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PROPOSED PETITION DECISION OF THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD (PETITION FILE NO. 616)

I. INTRODUCTION

On June 29, 2026, the Occupational Safety and Health standards Board (Board or OSHSB) received a petition from Greg Small (Petitioner), founder of Outdoor Power Equipment Institute, Inc. The Petitioner requests the Board to consider amending California Code of Regulations title 8[1] to require all at height workers to wear helmets meeting the ANSI Z89.1-2014 Type II requirements.

II. SUMMARY

The Petitioner identifies their experience as a Fall Protection Qualified Person Instructor, serving as an expert witness, and a member of ANSI Z359. In their petition, the Petitioner details incidents of workers sustaining serious injuries or fatalities. The Petitioner pointed out had the worker wore a "hardhat" that is rated for side and top impacts, secured with a harness to hold the hardhat on their head, the severity of the injuries may have been mitigated.

Examples of falls at height workers experience include workers in the construction industry that fall from a scaffold eight feet off the ground. In this instance, the first thing that happens is the construction hardhat falls off the head. At this height a worker may be able to land horizontally, chest down, distributing the impact into their legs, hips and may have enough arm and neck strength to hold their head from hitting the ground, sustaining only minor injuries. However, at a greater height, if the head had struck something on the way down, or if the body had become inverted so the head was the first part of the body to contact the ground, more serious injuries could result. Another example includes workers who risk head injury when using a fall arrest system. The Petitioner states prior to full engagement of the fall arrest system is when a worker has the greatest risk of head injury. The Petitioner states during and slightly beyond the free fall phase of the fall even, when a worker is tumbling, the head can easily strike objects even if the fall is arrested. In both examples, the head has potential for injury while falling.

[1] All references are to title 8 unless otherwise noted.

The Petitioner additionally states that falls from height continue to be the leading cause of death in construction and cites industry experience, incident examples, and statistical data to support their request that the Board consider requiring ASNI Z89.1-2014 Type II helmets for all at-height workers. The petitioner contends that improved head protection has the potential to "significantly reduce fatalities and life-changing injuries" at a "relatively low cost" and that these changes could be put into the walking-working surfaces regulations, "where head protection [is] perhaps needed the most."

The Petitioner believes the head is one of the most vulnerable parts of the human body as “brain injuries do not heal as readily as injuries to other parts of our bodies. Unlike bone, muscle and tendons (which can often completely recover from serious cuts, breaks, tears and punctures), brain tissue does not regenerate. At best, other parts of the brain attempt to partially take over functions lost by the injured part of the brain, and are much less effective than the injured brain had been before the injury.”

Based on investigation of all incidents, the Petitioner found “the vast majority of fatalities and serious injuries involved the head striking something, which aligns with the Australian statistics.” The Petitioner also believes the difference between UK fatalities from falls (20% of those recorded in the US per person-hours worked), is because US workers wear construction hardhats instead of helmets, which provide less head protection.

Because the federal regulations do not cover this area and California does not have a specific regulation regarding hard hats, Petitioner brings forth this Petition.

III. RELEVANT STANDARDS

California Standards

Section 3381. Head Protection

(a) Employees working in locations where there is a risk of receiving head injuries from flying or falling objects and/or electric shock and burns shall wear approved head protection in accordance with this section.
(b) When head protection is required, the employer shall provide each employee with head protection that meets the criteria in one of the following standards, which are hereby incorporated by reference:
(1) American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) Z89.1-2009, “American National Standard for Industrial Head Protection;”
(2) ANSI Z89.1-2003, “American National Standard for Industrial Head Protection;” or
(3) ANSI Z89.1-1997, “American National Standard for Industrial Head Protection.”
(c)(1) The employer shall ensure that the appropriate impact type helmet is selected and used.

Note: Protective helmets are described by impact type and electrical class. All protective helmets required by subsection (b) meet either Type I or Type II impact requirements. Type I helmets are intended to reduce the force of impact resulting from a blow only to the top of the head. Type II helmets are intended to reduce the force of impact resulting from a blow to the top or sides of the head.

(2) The employer shall ensure that the appropriate electrical class of ANSI designated helmet is selected and used in accordance with the following:

(A) When there is no risk of head injury from contact with electrical conductors, and protective helmets are only required to reduce the danger of injury from flying or falling objects, protective helmets shall be ANSI-Z89.1 designated Class C, E, or G.

