STATE OF CALIFORNIA GAVIN NEWSOM, *Governor*

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MINUTES OF THE ADVISORY COMMITTEE FOR
GENERAL INDUSTRY SAFETY ORDERS
ARTICLE 2 AND FALL PROTECTION
WALKING WORKING SURFACES
February 22-23, 2023
In-Person - Sacramento, CA
Videoconference – Zoom

1. Call to Order.

The videoconference and in-person meeting was called to order by the Committee Chair, Maryrose Chan, Senior Safety Engineer, Occupational Safety and Health Standards Board (OSHSB), at 10:30 am on Thursday and Friday, February 22 and 23, in Sacramento, CA. The Committee Chair was assisted by Cathy Dietrich, Associate Governmental Program Analyst, OSHSB. Turn-Key Operations (TKO) Communications assisted with managing the videoconference participation.

2. Opening remarks.

The Committee Chair welcomed members of the advisory committee meeting to the third meeting on Walking-Working Surfaces, which is also the second meeting on Article 2. The meeting is a continuation of the prior meeting held on October 13 and 14, 2023, to discuss proposed amendments to the General Industry Safety Orders (GISO), Article 2 and Fall Protection.

The Committee Chair briefed the advisory committee members on the staff guidelines on using an advisory committee to develop a rulemaking proposal, which is found in OSHSB website at https://www.dir.ca.gov/oshsb/acguidelines.html.

3. Review of the October 13-14, 2022 Post AC Action Items.

The Committee Chair referred to the discussion draft, which includes the post-AC proposal. The Committee Chair reviewed the bold text underline, which reflects the consensus reached during the last meeting. After the review, the format of the text will be changed from bold to normal and outstanding items will have comments in braces.

§3209. Standard Guardrails and Toeboards. (page 8 of 39)

Post AC Text
~~(b) All guardrails and other permissible types, including their connections and anchorage, shall be designed for a live load of 20 pounds per linear foot applied either horizontally or vertically downward at the top rail. Dimensional details of railing members of a few types of construction which comply with this strength requirement are given hereinafter in subsection (c).~~

Comment:
Cal/OSHA had a concern regarding the deletion of the live load design requirements.

Resolution:
The Committee Chair explained that the live load requirements in title 8 were from the California Building Code and it has since changed from 20 to 50 pounds per linear foot with some exceptions depending on occupancy. Title 8 standards are no longer in sync with the building code, but the proposal must not contradict the California Building Code. Therefore, there will be no proposed changes, and existing subsection (b) will be deleted.

Post AC Text
~~(a)~~ (b) A standard guardrail shall consist of top rail, midrail or equivalent protection, and posts, and shall have a vertical height within the range of 42 inches to 45 inches from the upper surface of the top rail to the ~~floor, platform, runway, or ramp level~~ walking-working surface. ~~(Note: the permissible tolerance on height dimensions is one inch)~~. See Figure 3209-1 of this section. ~~The top rail shall be smooth-surfaced throughout the length of the railing. The midrail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard. (Title 24, Part 2, Section 2-1716(a)).~~

Action Item:
Research the rulemaking records regarding the Note.

Resolution:
The Committee Chair sent an e-mail on November 30, 2022 to AC members regarding the history of the Note. A rulemaking document dated in 1977 states that the amendment was to eliminate questions regarding permissible tolerance to height dimensions.

Based on the e-mail, the Committee Chair proposed to delete the Note to eliminate confusion regarding the allowed tolerance for top rails. The text by itself is consistent with the 2022 California Building Code, section 1015.3 which requires guardrails to not be less than 42 inches high.

The committee reached a consensus to delete the Note.

Post AC Text
(b)(1) Midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent intermediate members shall be used as midrail protection ~~installed approximately halfway (within 1 inch tolerance) between the top rail and the walking-working surface when there is not a wall or parapet that is at least 21 inches high.~~ Where used, they shall meet the following requirements:
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(D) A parapet shall be at least 21 inches high.

Action Item:
The Committee Chair was to rephrase subsection (b)(1) text to reflect the post-AC proposal.

Resolution:
The Committee Chair proposed a rephrasing of the post-AC text and the committee found it acceptable. See discussion draft below. Proposed changes in bold text were acceptable to the committee.

(1) Where screens, mesh, intermediate vertical members, solid panels, parapets, or equivalent intermediate members are used as mid-rail protection, they shall meet the following requirements:

Post AC Text
(c) Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied in a downward or outward direction within ~~**two**~~ **2** inches of the top edge, at any point along the top rail.
(3) Guardrails that rely on friction or ballasted weights shall be secured to the structure.

Resolution
The proposed change in bold text to change was acceptable to the committee.

