

State of California  
Department of Industrial Relations  
Occupational Safety and Health Standards Board

Petition File No. 599

Board Staff Evaluation  
Submitted by Mike Nelmidia  
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State of California

Gavin Newsom, Governor

## INTRODUCTION

Petition 599 (Petition) was submitted by Tanya Charlesworth, PE, Director of Project Management for Brand Safway (Petitioner) on September 26, 2023. The Petition requests the Standards Board (Board) to consider updates to title 8, article 14<sup>1</sup> of the Construction Safety Orders. Specifically:

1. Adoption of the provisions of the ANSI/ASSE A10.4-2016 *Safety Requirements for Personnel Hoists and Employee Elevators on Construction and Demolition Sites* (A10.4-2016) code to replace existing requirements within article 14<sup>2</sup> that were based on the 1973 edition of A10.4.; and
2. Add amendments to section 1604.21 to include the A10.4-2016 provision (section 21.1) that construction passenger elevators (CPE)<sup>3</sup> equipped with an overload detection devices follow ratio of 82 lbs./ft<sup>2</sup> rather than Table 4's CPE car area limitations (Table 6 in the A10.4-2016 code).

## BACKGROUND/HISTORY

Article 14 was originally heard at a public hearing in 1974 and adopted in 1975. Article 14 *Construction Hoist* is divided into "Personnel Hoists" (1604 – 1604.30) and "Construction Material Hoists" (1605 – 1605.21). Construction hoists requirements were amended five times since 1976 (Table 1). The article 14 personnel hoists standards are based on the *American National Standard Safety Requirements for Personnel Hoists A10.4-1975*.

<b>Public Hearing</b>	<b>Section No.</b>	<b>Subject</b>
11/20/1974	1604, 1604.1-1604.30	Construction Passenger Elevators and Hoists
7/29/1976	1604.1 (a)(4)	Non-guided or Wire-rope Guided Hoists. Exception.
1/18/1990	1604.26(b)	Construction Industry Test and Inspection Records
7/19/1990	1604.12	Location and Guarding of Counterweights
11/21/2002	1604.5(c)(3) and 1604.6	Construction Hoistway Doors and Door Locking Devices
5/15/2008	1604.24, 1604.26	Construction Personnel Hoists (Car Top Operations)

The Federal Standard for Personnel Hoists [29 CFR 1926.552\(c\)](#) is based on the American National Standard A10.4–1963, *Safety Code for Building Construction: Safety Requirements for*

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<sup>1</sup> Unless otherwise stated all references are to title 8, California Code of Regulations.

<sup>2</sup> Article 14 consists of section 1604 through 1605.21.

<sup>3</sup> "Hoist(s)" or "personnel hoist(s)" are "construction passenger elevators" (CPE) in the context of this document, the terms are synonymous.

*Workmen's Hoists*. The Federal requirements have been amended twice (1987 and 2020).

The A10.4 code originated as part of the A10.2-1944 code and in 1963 was published under the A10.4 code. The A10.4 code was amended in 1975, 1981, 2004, 2007 and 2016. The current edition of the A10.4 code is the 2016 edition.

### **Prior Petition ([Petition 589](#))**

- Petition 589 sought updates to title 8, article 14, based on the A10.4-2016 code;
- Petition 589 referenced “21.5 Overload Detection Devices” for consideration as an example of a safety enhancement;
- The Board GRANTED Petition 589 to convene an advisory committee to review the A10.4-2016 code; and
- The Board did not specifically address Overload Detection Devices in the Conclusion and Order.

In response to a 2021 Petition (No. 589), the Board, within the [adopted decision](#), requested the Board staff to convene an advisory committee to review the A10.4 code but limited focus to exclude from inclusion into article 14 “*consensus standard sections that are deemed via committee deliberation to be either duplicative/unnecessary, or do not represent either an enhancement to or equivalent safety.*”<sup>4</sup> The advisory committee has not yet been formed to address Petition 589.