(B) When there is a risk of head injury from contact with conductors less than 600 volts, protective helmets shall be ANSI-Z89.1 designated Class E or G.

(C) When there is a risk of head injury from contact with conductors greater than 600 volts, protective helmets shall be ANSI-Z89.1 designated Class E.

(3) The employer shall ensure that the head protection provided for each employee exposed to high-voltage electric shock and burns also meets the specifications contained in Section 9.7 "Electrical Insulation" of any of the consensus standards identified in subsection (b) of this section.

(d) Each approved protective helmet required by subsection (b) shall bear the permanent markings required by the ANSI standard under which it was approved. At a minimum, the marking shall identify the manufacturer, ANSI designated standard number and date, and ANSI designated class and impact type of helmet.
(e) Where there is a risk of injury from hair entanglements in moving parts of machinery, combustibles or toxic contaminants, employees shall confine their hair to eliminate the hazard.

Consensus Standards

ANSI Z89.1-2014

7.2.3 Chin Strap
Chin straps shall be made of material not less than 12.7 mm (0.50 in.) in width.
Type II helmets *which are provided with chin straps* shall be tested for retention in accordance with Section 10.6.

For each helmet tested, the chin strap shall remain attached to the helmet. The residual elongation of the strap shall not exceed 25 mm (1.0 in.).

ANSI Z89.1-2026

7.3.5. Additional Protection (“+” Mark)
7.3.5.1. Chin Strap Retention (Type I+, Type II+):
Helmets marked "+" for additional protection shall be provided with a chin strap by the manufacturer, which shall be installed and utilized according to the manufacturer's instructions in order to meet the "+" requirement.
Helmets marked “+” for additional protection shall be tested in accordance with Section 10.6. 12

For each helmet tested, the chin strap shall remain attached to the helmet. The residual elongation of the strap shall not exceed 25 mm (1.0 in.). Chin straps shall be made of material not less than 12.7 mm (0.50 in.) in width.

7.3.5.2 Retention System Effectiveness (Roll Off) (Type I+, Type II+)
Helmets marked “+” for additional protection shall be tested in accordance with Section 10.10. The helmet shall not come off the headform completely and shall maintain some point of contact above the basic plane of the headform for a minimum of 5 seconds.

7.3.5.3 Off-Center Force Transmission

European Standards

BS EN 397 and 13087 are British and European Standards for industrial safety helmets. BS EN 397 sets mandatory performance and design requirements for helmets, while BS EN 13087 provides a series of test methods used in a laboratory to measure those performance criteria.

> BS EN 397 – Industrial Protective Helmets – specifies minimum physical criteria for safety helmets such as shock absorption, penetration resistance, flame resistance, and retention system (chin strap) effectiveness.
>
> BS EN 13087, Protective Helmets—Test Methods, is a ten-part series specifying test methods for industrial protective helmets. The parts of this standard relevant to this petition are the following:
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> - Part 2: Test methods for shock absorption
> - Part 3: Test methods for resistance to penetration
> - Part 4: Test methods for retention system effectiveness
> - Part 5: Test methods for retention system strength

BS EN 397 and BS EN 13087 do not include requirements or test methods for protection from rotational motion on the head and brain caused by impacts.

BS EN 17950:2024, titled “Protective helmets - Test methods - Shock absorption including measuring rotational kinematics,” includes test methods to measure translational (linear) and rotational forces from helmet impacts. The 2024 edition of BS

EN 17950 describes helmet test protocols for shock absorption including measuring rotational kinematics.

IV. CAL/OSHA'S EVALUATION

In their evaluation, Cal/OSHA cited an article in The American Journal of Industrial Medicine that reported construction workers are at higher risk for traumatic brain injuries (TBI) because they can be struck by falling and flying objects or fall from elevation within a dynamic work environment. Additionally, falls from roofs, ladders, and scaffolds are major causes of TBIs.[2]

Cal/OSHA next analyzed the differences between the applicable codes and gaps that remain in providing the highest head injury protection possible. Their evaluation noted section 3381 of the General Industry Safety Orders addresses head protection from the hazard of flying or falling objects and/or electric shock and burns but it does not specifically address protection from head injuries caused by falls.