Outstanding or Unresolved
Subsection (c)(3) is tabled. Board staff will review existing and soon to be published consensus standards to address ballasted guardrails and evaluate incorporating a standard by reference.

A subject matter expert (SME) stated that the issue of ballasted guardrails is being discussed by the American National Standards Institute (ANSI) Z359 Fall Protection & Fall Restraint full committee in November 2023. There were concerns about it being outside of the scope of Z359 because it is a guardrail system. American Society of Safety Professionals (ASSP) committee indicated to the SME that the issue is more aligned with the scope of the A1264 Walking/Working Surfaces standard. It appears they are moving forward with their process and it is being fast tracked.

Post-AC Proposal
(c) Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied in a downward or outward direction within ~~**two**~~ **2** inches of the top edge, at any point along the top rail.

~~**(4) Collapsible guardrails shall be prohibited.**~~

Resolution
The proposed change in bold text was acceptable to the committee.

Post AC Proposal
~~(c) The following are some acceptable guardrail specifications: other combinations will be accepted as long as equivalent strength and protection are maintained. See Figure 3209-2.~~

Outstanding
The Committee Chair has yet to draft a proposal to move existing subsection (c) to an Appendix. It is unclear if the proposal will be acceptable to the Office of Administrative Law (OAL) because examples of guardrails are non-mandatory.

§3210. Guardrails and Fall Protection at Elevated Locations. (page 15 of 39)

Post AC Proposal
(a) Buildings. Guardrails shall be provided on all open sides of unenclosed elevated work locations, such as: roof openings, open and glazed sides of landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor, ground, or other working areas of a building as defined in ~~S~~section 3207 ~~of the General Industry Safety Orders~~. Where overhead clearance prohibits installation of a 42-inch guardrail, a lower rail or rails shall be installed. The railing shall be provided with a toeboard where the platform, runway, or ramp is ~~6~~ 4 feet or more above places where employees normally work or pass and the lack of a toeboard could create a hazard from falling tools, material, or equipment.

2. Stationary elevated platforms secured to buildings or structures used exclusively for the service and maintenance of overhead bridge cranes and similar mobile equipment may be equipped with removable railings in lieu of guardrails on the side adjacent to the machinery, provided such railings are secured against falling when they are not serving as a protective railing. In existing installations where clearance prohibits railings on the outside of the platform, railings will be permitted on the building side to serve as ~~**handholds**~~ **grab handles**.

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Exceptions to (b)

~~7~~ 8. Belt loaders or conveyors designed and used for access/egress to aircraft shall be equipped with at least one handrail that will furnish a ~~handhold~~ **grab handle** for anyone grasping it to avoid falling.

Resolution
Proposed changes in bold text were acceptable to the committee.

§3210.1. Personal Fall Protection Systems. (page 20 of 39)

Post AC Proposal
(b) Definitions
Personal Fall Restraint (Tether) Line. A ~~**rope**~~ **line constituent** ~~**or wire rope**~~ used to transfer forces from a body support to an anchorage or anchorage connector in a fall restraint system.

Travel Restraint System. See Personal Fall Restraint System.

Resolution
No comments on the bold text.

~~**Self-Retracting Lifeline/Lanyard. A deceleration device containing a drum-wound line that can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement by the employee. At the onset of a fall, the device automatically locks the drum and arrests the fall.**~~

Action Item:
ANSI Chair will provide a definition to be considered by the committee. See definition below:

Self-Retracting Device (SRD). A device that contains a drum wound line, that automatically locks during the course of a fall to arrest the user, but that pays out from and automatically retracts onto the drum during normal movement of the person whom the line is attached. After onset of a fall, the device automatically locks the drum and arrests the fall when mounted overhead. Self-retracting devices include self-retracting lanyards (SRLs), self-retracting with integral rescue capability (SRL-Rs), self-retracting lanyards, personal (SRL-Ps) and hybrid combinations of these devices.

NOTE: Normally, an SRD pays out from and automatically retracts onto the drum during movement of the person whom the line is attached. When mounted overhead, the device automatically locks the drum and arrest**s** the fall after the onset of the fall. When not mounted overhead, the device likely will not lock until the device is vertically above the person for whom the line is attached. The arrest distance is a metric which measures the activation distance plus the deceleration distance. SRDs anchored overhead (Class 1 devices) will have a very short

activation distance. SRDs anchored below the dorsal d-ring or to the walking-working surface will not activate until such time as the falling worker begins extracting the constituent line from the device.

Resolution
ANSI Chair clarified that the proposed definition is not from ANSI, but the proposed definition will be submitted to ANSI's technical review committee.

The proposed new definition was acceptable to the committee.

Post AC Text
(c) General Requirements. The employer shall ensure that personal fall protection systems meet the following requirements. Additional requirements for personal fall arrest systems and positioning systems are contained in subsections (d) and (e), respectively. *[Code of Federal Regulations (29 CFR) §1910.140(c)]*

(1) Personal Fall protection systems shall be used in accordance with the manufacturer's instruction.