Of the numerous codes referenced in Petition 589, “21.5 Allows overload detection devices” was included. Section 1604.21(e) prohibits the use of overload systems. Petition 589’s Petitioner identified the overload system as an improvement to safety and cited it as an example of a change that should be considered. [Cal/OSHA’s evaluation](#) for [Petition 589](#) supported provisions to include Overload Detection Devices stating in relevant part:

*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.*

*[...] 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.<sup>5</sup>*

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<sup>4</sup> Adopted Decision Petition 589, p. 4

<sup>5</sup> Petition 589, Cal/OSHA evaluation, pp. 15-16

Petition 589 highlighted the prohibition of overload detection devices. Petition 589 did not reference section 1604.21(a) or A10.4-2016 section 21.1.

### **Prior variances**

A review of the Board records of variances yielded no relevant request for variance to alter the car space.

### **PETITIONER'S ASSERTIONS**

Petitioner's Request 1.

- Adoption of the provisions of the A10.4-2016 code to replace existing provision under article 14.

A discussion with the Petitioner resolved the Petitioner's broader request (to consider the adoption of A10.4-2016 into article 14). Per the Petitioner, the *Conclusion and Order* of Petition 589 suffices.

Petitioner's Request 2.

- Add amendments to section 1604.21 to include the A10.4-2016 provision (section 21.1) that construction passenger elevators (CPE) equipped with overload detection devices follow a ratio of 82 lbs./ft<sup>2</sup> rather than Table 4's CPE car area limitations (Table 6 in the A10.4-2016 code).

The Petitioner's second request is to consider amendments to section 1604.21 consistent with A10.4-2016 sections 21 through 21.5.3. Section 1604.21 addresses "capacity and loading" of CPEs. The Petitioner highlights subsection (a) which specifies that the "inside net platform area" is based on the CPE's rated load. The rated load is *the maximum load for which the hoist is designed and installed to lift at the rated speed*<sup>6</sup>. The higher the rated load, the greater the "inside net platform area." For simplicity, staff will refer to the "inside net platform area" as "car space."

The Petitioner claims, in a subsequent email discussion, that the alternative under A10.4-2016 section 21.1 *allows elevators that are beyond the square footage of Table 6<sup>7</sup> to be utilized when equipped with an overload detection device. This provides an added level of safety for elevators that do not meet the Table 6 requirements.*

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<sup>6</sup> ANSI A10.4-2016 section 3.50, definition of "rated load".

<sup>7</sup> Table 4 in section 1604.21

An overload detection device is an optional device supplied by the CPE manufacturer that uses load-weighting devices (such as load cells) and a control system to measure the weight of passengers and loads inside the car space. The overload detection device is active only while the car is stationary (landed at any floor landing). The overload detection device is linked to the elevator controls and prevents the car from moving/traveling when an overload condition is detected.

The Petitioner characterized the overload detection device as an objective means of determining whether the load carried by the car is safe for the elevator to travel. By contrast, according to the Petitioner, despite an operator's best efforts to estimate the weight of the materials and personnel loaded into the car, the elevator could still travel while overloaded (when not equipped with an overload detection device).

The Petitioner seeks to leverage the additional safeguard of the overload detection device as an offset for increasing the car space as allowed under A10.4 2016, section 21.1 code. Seeing that the Petitioner's request could be misinterpreted, the Petitioner later clarified that the Board should not mandate overload detection devices for all CPEs used. The Petitioner argued that mandating overload detection devices on all CPEs would be unnecessarily disruptive to the construction industry since California's title 8 prohibition on overload detection devices has been maintained since the regulation's inception. Further, the A10.4-2016 code does not mandate overload detection devices on CPEs. However, those CPEs that alternatively follow the 82lbs./ft<sup>2</sup> allowance under section 21.1 of the code must include an overload detection device.

## **Cal/OSHA EVALUATION**

The Cal/OSHA evaluation was not available at the time of drafting of this report.

