of this Standard and that all safety equipment functions as required. A similar inspection and test shall be made following a major alteration of an existing installation and at any time the hoist is moved to a new location. (A jump of the tower after initial installation shall not be considered a major alteration.) Records shall be maintained and kept on file at the job site for the duration of the job.

(1) Persons Authorized to Make Acceptance Inspections and Tests. Inspections shall be made by a representative of the Division of Industrial Safety. The following tests shall be performed by the person or firm installing or altering the equipment in the presence of the Division representative.

(A) Acceptance tests for car and counterweight safeties and governors.

(B) Acceptance tests for oil buffers.

(C) Any tests which require rendering of any safety device or equipment inoperative or which require removal or resetting of devices or equipment.

(2) Acceptance Inspection Requirements. All parts of the installation shall be inspected for conformity with the applicable requirements of these Safety Orders.

(3) Acceptance Test for Safeties. Car safeties shall be tested with rated load in the car. Counterweight safeties, where provided, shall be tested with no load in the car.

(4) Acceptance Test for Governors. Governor-tripping speed shall be measured and the operation of the governor overspeed switch and safety mechanism switch inspected.

(5) Acceptance Test for Oil Buffers. Oil buffers under the car shall be tested with a rated load on the car traveling at rated speed. Oil buffers under the counterweight shall be tested with no load on the car and the counterweight traveling at rated speed.

(b) Periodic Inspections and Tests. All existing installations, and all new installations after being placed in service, shall be subjected to periodic inspections and tests at regular intervals of not more than 3 months for construction hoists and not more than one week for bridge construction elevators to determine that the equipment is in safe operating condition and has not been altered. All parts subject to wear

shall be inspected and those worn to such an extent as to affect the safe operation of the installation shall be adjusted or replaced. Whenever the hoisting equipment installed on bridges is exposed to winds exceeding 35 miles per hour, it shall be inspected and put into operable condition before use. The employer shall prepare a certification record which includes the date the inspection and test of all functions and safety devices was performed; the signature of the person who performed the inspection and test; and a serial number or other identifier for the hoist that was inspected and tested. The most recent certification record shall be maintained on file at the job site.

(1) Periodic Inspections. Periodic inspections and tests as recommended by the hoist manufacturer shall be performed by a person designated by the employer and qualified to perform such service. Records shall be maintained and kept on file at the job site for the duration of the job.

(c) Operation. Hoists shall be operated only by a competent authorized operator, in the car, or stationed adjacent to the driving machine subject to the following conditions:

(1) A regular attendant is stationed in the car.

(2) A constant-pressure-type switch shall be provided in the car, which must be held manually in the closed position by the attendant in the car in order to permit operation of the driving machine and which shall be opened automatically when released by the operator during normal or emergency stop operations.

(3) A means of closed voice communication shall be provided between the car attendant and the operator stationed adjacent to the driving machine.

Section 1604.26 is a general, performance-based regulation and thus covers all components of the hoist making it a broader, more protective standard. Cal/OSHA believes that the inclusion of section 26.4 into Article 14 is unnecessary.

#### **6.16 ANSI A10.4-2016 Section 26.5**

Section 26.5 of ANSI A10.4-2016 requires a re-inspection when the height of the hoist is changed. Section 3.36.2 of ANSI A10.4-2016 defines “jumping” as “The addition or removal of mast or tower allowing a change in the hoist service elevation”. Section 26.1.1 of ANSI A10.4-2016 contradicts section 26.5 by stating a “jump” is not considered an alteration and thus not subject to a re-inspection.

Title 8 section 1604.26 includes requirements for inspection after major alterations with a similar exclusion for jumping of the hoist tower. Cal/OSHA believes that the inclusion of section 26.5 into Article 14 is unnecessary and ill-advised due to the contradiction in section 3.36.2 and 26.5 discussed above.