(~~**1**~~ **2**) Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

(~~**2**~~ 3) Connectors shall have a corrosion resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

(~~**3**~~ **4**) When vertical **(single point)** lifelines are used, each employee shall be attached to a separate lifeline.

(**4** 5) Lanyards and vertical **(single point)** lifelines shall have a minimum breaking strength of 5,000 pounds. All ends of ~~**wire rope**~~ **lifelines or** lanyards shall be **terminated** ~~**spliced or swaged**~~ as per the manufacturer's specifications. Knots shall not be permitted at ends or anywhere along the length of the lanyard or safety line.

(~~**5**~~ 6) Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet or less shall have components capable of sustaining a minimum tensile load of ~~**3,000**~~ **3,600** pounds applied to the device with the lifeline or lanyard in the fully extended position.

(~~**6**~~ **7**) ~~**Self-retracting Ll**~~ifelines **and lanyards** that do not automatically limit free fall distance to 2 feet or less shall have components capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

(8) Class 1 self-retracting devices (SRD) shall only be anchored ~~overhead~~ above the dorsal attachment point.

(~~7~~ **9**) D-rings, snaphooks, and carabiners shall be capable of sustaining a minimum tensile load of 5,000 pounds.

(~~8~~ **10**) D-rings, snaphooks, and carabiners shall be proof tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or incurring permanent deformation. The gate strength of snaphooks and carabiners shall be capable of withstanding a minimum load of 3,600 pounds without the gate separating from the nose of the snaphook or carabiner body by more than 0.125 inches.

(~~9~~ **11**) Snaphooks and carabiners shall be the automatic locking type that require at least two separate, consecutive movements to open.

(~~10~~ **12**) Snaphooks and carabiners shall not be connected to any of the following unless they are designed for such connections:

(A) Directly to webbing, rope, or wire rope;

(B) To each other;

(C) To a D-ring to which another snaphook, carabiner, or connector is attached;

(D) To a horizontal lifeline; or

(E) To any object that is incompatibly shaped or dimensioned in relation to the snaphook or carabiner such that unintentional disengagement could occur when the connected object depresses the snaphook or carabiner gate, allowing the components to separate.

Resolution
Proposed changes in bold and underline were acceptable to the committee.

4. Presentation on ANSI Z359.6 Certification Record by Thomas Kramer

The Committee Chair introduced Thomas Kramer, the Principal Engineer of LGB Inc., a professional engineer and a certified safety professional. He is the Chair of the ANSI/ASSP Z359 full committee on Fall Protection and Fall Restraint.

The Committee Chair requested Thomas Kramer to present to the committee an exemplar of the certification record. The committee is considering incorporating ANSI Z359.6 by reference, therefore it was important to review a sample certification record. Certification record is documentation that the design meets the ANSI Z359.6 standard. Thomas Kramer presented a detailed example of a certification record.

The main sections of the certification record are:

- Certification letter

- Certification Log
- Certification Summary
- Design Documentation. Calculations may not be included in this portion of the document, but those calculations should be available.
- Construction Documentation. Drawings
- Training Documentation. Documentation as to how the worker is expected to use fall protection.
- Inspections

5. Review of the Manufacturer's Manuals by Maryrose Chan

The Committee Chair reviewed the instructional manuals for horizontal lifelines.

- 3M DBI Sala User Instructional Manual Synthetic Rope Horizontal Lifeline System
- User Instructions MSA Cable Temporary Horizontal Lifeline
- Safewaze-Safelink Mobile Horizontal Lifeline System User Manual

The committee reviewed the manufacturer's manuals because proposed subsection 3210.1(c)(1) requires personal fall protection components and/or systems be used in accordance with the manufacturer's instructions. The review of the manual illustrates that the qualified person must be suitably trained to understand the manual and question portions that may be unclear or insufficiently covered.

6. Presentation by Greg Small on Mistakes Made by Qualified Person

Greg Small is former chair of the Canada Standards Association (CSA) committee that developed the standard for the design of active fall protection. Ultimately, American National Standards Institute (ANSI) Z359.6 took most of what was in the CSA standard regarding the design of active fall protection. Greg Small sits on both ANSI and CSA committees; he stated that he is in favor of referencing ANSI Z359.6 in the regulation to provide guidance to engineers who will be designing fall arrest systems.

The presentation included typical errors made by a qualified person who may be the employer or senior employee, manufacturer trained installer, professional engineer, or manufacturer. These are errors in determining strength, clearance, and maximum impact force.

Strength – not making them as strong as they should be. Fall protection systems must be designed with a factor safety of 2.