## **STAFF EVALUATION**

Board staff discussed the request with the Petitioner, operating engineers, additional A10.4 committee members and Cal/OSHA. Staff reviewed the relevant federal, state and consensus standards identified in the *Relevant Standards* section below.

## **Relevant Standards**

### **Federal Standards**

Federal OSHA regulations concerning hoists and elevators are found in 29 CFR 1926.552 "Material hoists, personnel hoists, and elevators." Of particular relevance to the present subject is 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.*

### California Standards

Section 1604 "Personnel Hoists" reads in its entirety:

*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.*

Of particular note is section 1604.21 which states:

*§ 1604.21. Capacity and Loading.*

*(a) Inside Net Platform Area.*

*The inside net platform area (see Figure 4) of the hoist car is determined by the rated capacity of the hoist and shall be no greater than that given in Table 4.*

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Table 4  
Relationship of Hoist Rated Capacity to Inside Net Platform Area

Rated Load (pounds)	Inside Net Platform Area (square feet)
2,000	24.2
2,500	29.1
3,000	33.7
3,500	38.0
4,000	42.2
4,500	46.2
5,000	50.0
10,000	88.0

## Consensus Standards

### **ANSI/ASSE A10.4-2016**

The American National Standards Institute (ANSI) and the American Society of Safety Engineers<sup>8</sup> (ASSE) publish ANSI/ASSE A10.4-2016 “*Safety Requirements for Personnel Hoists and Employees Elevators on Construction and Demolition Sites*”, the latest version of the standard. The scope of ANSI/ASSE A10.4-2016 provides:

*This standard applies to the design, construction, installation, operation, inspection, testing, maintenance, alterations and repair of hoists and elevators that (1) are not an integral part of buildings, (2) are installed inside or outside buildings or structures during construction, alteration, demolition or operations and (3) are used to raise and lower workers and other personnel connected with or related to the structure. These personnel hoists and employee elevators may also be used for transporting materials under specific circumstances defined in this standard.*

Section 21 states in relevant part:

#### **21. CAPACITY AND LOADING**

*21.1 Inside Net Platform Area. The inside net platform area (see Figure 21.1 [omitted]) of the hoist car shall be determined by the rated capacity of the hoist and shall be no greater than that given in Table 6 [omitted] unless an overload detection device as described in Section 21.5 is provided. With the use of an overload detection device, the rated load ratio to inside net platform area shall not be less than 82psf (400kg/m<sup>2</sup>). The rated capacity shall not be increased without written approval of the manufacturer or a registered professional engineer, if the manufacturer is no longer in business. The authorized person assigned to the hoist is responsible for insuring that the material carried in the hoist is appropriately secured to prevent it from shifting and the maximum load rating is not exceeded when transporting material or personnel.*

*21.2 Capacity and Data Plate. [...]*

*21.3 Information on Plates. [...]*

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<sup>8</sup> In June, 2018, the American Society of Safety Engineers (ASSE) changed its name to the American Society of Safety Professionals (ASSP). Because the 2016 update to ANSI/ASSE A10.4 uses the acronym “ASSE” in its title, staff elects to refer to the organization by the old name to avoid confusion by switching to “ASSP” for the present evaluation.

*21.4 Material and Marking of Plates. [...]*

*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.*

*21.5.1 The design and installation of overload detection devices shall take into account the need to test the hoist with overloads without dismantling and without affecting the performance of the overload indicator or detector.*

*21.5.2 If interruption of the power occurs, all data and calibration of the overload detection device shall be retained.*

*21.5.3 Devices shall be protected to prevent damage from shock, vibration and the general use of hoists including erection, operation, dismantling and maintenance as well as environmental influence intended by the manufacturer.*

**ANSI/ASME A17.1**

The ASME A17.1 *Safety Code for Elevators and Escalators* standard is the basis for the Group II, III and IV Elevator Safety Orders. Currently the 2004 edition is incorporated by reference. CPEs are not covered under the ASME A17.1 requirements, but both consensus codes share similarities. Specifically, a more expansive version of 1604.21's Table 4 is found in A17.1-2004, Table 2.16.1.1.