**6.17 ANSI A10.4-2016 Section 26.6**

Section 26.6 of ANSI A10.4-2016 requires a written checkout procedures or documentation from the manufacturer that devices on a hoist that cannot be tested on site comply with ANSI A10.4-2016. Title 8 section 1604.26 requires that testing be performed in the field to ensure that all parts of the installation conform to the applicable requirements of this Standard and that all safety equipment functions as required. Allowing documentation in lieu of field testing would reduce the level of safety of current title 8 regulations. Therefore, Cal/OSHA believes that the requirements of section 26.6 should not be included in title 8 regulations.

**6.18 ANSI A10.4-2016 Section 27.3**

ANSI section 27.3 requires replacements of device and components to be of sound engineering design and acceptable by the manufacturer. Title 8 subsections 1604.1(c) and 3328(a) and (b) currently address requirements for complying with manufacturer's specifications and limitations and the engineered design for machinery and equipment.

§1604.1. General.

(c) Engineering Supervision.

(1) The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of all hoists and elevators. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a professional engineer competent in the field.

§3328. Machinery and Equipment.

(a) All machinery and equipment:

(1) shall be designed or engineered to safely sustain all reasonably anticipated loads in accordance with recognized engineering principles; and

(2) shall not be used or operated under conditions of speeds, stresses, loads, or environmental conditions that are contrary to the manufacturer's recommendations or, where such recommendations are not available, the engineered design.

(b) Machinery and equipment in service shall be inspected and maintained as recommended by the manufacturer where such recommendations are available.

\* \* \* \* \*

Title 8 section 1604.1 requires compliance with the manufacturer's specifications to the operation of hoists, which can be implied to include the replacement of components to the hoists because a manufacturer approving a component's operation by default must also approve of the component itself. Additionally, title 8 section 3328 requires machinery and equipment to be designed or engineered to safely sustain all reasonably anticipated loads in accordance with recognized engineering principles and maintained according to the manufacturer's recommendations. Cal/OSHA believes that incorporation of section 27.3 of ANSI A10.4-2016 in to title 8 regulations is duplicative.

**6.19 ANSI A10.4-2016 Section 30.3**

ANSI A10.4-2016 section 30.3 requires the user of the hoist to ensure personnel assigned to maintain, operate, and inspect the hoist are knowledgeable in their duties. Title 8 subsections 1604.26(b)(1) and 1604.26(c) currently require that personnel who perform inspections and testing and who operate the hoist to be qualified.

§1604.26. Inspection and Tests of Personnel Hoists.

\* \* \* \* \*

(b)(1) Periodic Inspections. Periodic inspections and tests as recommended by the hoist manufacturer shall be performed by a person designated by the employer and qualified to perform such service. Records shall be maintained and kept on file at the job site for the duration of the job.

\*\*\*\*\*

(c) Operation. Hoists shall be operated only by a competent authorized operator, in the car, or stationed adjacent to the driving machine subject to the following conditions:

\* \* \* \* \*

Cal/OSHA believes that incorporation of section 30.3 into title 8 Article 14 is unnecessary.

**7.0 CONCLUSION**

Cal/OSHA recommends that the proposal to include sections 5.1.1, 17.8, 17.10, 26.4, 26.5, 26.6, 27.3, and 30.3 of ANSI A10.4-2016 be DENIED.

Cal/OSHA recommends that the proposal to include the following sections 5.5.1.1, 5.6.3, 15.2, 17.1, 19.5, 19.10.2, 20.9, 21.5, 22.10, 22.11 25.5 of ANSI A10.4-2016 be GRANTED insofar as an advisory committee be convened to determine appropriate regulatory language and determine any potential conflicts with other state or local laws and regulations. Title 8 changes made to elevator counterweight design in response to ANSI A10.4-2016 Section 15.2 should be limited to the maximum counterweight established in title 8 section 1604.15(b).

cc: Yancy Yap  
Jason Denning