- Happens occasionally.
- Consequences are serious. If the system breaks then the person falls.

Clearance – Not enough space from where the employee is anchored. This happens in both vertical and horizontal fall arrest systems. Most people do not understand that a window washer is going to hit the ground if the window washer falls within the bottom 20 feet of the descent.

- Happens very frequently.
- The consequences are moderate compared to error in strength. It depends on how short you are on the clearance, if you are short 3 feet, typically lower limb type of injury, broken ankle, hip injuries.

Greater than the allowable 1,800 maximum impact force.

- Happens occasionally. For example, when you have multiple persons tied to a horizontal lifeline and have sequential fall. If the personal energy absorber of person one bottoms out (4 foot full deployment) and the second person also bottoms out their energy absorber. The forces where the energy absorbers deployed would not the load supplied to the system. It is going to be greater than that.
- The consequences are not as bad compared to mistakes related to strength. For falls involving two persons, there is a good chance the second worker may experience a force greater than 1,800 pounds.

Greg Small's presentation included multiple examples of the various mistakes relating to strength, clearance, and greater than allowable maximum impact forces and demonstrated the high level of knowledge and training needed to be a true qualified person. It also showed the importance of standards to provide guidance to the person designing and installing fall protection systems.

7. Discussion of Proposed Draft Text

There was a question regarding the scope of the rulemaking. The Committee Chair clarified that the WWS rulemaking project will affect General Industry only. However, OSHSB will undertake a follow-up rulemaking to harmonize fall protection requirements in the Construction Safety Orders with the General Industry Safety Orders.

§3209. Standard Guardrails and Toeboards

The Committee Chair addressed Cal/OSHA 's comment regarding the deletion of the linear load 20 pounds/ft requirement by showing the committee the 2022 California Building Code, Section 1607.9.1, which requires that handrails and guards shall be designed to resists a linear load of 50 pounds/ft with exceptions to certain occupancies. The 20 pounds/ft was deleted because it is outdated. A Note was added at the end of the section to refer the reader to the California Building Code. When rules overlap with the California Building Code, Board staff checks the California Building Code to make sure that the proposal does not contradict the California Building Code.

§3210.1. Personal Fall Protection Systems
Subsections (c)(9), (c)(10), and (c)(15) regarding connectors, components, and anchorage

Cal/OSHA proposed to add shackles and tensioning devices in the list of items that shall be capable of sustaining a minimum tensile load of 5,000 pounds. In a fall arrest system, you are only as strong as the weakest link.

Cal/OSHA proposed:
(c)(9) D-ring, snaphooks, ~~**and**~~ carbiners, **and all components of a fall arrest system** shall be capable of sustaining a minimum tensile load of 5,000 pounds.

(c)(10) D-rings, snaphooks, ~~**and**~~ carabiners, **and all components of a fall arrest system** shall be proof tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or incurring permanent deformation. The gate strength of snaphooks and carabiners shall be capable of withstanding a minimum load of 3,600 pounds without the gate separating from the nose of the snaphook or carabiner body by more than 0.125 inches.

The **Committee Chair** asked the Cal/OSHA representative if the term "components of a fall arrest system" can be replaced by connectors. Connectors is defined as a device used to couple (connect) parts of the fall arrest system together.

Cal/OSHA replied that the term connectors was considered but was not sure if the tensioning devices were considered connectors even though they are connected to the system.

The **Committee Chair** asked if Cal/OSHA is proposing that turn buckles and come along have a minimum tensile load of 5,000 pounds.

The SME of a manufacturer was concerned that the items being discussed are not included in Z359.12. Items such as turn buckles and adjusters are not required to meet the 5,000 pounds. Putting connectors in there may be safe, but probably not for these other items.

SME stated connectors are defined in Z359.12, but do not include turn buckles. For turn buckle, the term minimum breaking strength is what is used. There are different factors of safety for rating components vs. connectors. It gets complicated if the listed items go beyond the connectors that are included in Z359.12.

SME (Manufacturer) did not have an objection to connectors, but objected to including shackles and tensioning devices.

Construction representative stated that the term "components" is too broad of a term.
SME (Engineering Firm) stated that the clauses the members are working on related to Horizontal Lifelines (HLL) may address Cal/OSHA's concern.

Cal/OSHA replied that there is a 5,000 pounds requirement for lanyards, D-rings, snaphooks, but there are other components along the chain of the fall arrest system. He wants to make sure that all the components in the fall arrest systems are capable of 5,000 pounds.