**EN 12159**

The EN 12159 consensus code is EN 12159:2012 *Builders hoists for persons and materials with vertically guided cages* is the European code. EN 12159 served, in part, as the basis for the recent changes to the A10.4 requirements pertaining to overload detection devices currently found in the A10.4-2016, section 21.5.

**Staff Analysis**

The Petitioner's first request is the adoption of the provisions of the ANSI/ASSE A10.4-2016 *Safety Requirements for Personnel Hoists and Employee Elevators on Construction and Demolition Sites* (A10.4-2016) code to replace existing requirements within article 14 that were based on the 1973 edition of A10.4. The Petitioner and staff agree that the *Conclusion and Order* for Petition 589 sufficiently addresses the Petitioner's first concern.



The Petitioner's second request is the adoption of the provisions of ANSI/A10.4-2016, section 21 to allow an alternative to table 4 within section 1604.21. What differentiates the subject of Petition 589 from Petition 599 is the alternative under A10.4-2016, section 21.1:

*[...]The inside net platform area (see Figure 21.1) of the hoist car shall be determined by the rated capacity of the hoist and shall be no greater than that given in Table 6 unless an overload detection device as described in Section 21.5 is provided. With the use of an overload detection device, the rated load ratio to inside net platform area shall not be less than 82psf (400kg/m<sup>2</sup>)[...][emphasis added]*

While Petition 589 considered, in part, the merits of overload detection devices themselves, Petition 599's takes the request further. Under the A10.4-2016 code the rated load limits the inside net platform area (car space). As emphasized above, the A10.4-2016 code allows for a larger car at the same rated load if an overload detection device is included. The car space would be determined by dividing the rated load by 82 lbs./ft<sup>2</sup> (rated load ÷ 82 lbs./ft<sup>2</sup>).

The Petitioner specifically requests the Board consider updates to section 1604.21(a). The Petitioner requests the Board consider A10.4-2016, section 21.1's alternative. Section 21.1's alternative is, "With the use of an overload detection device, the rated load ratio to inside net platform area shall not be less than 82psf (400kg/m<sup>2</sup>)." Based on later discussions with the Petitioner, the Petitioner requested that section 1604.21 be amended to add the language from section 21.

For clarity, Staff prepared the following to illustrate the proposed change to 1604.21(a)(see underline):

*(a) Inside Net Platform Area.*

*The inside net platform area (see Figure 4) of the hoist car is determined by the rated capacity of the hoist and shall be no greater than that given in Table 4 unless an overload detection device[...] is provided. With the use of an overload detection device, the rated load ratio to inside net platform area shall not be less than 82psf (400kg/m<sup>2</sup>). The rated capacity shall not be increased without written approval of the manufacturer or a registered professional engineer, if the manufacturer is no longer in business. The authorized person assigned to the hoist is responsible for insuring that the material carried in the hoist is appropriately secured to prevent it from shifting and the maximum load rating is not exceeded when transporting material or personnel.*

The Petitioner's aim is to allow the transport of bulkier items (such as curtain walls) which necessitate a larger car area. Items such as curtain walls, according to the Petitioner, are not heavy enough to exceed the CPE's rated capacity, however extending the car space would

violate the table 4 requirements when section 1604.21's restrictions are applied. According to the Petitioner, unless the Board grants their request, CPEs with larger rated capacity must be selected (unnecessarily), not because of their ability to carry greater loads, but rather because of the larger car area available to load those materials. As argued by the Petitioner, the corresponding increase in rated load is unnecessary to safely convey the bulkier items.