Subsection 3381(b) requires head protection to meet the requirements of either the 1997, 2003, or 2009 edition of the ANSI Z89.1 Head Protection standard. Subsection 3381(c)(1) requires that the appropriate impact type helmet is selected and used; and contains a non-enforceable note describing Type I and Type II helmets. The regulation has not been updated to include the 2014 or the 2026 versions of ANSI Z89.1.

With respect to the consensus standards, Cal/OSHA correctly points out that the Petitioner referenced the 2014 edition of ANZI Z89.1 standard which is not the most up to date standard. At the time of Petitioner's request, the 2026 ANZI Z89.1 standards had yet to be published. Under the older standard, chin straps are not required as some type II helmets provide a strap and others do not.

The helmet type is the part of the ANSI Z89.1 standard relevant to this petition (the petitioner requests Type II helmets with chin straps for workers exposed to falls). The types are:

- Type I helmets: designed to reduce penetration and force from impacts to the top of the head; they are not tested for protection to the sides, back, or front of the head.

- Type II helmets: designed to reduce penetration and force from impacts to both the top and lateral areas (front, back, and sides) of the head.

The Type II designation also includes additional testing requirements for chin strap retention if a chin strap retention system is provided with the helmet. However, chin straps are optional and **not** required on Type II helmets.

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[2] Konda S, Al-Tarawneh IS, Reichard AA, Tiesman HM, Wurzelbacher SJ, Pinkerton LE, Meyers AR, Hendricks SA, Tseng CY, Lampl MP, Robins DC. Workers' compensation claims for traumatic brain injuries among private employers-Ohio, 2001-2011. Am J Ind Med. 2020 Feb;63(2):156-169. pubmed.ncbi.nlm.nih.gov/31742763/

According to Cal/OSHA, laboratory testing from Virginia Tech estimated that Type II helmets reduce concussion risk by 32.7% and skull fracture risk by 57.5% compared with the Type I helmets tested. However, there is variability among the Type II helmets; the two best Type II helmets had 28.7% and 33.2% lower concussion risk than the two worst-performing Type II helmets. They have not yet tested Type II+ or Type I+ helmets.

Although superior to Type I, Cal/OSHA considers the Type II helmet designation alone as insufficient because the chin strap retention system is optional.

Cal/OSHA believes within the Type II designation, the new "+" designation in the 2026 standard is important because head protection is ineffective if a worker falls and the helmet does not stay on their head. Both Type I+ and Type II+ helmets must include a chin strap retention system and meet standardized test requirements designed to evaluate the strap and the helmet's ability to remain properly positioned after an impact. In addition to the mandatory chin strap retention system requirements, Type I+ helmets must pass off-center force-transmission testing at the front, rear, and side and cannot transmit more than 10 kN of force. However, Type I+ helmets are not tested to the Type II lateral impact-energy attenuation and off-center penetration criteria.

Type II+ helmets combine the existing Type II impact-energy attenuation and off-center penetration requirements with the new "+" retention requirements. As a result, Type II+ helmets provide protection from top and lateral impacts while incorporating requirements to improve helmet retention during falls and other incidents involving worker movement.

Based on 1) the lower concussion and skull fracture risk estimated for the Type II helmets compared to the Type I helmet in the Virginia Tech testing, 2) the need for a mandatory helmet retention system, and 3) the enhanced lateral impact and penetration protection of Type II+ helmets compared to Type I+ helmets, Cal/OSHA considers Type II+ helmets meeting ANSI Z89.1-2026 to be the minimum level of head protection that should be required for employees exposed to falls from height.

According to Cal/OSHA, no helmet types in ANSI Z89.1-2026 or earlier versions include test methods for protection from rotational motion on the head and brain caused by impacts.

Thus, Cal/OSHA proposes changes to at height worker protections that include system testing to include evaluation of rotational kinematics associated with oblique impacts. The British and European standard BS EN 17950:2024 establishes a test method specifically designed to measure both translational and rotational kinematics during helmet impacts. Similarly, the Virginia Tech Helmet Lab construction helmet rating system evaluates helmet performance using oblique fall-impact scenarios and

corporates both linear and rotational head acceleration measurements when estimating concussion risk[3].

Cal/OSHA asserts because falls from height commonly involve oblique impacts capable of generating rotational motion of the head, consideration should be given to whether employees exposed to fall hazards would benefit from head protection evaluated for both translational and rotational impact performance.