Another **SME (Fall Protection Training, Engineering & Equipment)** commented that the 5,000 pounds requirement does not apply to engineer-designed systems. Engineered systems must use a safety factor of 2, not necessarily the 5,000 pounds. As soon as you start engineering the anchor point, then you are no longer bound to the 5,000 pounds requirement. There are manufactured products with maximum arrest rating and any engineer can design a system that will allow for a safety factor of 2. It could be as low as 1,800 pounds right now, but it could change up to 2,700 pounds with the standards that are coming out. The anchorage point could be less than 5,000 pounds. The SME's company designs systems in places where they can't find a 5,000 pound anchor point.

Construction representative commented there may be multiple pieces that have a combined strength of 5,000 pounds, where by itself is not sufficient. For example, there may be 3 anchor points, each capable of 3,000 pounds. Now you have a 9,000 pounds anchor when you tie them all together.

Cal/OSHA replied, if you have several components making up the anchor with a combined strength of 5,000 pounds, then that meets the regulation. Cal/OSHA is trying to avoid a situation where there is a component or connector with a capacity of less than 5,000 pounds, whether that is a come along or some other device.

SME (Engineering Firm) asked if Cal/OSHA is proposing to require 5,000 pounds for the horizontal lifeline for a vertical system.

Cal/OSHA replied they are proposing that all components or equipment that are used in a fall arrest meet 5,000 pounds. It is from the anchorage all the way to the user and any component along the line. If one component is required to have 5,000 pounds in tensile strength, then all other components should also meet the 5,000 pounds requirement. Otherwise, there will be no purpose to 5,000 pounds on one component and not others. California's regulations require the carabiner, D-ring and the snaphook have 5,000 pounds, but it is silent about the carabiner, turn-buckle, and other components in the series of the fall arrest system.

SME (Manufacturer) stated shackles and turn buckle for a horizontal lifeline are different than a carabiner and a snaphook. Carabiner and snaphooks are for personal use and are not used in horizontal lifelines. In a lot of the horizontal lifelines systems, especially if they are not

temporary systems using synthetic ropes, you can reach way over 5,000 pounds quite easily. These are temporary systems that have been tested and the manufacturer knows that the energy absorber that is in the system has a deployment load of 2,500 pounds so that when they say 5,000 pounds, they take into account the 5,000 pounds and the safety factor of 2. The safety factor of 2 is more important than the 5,000 pounds.

Cal/OSHA replied, that California's safety order requires 5,000 pounds per employee.

Construction representative stated that Cal/OSHA's proposal should separate the requirements between vertical and horizontal lifelines.

SME (**Engineering Firm)** representative agreed and added that there is a need to separate components from manufactured system versus one that is engineered by a qualified person. The origins of the 5,000 pounds is unclear but having a safety factor of 2 is very sound engineering practice. He thinks we can replicate that and there is some soundness behind snaphooks that are good. If we over-engineer and are really conservative, fall protection becomes more expensive to implement and more challenging for users. It must be a safe design, but not over designed too much.

Cal/OSHA commented that it is important to have minimum strength and not just rely on a factor of safety that must be calculated properly for the system.

General Industry (Scaffold Testing) representative stated that in the draft proposal, the reference to Article 24 has been deleted from section 3210 and has been replaced by section 3210.1. He believes that takes away the application of the 2:1 engineering system that was previously or currently in the code.

Cal/OSHA stated that in order to meet the exception to the 5,000 pounds, the complete system has to be under the supervision of a qualified person. Cal/OSHA rarely finds that in the field. In addition, there is a discrepancy in the standard. In subsection 1670(i) it states that lifelines and anchors must have a minimum dead load of 5,000 pounds in strength.

> §1670. Personal Fall Arrest Systems, Personal Fall Restraint Systems and Positioning Devices.
> (i) Lifelines and anchorages shall be capable of supporting a minimum dead weight of 5000 pounds.

Construction representative stated that the discussion draft states that it has to be 5,000 pounds and that it should include the engineered system safety factor of 2:1. It is in the Federal standard, in subsection 1670(b)(10), and Appendix C.

§1670. Personal Fall Arrest Systems, Personal Fall Restraint Systems and Positioning Devices.
(b) Personal fall arrest systems and their use shall comply with the provisions set forth below. Effective January 1, 1998, except as permitted in subsections (c) and (d), body belts shall not be used as part of a personal fall arrest system.
(10) Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached, or shall be designed, installed, and used as follows:
(A) as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
(B) under the supervision of a qualified person.

Cal/OSHA stated that when there is a discrepancy, the stricter one applies.

Construction representative replied that there must be consistency and recommended we strike out subsection 1670(i).

SME (Fall Protection Training, Engineering & Equipment) representative stated that there are going to be a lot of anchors that do not meet the 5,000 pounds so long as they meet the criteria in the upcoming ANSI Z359.18. He asked Cal/OSHA what the agency does when they inspect a residential roof job. There is no 5,000 pounds anchor in a residential building with a wood roof. He asked how that situation is addressed if the 2:1 safety factor does not apply.