Discussions with additional A10.4 committee members revealed that there is a benefit to allowing items such as curtain walls to be transported by the CPE. A representative of Alimak Group USA, Inc., a manufacturer of CPEs commonly used in California, claimed that on construction sites with smaller footprints and fewer cranes, under special operations, items such as curtain walls have been secured to the outside of the CPE car for transport rather than inside the car. Such practice involved greater dangers in unloading the items mounted to the exterior of the car compared to using a larger car. Currently, Board staff is unaware of any requirement under title 8 which directly address this practice. However, section 1604.28(a) states:

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

#### ***Rated Load Ratio to Inside Net Platform Area***

The ratios tabulated in the 1604.21, table 4 are the same as the passenger elevator equivalent requirements in the ASME A17.1-2004<sup>9</sup> *Safety Code for Elevators and Escalators*. Freight elevators, governed by the ASME A17.1-2004 code, have a ratio of 49 lbs./ft<sup>2</sup>. A freight elevator (Class A, General Freight Loading<sup>10</sup>) with a 10,000 lb. rated capacity would have a car space of 204 ft<sup>2</sup>. To clarify, CPEs are not governed by the ASME A17.1 code, however, similarities in the requirements do exist.

The proposal would allow for a rated load ratio to car space area of 82 lbs./ft<sup>2</sup> when the CPE is paired with an overload detection device. For comparison, tabulated rated loads in the existing regulation, the ratio ranges from 82.6 to 113.6. The lower the ratio the more permissive a car space allowed (at the same rated load). The proposal would allow a CPE with a 10,000 lbs. rated load a 122 ft<sup>2</sup> car when equipped with an overload detection device, rather than the 88 ft<sup>2</sup> car (without an overload detection device) as tabulated in section 1604.21. The result is a slightly more permissible car space at 2,000 lbs. rated capacity and more permissible car space at 10,000 lbs. rated capacity than allowed under the current section 1604.21(a) requirements.

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<sup>9</sup> ASME A17.1-2004 table 2.16.1.1

<sup>10</sup> ASME A17.1-2004, Section 2.16.2.2.1

### ***Overload Detection Device***

The Overload Detection Device (“Overload Devices”, prior to 2016) provisions were added to the 1981 edition of the A10.4 code. The 1981 code permitted (but did not require the use of) overload detection devices to be installed and used on CPEs. There is no requirement in any edition of the A10.4 code which mandates the use of an Overload Detection Device.

Within the A10.4-2016, the provision to allow for larger car sizes (consistent with the 82 lbs./ft<sup>2</sup> ratio) was added with additional changes to section 21.5. The changes to section 21.5 included the following provisions (see underline):

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.

21.5.1 The design and installation of overload detection devices shall take into account the need to test the hoist with overloads without dismantling and without affecting the performance of the overload indicator or detector.

21.5.2 If interruption of the power occurs, all data and calibration of the overload detection device shall be retained.

21.5.3 Devices shall be protected to prevent damage from shock, vibration and the general use of hoists including erection, operation, dismantling and maintenance as well as environmental influence intended by the manufacturer.

The changes were added to allow the larger car size provisions to be added to section 21.1. A10.4-2016, section 21.1 also includes a provision for:

*The authorized person assigned to the hoist is responsible for insuring that the material carried in the hoist is appropriately secured to prevent it from shifting and the maximum load rating is not exceeded when transporting material or personnel.*

Board staff is mindful that the changes to section 21.1’s provisions were added to address overloading when complying with table 4 and when applying the 82 lbs./ft<sup>2</sup> ratio.