Cal/OSHA recommends that the requirement for improved head protection be included in title 8 section 3381 with references in the Walking Working Surfaces (WWS) regulations as well as other applicable regulations where employees working at height could be exposed to head injuries from fall hazards.

V. BOARD STAFF'S EVALUATION

Board staff similarly agreed with Cal/OSHA that type II helmets are far superior to type I helmets.

The Board staff evaluation compared the two types of approved impact helmets per ANSI Z89.1-2014 - Type I and Type II impact helmets with three different Classes. For example, one may purchase a Type II, Class E helmet.

- Type I helmets are designed to reduce the impact force from a blow to the top of the head.
- Type II helmets are designed to reduce impact force from a blow to the top or sides of the head.
- Class G (General) intended to reduce the danger of contact with low voltage conductors. Test samples shall be proof tested at 2200 volts (phase to ground)
- Class E (Electrical) Class E helmets are intended to reduce the danger of contact with higher voltage conductors. Test samples shall be proof tested at 20,000 volts (phase to ground).
- Class C (Conductive) are not intended to provide protection against contact with electrical hazard.

Type II helmets are required to meet additional performance requirements by passing the ANSI prescribed test methods.

- Impact Energy Attenuation. Type II helmets include a liner (foam) that is intended to absorb impact force, therefore lessening the amount of impact energy received by the head. Impact Energy Attenuation test is in section 10.4 of the ANSI standard.

[3] Virginia Tech Helmet Lab. (2025). *Construction Helmet Ratings*. Virginia Polytechnic Institute and State University. Accessed on October 24, 2026. https://www.helmet.beam.vt.edu/construction-helmet-ratings.html

- Off-Center Penetration. The impact testing on the headform is performed in various positions to demonstrate protection against impact.: front, side, rear and anywhere on the shell above the Dynamic Test Line (DTL) - drawing in ANSI standard. Impact penetration test is in section 10.5 of the ANSI standard.
- Chin Strap is a required element and shall remain attached to the helmet when tested.

According to Board staff, the Petitioner's request is intended to mitigate risks of a head injury to employees who work at heights and use personal fall protection. Working at height exposes the employee to fall and impact hazards. Workers affected include all industries that have employees who work at heights such as Construction, Agriculture, Manufacturing, Electrical, Petroleum, etc.

At the time the Board staff evaluation was drafted, ANSI Z89.1-2026 had yet to be published. However, staff reasoned that the ANZI standard at the time should be followed because while section 3380(c)(1) requires the employer to ensure that the appropriate impact type helmet is selected and used, employers do not uniformly select Type II helmets as the type of head protection appropriate for employees who use active fall protection systems.

Board staff noted Virginia Tech University developed a rating system called the Safety Technology and Research (STAR) system. They developed test methods beyond the minimum safety standards to quantitatively evaluate impact performance and rate helmets. Historically, their research was focused on head impacts and helmets in sports.

In 2025, the Construction STAR tests methods[4] were developed to quantitively compare safety helmets performance in the context of concussion and skull fracture risks. According to the study, the STAR scores show that Type II helmets reduce the concussion risk by 32.7% and skull fracture by 57.5% compared to the Type I helmets.[5] Virginia Tech Helmet Ratings recommend Type II helmets with a 4 and 5 star rating.

Based on the benefits versus the low cost of Type II helmets, Board staff recommends the Board grant the petition to require ANSI approved Type II helmets for employees who are using an active fall protection system.

VI. DISCUSSION

The Board does not need convincing that head protection designed to reduce penetration and force from impacts to only the top of the head offers less superior safety

[4] Susanna M. Gagliardi, Nicole E.-P Stark, Lee M. Edwards, Mark T. Begonia, and Steve Rowson. *STAR Protocol for Construction Helmets* (Blacksburg, VA; Virginia Tech Helmet Lab, Virginia Tech, 2025), https://vtechworks.lib.vt.edu/server/api/core/bitstreams/87102c67-180f-47e6-82c0-fbdd15c812d4/content

[5] Gagliardi, S.M., Stark, N.EP., Begonia, M.T. *et al.* Development of a Fall-Specific Impact Testing Method to Evaluate Safety Helmet Performance and Injury Risk. *Ann Biomed Eng* **54**, 777–795 (2026). https://doi.org/10.1007/s10439-025-03930-9

to helmets that also protect the sides, back, or front of the head. More clarity is needed on the issue of applicability, cost, and implementation.