Cal/OSHA asked if the SME was referring to gable anchors?

SME (Fall Protection Training, Engineering & Equipment) representative replied yes, crown anchors, screw-in anchors, clamp-on anchors around the rafter or something like that. You are not going to be able to prove 5,000 pounds mathematically or even with the turf to do the test on it. There are many systems (anchors with less than 5,000 pounds capacity) that are used on a regular basis. Cal/OSHA appears to be saying that those are no longer a feasible option when they are a good option for construction.

Cal/OSHA replied that he is not saying that we have not allowed for the 2:1 safety factor.

General Industry (Petroleum) stated that it appears that Cal/OSHA is suggesting removing the 2 times safety factor and that is very limiting to the construction industry. They use systems less than the 5,000 pounds requirement in construction activities that happen in the refinery.

Cal/OSHA replied that in order to use the 2:1 safety factor, the system has to meet subsection 1670(b)(10) and if it does not meet subsection (b)(10), then subsection 1670(i) applies.

SME (Manufacturer) stated that the Federal regulations allow 3,600 pounds or a 2:1 safety factor with certification. In the absence of certification, the anchor is required to have 5,000 pounds. If you say 5,000 pounds. for everything, there will be added cost. Cal/OSHA may not be seeing 2:1 safety factor in the field, but the SMEs in the course of their work see the 2:1 safety factor. It is probably more common that a 5,000 pounds anchor across the board.

Cal/OSHA proposed new text for subsection (c)(10).

(c)(10) Components of personal fall protection systems shall be capable of sustaining a minimum tensile load of 5,000 pounds. Components of a fall protection system may work in conjunction to sustain a minimum tensile load of 5,000 pounds.

EXCEPTION to subsection 3210.1 (c)(6)

SME (Engineering Firm) stated ANSI Z359.0 section 2.34 defines "component" as "any element or integral assembly of interconnected elements intended to perform a one function in the system." This includes the full body harness, carabiner, fall arrestor. A full body harness and self-retracting device have a minimum tensile load of less than 5,000 pounds. Cal/OSHA's proposal would require manufacturers to create full body harness and self-retracting devices specifically for the State of California.

The **Committee Chair** asked if there is a specific component that could be named so that the 5,000 pounds requirement that Cal/OSHA is proposing does not capture all the components.

Cal/OSHA replied that their proposed text included an exception to subsection 3210.1(c)(6), which refers to self-retracting lifelines. If needed, an exception for a full body harness can be added as well. Those are the only 2 that he could think of that is less than 5,000 pounds. capable.

SME (Engineering Firm) added that there should be an exception for a system designed by a professional engineer.

Construction representative objects to the addition of the 5,000 pounds requirement.

Cal/OSHA is concerned that the components in the horizontal lifelines that are borrowed from the rigging industries (shackles, turn buckles) and those other components should be accounted for and should have a specified strength criteria.

SME (Engineering Firm) stated one thing that is not clear to people designing these systems is whether you use the manufacturer's working load or ultimate strength. For example, Crosby uses a factor of safety of 5 or 6. It would be a pretty small shackle if the ultimate strength of 5,000 pounds was used.

He cautioned that the 5,000 pounds requirement may lead a novice to assume that if every component is rated to 5,000 pounds, then the system would be good, but for a horizontal lifeline, that may not be the case.

Cal/OSHA replied that the proposal states a minimum of 5,000 pounds. There is a separate subsection about anchors, which requires 5,000 pounds or safety factor of two. Cal/OSHA's proposed text is for tensile strength and is for the ultimate load or ultimate strength of 5,000 pounds.

Construction representative stated that the components' (for example, shackles) turn buckles should be named individually for clarity and to prevent capturing other components that are not intended to be included.

SME (Engineering Firm) stated that for systems designed by a qualified engineer, Cal/OSHA's proposed text maybe redundant. The examples that Cal/OSHA cited were used in horizontal lifelines. He proposed language along the lines of stating the "horizontal lifeline components shall have a minimum tensile load of 5,000 pounds or a factor of safety of two if the strength is greater than…" He added that we can also mention specific components as well and mention that it may be greater than 5,000 pounds.

The **Committee Chair** asked for clarification if Cal/OSHA's proposed text is for all fall protection systems or horizontal lifelines.

Cal/OSHA replied that their proposed text is a general requirement for all fall protection systems, not just horizontal lifelines. Cal/OSHA explained that the reason for using the term components and not naming them individually is that a variety of items are used. For example, if you have a tension indicator that is only capable of 300 pounds, that would be the weak link in the entire system. The goal is to have an entire line of components to be capable of 5,000 pounds.