### ***Braking Capacity***

Staff’s concern is the larger car area can, to the detriment of the safety of riders, fit more riders, overloading the car and surpassing the braking systems capacity to hold the car. According to A10.4-2016, section 21.5, an *overload is considered to occur when the rated load is exceeded by*

*a maximum of 20%. However, also in the A10.4-2016 code section 22.7, [t]he brake shall be designed to [...] stop and hold the car at rest at 125% of its rated load.*

It is important to note that the European code (EN 12159) related to overload detection device and braking capacity limits are similar but not identical. Under the EN 12159, overload limits are 120% of the rated load. However, under the EN 12159, the braking capacity must be capable of stopping the car from the rated speed in the down direction with 125% of the rated load aboard. Stopping the car in the downward direction while traveling at the rated speed is a more specific and restrictive requirement than the current A10.4 requirement. When compared to the A10.4 standard, the 5% difference is concerning to Board staff. Given that the overload limit was based on the EN 12159 standard, staff is concerned that the margin of safety from the originating EN 12159 code when brought into the A10.4 code has been diminished.

Staff notes that there is only a 5% difference (120% vs 125% of the rated load) between the overload condition of the detection device and the maximum capacity of the brake “to hold the car at rest.” At 6,000 lbs. rated load, under the A10.4-2016 code, the car can accommodate up to 30 riders (6,000 lbs. ÷ 200 lbs. per rider). However, the additional 15.4 sq.-ft. of car space may accommodate eight additional riders. Under this condition, the car is in both an overload condition and loaded beyond the braking capacity of the elevator to hold the car.

For capacities from 6,000 to 10,000 lbs. additional riders could enter the car, thus exceeding the braking capacity:

Rated Load (lbs.)	Braking Capacity (Calculated, 125% Rated Load)	Overload Condition (Calculated, 120% Rated Load)	Additional Personnel	Additional Weight (lbs.)	Braking Capacity	Overload Status
6,000*	7,500	7,200	8	1,600	Exceeds Capacity	Overload
7,000*	8,750	8,400	11	2,200	Exceeds Capacity	Overload
8,000*	10,000	9,600	13	2,600	Exceeds Capacity	Overload
9,000*	11,250	10,800	17	3,400	Exceeds Capacity	Overload
10,000	12,500	12,000	19	3,800	Exceeds Capacity	Overload

With a difference of 5% of the rated load between the “overload condition” exceeding the capacity of the brake, staff cannot support or recommend the Petitioner’s proposal without an additional amendment. The amendment staff would propose would be to reduce the “overload condition” to offer a greater margin of safety between an overload condition and exceeding the capacity of the brake. Lowering the “overload condition” is possible because the limits are set when the CPE is installed. For example, the Alimak Overload Sensing Device (OSD-5) can be configured to set the “overload condition” to between 100 to 120% of the rated load. The

overload detection device would be inspected and tested in accordance with the manufacturer's recommendation.

### ***Current Regulations Lack Overload Safeguards***

Though not raised directly by the Petitioner, A10.4-2016, section 21.1 also includes a provision for:

*The authorized person assigned to the hoist is responsible for insuring that the material carried in the hoist is appropriately secured to prevent it from shifting and the maximum load rating is not exceeded when transporting material or personnel.*

The A10.4-2016 code highlights the importance of a means ("overload detection device" or "authorized person assigned to the hoist") to ensure that the maximum load rating shall not be exceeded.

Existing title 8 regulations prohibit an overload detection device and do not require an authorized person to ensure that the maximum load rating is not exceeded. Consequently, title 8 has no specific regulations addressing the overloading of CPEs. The requirement for a responsible person or device to prevent overload conditions does represent an enhancement to the safety of riders. Staff discussed overload detection devices with a representative of Operating Engineers, Local 3. The representative favored changes to title 8 based on A10.4-2016, section 21.

### **STAFF RECOMMENDATION**

Consistent with the foregoing discussion, Board staff recommends Petition file no. 599 be conditionally GRANTED, such that an advisory committee be convened concurrently with Petition 589. The committee should consider amendments to section 1604.21 consistent with the ASME A10.4-2016 section 21 code. It is further recommended by Board staff to include consideration to reduce the "overload condition" specified in A10.4-2016, section 21.5, to offer a greater margin of safety between an overload condition and exceeding the capacity of the brake. The Petitioner should be extended an invitation to participate in the advisory committee process.