A. Should All At Height Workers Be Required to Wear a Type II Helmet?

While the Petitioner uses the term "at height workers" when requesting those impacted be required to wear Type II helmets, this term is not defined. A general industry definition is that "[w]ork at height includes any activity where a person could fall from an elevated surface, from one level to another, or into shafts, pits or other openings. Examples include working on ladders, scaffolding, roofs, elevated work platforms, or near unprotected edges and fragile surfaces. This type of work often requires fall prevention and robust control measures, such as guardrails, personal fall arrest systems or safety nets, to reduce the risk of injury.[6]

The Petitioner also referred to a fall arrest system without describing what this entails. Board staff's evaluation states "[a]ctive fall protection systems are systems that require active participation from the user to prevent fall or arrest falls. Examples of active fall protection systems are personal fall arrest and fall restraint or travel restraint systems. Components of personal fall protection system include: full-body harness, lanyards, self-retracting lifelines (SRL), anchorage points. Passive system does not require user interaction such as guardrails, barriers or nets."

Given the above definitions, it appears that the Petitioner's request that at height workers be required to wear Type II helmets is to be interpreted broadly as there are no height minimums, general industry orders, or construction industry orders specifically mentioned. A potential argument could be made that not all at height workers may require the same protection as safety mechanisms range from guardrails, safety nets, to full arrest systems.

B. The Range of Type II Helmets Vary In Performance, Making A Requirement More Likely Prescriptive

The laboratory testing from Virginia Tech which both Cal/OSHA and Board staff cited estimated that Type II helmets reduce concussion risk by 32.7% and skull fracture risk by 57.5% compared with the Type I helmets tested. These numbers are convincing.

However, as Ca/OSHA points out, there is variability among the Type II helmets; the two best Type II helmets had 28.7% and 33.2% lower concussion risk than the two worst-performing Type II helmets.

The Board staff evaluation attempted to discern Type II helmets further by stating The Virginia Tech Helmet Ratings recommend Type II helmets with a 4 and 5 star rating.

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[6] NSC 2020 Safety Technology in the Workplace Survey. https://www.nsc.org/workplace/safety-topics/work-to-zero/hazardous-situations/work-at-height?srsltid=AYCX9vKf3Wnzq-uAfxv2M4NTX-VFigkeE1qHgpaxJuOwLvbsosu1cnAx

Although that is helpful, it is important to note that Cal/OSHA's evaluation states with respect to the new ANSI Z89.1-2026 standards, Virginia Tech has not yet tested Type II+ or Type I+ helmets.

Moreover, Cal/OSHA suggests going another step further and consider European standards (British and European standard BS EN 17950:2024) that account for establishes a test method specifically designed to measure both translational and rotational kinematics during helmet impacts.

With so much variability in the tested and untested Type II helmets, a requirement that at height workers wear a Type II helmet may be so broad that a specific model of Type II helmet may be required, making the requirement more prescriptive than necessary.

C. No Cost Estimates For a Type II Helmet Have Been Provided

Considering all the options available, the Petitioner, Cal/OSHA, and Board staff have not provided any cost estimates for different types of Type II helmets. The Petitioner only says implementation "has a relatively ow cost." Board staff states Type II helmets "cost significantly more than Type I helmets" with no cost provided for either Type II or Type I helmets. And Cal/OSHA's review fails to mention any costs at all.

D. An Update of Subsection 3381(b) Is Needed, But Implementation Is Not Clear

It is obvious subsection 3381(b) leaves a gap in the regulation of head protection for at height workers. While ANSI Z89.1 may fill in these gaps, considering all the options available, the Board is left with more questions than answers on how to best implement amended regulations.

VII. CONCLUSION AND ORDER

The Board has considered the petition of Greg Small of Outdoor Power Equipment Institute, Inc. to require all at-height workers to wear helmets meeting ANSI Z89.1-2014 Type II. For reasons stated in the preceding discussion, Petition 616 is GRANTED to the extent Board staff will commence an exploratory discussion with balanced stakeholders on how to best integrate specific language from ANSI Z89.1-2026 into section 3381 and other applicable title 8 head protection regulations.