SME (Manufacturer) replied that there are efforts to reduce ultimate strengths of products to be more in line with reality and to conform with OSHA's 1,800 pounds practice that has been in place for many years. The Z359.14 has recently changed their static testing. It was recently increased, but it has never been 5,000 pounds for an SRL. It went from 3,000 pounds to 3,600 pounds so that it would align with Fed-OSHA's 1,800 pounds with a safety factor of two. SRL now have a static load requirement of 3,600. For full body harnesses, at one time it was 5,000 pounds, but it was lowered. If we follow Cal/OSHA's proposed text then all SRL, harnesses, shock absorbing lanyards, positioning and restraint lanyards will all have to meet 5,000 pounds. Some of those listed do meet the 5,000 pounds, but other components do not.

The **Committee Chair** added if Cal/OSHA was referring to Construction Safety Orders, section 1670, which references the ANSI 1992 edition.

SME (Manufacturer) representative replied that the 1992 edition has been updated many years ago.

The **Committee Chair** referred to section 1670 to give context to the discussions.

Construction representative noted that the examples used by Cal/OSHA are components used in horizontal lifelines. He suggested naming those components and then move the requirement into the horizontal lifeline subsection. He stated that the use of the term "components" as proposed is overly vague.

The **Committee Chair** stated that the review of the Safewaze's (manufacturer's) manual on horizontal lifelines demonstrated that Cal/OSHA's concern regarding inadequate strength of parts that connect to the horizonal lifeline system was valid. The Committee Chair suggested that maybe it would be best to address that under the subsection dealing with horizontal lifelines or name the specific components of the fall protection systems.

Cal/OSHA shared another example, a vertical lifeline attached to a parapet clamp on the roof of a building. The parapet clamp is required to be attached to an anchor on the roof. Shackles, wire rope using wire clip or fist grips can be used to attach to the anchor and if that shackle is capable of less than 5,000 pounds then that would be the weak link.

SME (**Engineering Firm)** suggested amending subsection (c)(10) to state that anchor connectors for personal fall protection shall be capable of sustaining minimum tensile load of 5,000 pounds. The lifelines are addressed in a different section.

The **Committee Chair** asked Cal/OSHA if amending subsection (c)(9) to include connectors would address the concern.

Cal/OSHA replied that the use of the term connectors is limiting. If the parapet clamp is less than 5,000 pounds then that would be the weakest link.

Construction representative expressed concern with the use of broad term "components" because the term affects all types of fall protection systems. Furthermore, certain components of systems designed by a professional engineer may not necessarily need 5,000 pounds. He added that the terms used to describe the strength criteria such as tensile strength, capable of holding, should be consistent.

General Industry (Outdoor Advertising) asked if lifelines with a 3,600 pound rating are not legal in California.
Cal/OSHA replied that existing Fed-OSHA regulations require that vertical lifelines that do not limit the fall to 2 feet or less shall be capable of sustaining a 5,000 pounds tensile load.

General Industry (Outdoor Advertising) stated a carabiner used to attach to the lifeline and rigged in a way that the fall distance is 18 inches (which is less than 2 feet) should not require 5,000 pounds. Cal/OSHA's proposal would require every component to meet 5,000 pounds.

Cal/OSHA replied that their proposal would include a list of exceptions. Cal/OSHA already proposed an exception in subsection 3210.1(c)(6), which is vertical lifelines that limit the fall to 2 feet.

General Industry (Outdoor Advertising) replied that the exception list would be long.

Construction representative asked why some elements are required to be 3,600 pounds and others are required to be 5,000 pounds. He understands that it has been mentioned that there are multiple stories on that 5,000 pounds.

SME (Manufacturer) replied that the requirements came from original 29 CFR sections 1910.140 and 1926.502(d)(15):

> §1926.502(d)(15)
> Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:
>
> §1926.502(d)(15)(i)
> as part of a complete personal fall arrest system which maintains a safety factor of at least two; and;
>
> §1926.502(d)(15)(ii)
> under the supervision of a qualified person.

He is not in favor of Cal/OSHA's proposal. He is not aware of any confusion in the industry on the 5,000 pounds or 2:1 safety factor that equals 3,600 pounds. When 29 CFR section 1910.140 was adopted in 2017, there was no comment about this issue.

3210.1(c)(13)

The **Committee Chair** introduced the 2 options or alternative text to address horizontal lifeline systems. Option 1 was an updated proposal by Cal/OSHA and Option 2 was the proposal from the last advisory committee meeting. The members discussed the concept behind the two options regarding horizontal lifelines.

The discussions centered around the following topics:

- when should a qualified person be an engineer?
- what does supervision under a professional engineer mean?
- supervision of a qualified person who is not a professional engineer
- should there be a distinction between permanent and temporary systems?
- defining permanent or temporary systems
- preserving the existing requirement for a qualified person who is a professional engineer under article 6. Powered platforms and Equipment for Building Maintenance
- referencing ANSI Z359.6
- definition of competent person vs. qualified person

Cal/OSHA proposed language for subsection (c)(13):

§3210.1(c)(13) Horizontal Lifeline (HLL)

(A) Horizontal lifeline systems shall be designed by a qualified professional engineer ~~**registered in the state of California**~~ experienced in the design of horizontal lifelines as part of a complete personal fall protection system with a safety factor of at least two. The HLL system shall be installed by a qualified person and used under the supervision of a competent person.

(B) The safety factor of two shall be based on forces determined using analytical methods of Section 8.3 of ANSI Z359.6-2016 Specifications and Design Requirements for Active Fall Protection Systems, which is hereby incorporated by reference.

(C) Drawings and specifications in accordance with Section 3.2 of ANSI Z359.6-2016 Specifications and Design Requirements for Active Fall Protection Systems applicable to each HLL shall be maintained and readily available at the location where the HLL is used.

Note: Additional requirements for horizontal lifelines used for building maintenance are included in title 8 section 3299.

§3299. Personal Fall Protection.

(a) Employees on working platforms shall be protected by a personal fall arrest system meeting the requirements of Section 3210.1 of the General Industry Safety Orders.

(b) Horizontal safety lines, to be used by employees performing building maintenance, shall be designed under the supervision of a professional engineer currently registered in the State of California and installed as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

SME (Engineering Firm) commented on proposed subsection (c)(13)(A)'s last sentence stating that the last sentence reflects industry's typical practice in the field. The proposed text technically will not meet the Fed-OSHA standards, but he supports the proposal as equally effective and offered to write a comment in support of the proposed that the HLL system would be installed and supervised by a competent person.

Construction representative commented about the feasibility of having a registered engineer in the State of California design system.

Cal/OSHA agreed to remove "registered in the State of California". Construction representative supported the change.

The **Committee Chair** asked if the designers of fall protections systems for manufacturers are engineers.

SME (Manufacturer) stated that he has engineers on staff.

SME (Engineering Firm) stated that the proposal may be in conflict with the deletion of the California registered engineer with the Board of Professional Engineers objecting that OSHSB is allowing the design to be done in the state by non-California PE. A professional engineer not licensed in the State of California cannot stamp a drawing.

Construction representatives restated the proposal in a prior meeting that distinguishes between "temporary and permanent" horizontal lifelines, which refers to the duration of installation. Permanent installations that are being built into the building should require a professional engineer, but a short duration "kit" system would not.

As an alternative a construction representative proposed:

(13) Horizontal lifeline systems:

(A) Each horizontal lifeline shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall protection system that maintains a safety factor of at least two.

(1) Horizontal lifelines in place at a single location for more than 6 months shall be designed under the supervision of a professional engineer currently registered in the State of California and installed as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

(B) The safety factor for horizontal lifelines shall be based on installation in accordance with the manufacturer's instructions or forces that are determined using the analytical methods included in Section 8.3 of ANSI Z359.6-2016 Specifications and Design Requirements for Active Fall Protection Systems, which is hereby incorporated by reference.

(C) Drawings and specifications in accordance with Section 3.2 of ANSI Z359.6-2016 Specifications and Design Requirements for Active Fall Protection Systems or the manufacturer's instructions applicable to each horizontal lifeline shall be readily available at the location where it is to be used.

Note: Additional requirements for horizontal lifelines used for building maintenance are included in title 8 section 3299.

§3299. Personal Fall Protection.
(a) Employees on working platforms shall be protected by a personal fall arrest system meeting the requirements of Section 3210.1 of the General Industry Safety Orders. Appendix C, Section I of this article, and as otherwise provided by these orders.

(b) Horizontal safety lines, to be used by employees performing building maintenance, shall be designed under the supervision of a professional engineer currently registered in the State of California and installed as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

The **Committee Chair** asked the **Construction** representative **Mike Donlon** to explain the difference between Cal/OSHA's proposal and the alternative to Cal/OSHA's proposal, Option 2.

Mike Donlon (Construction representative) explained that Option 2 proposal distinguishes between temporary and permanent systems. The timeline for temporary can be discussed and modified, but he proposed 6 months. If the duration of the installation is more than 6 months, then a qualified professional engineer registered in the State of California would be required. He thinks that it would be feasible to get an engineer to design those installations.

In proposed subsection (c)(13)(B) and (c)(13)(B), the proposal requires the documentation as required by the ANSI for systems designed by a professional engineer or the manufacturer's instructions for a "kit" type system, which is equivalent to ANSI.

The **Committee Chair** did not see a problem with requiring the system to be installed in accordance with the manufacturer's instruction.

Construction representative stated that there should be some language about a manufactured or pre-engineered system that the qualified person is the one installing.

Mike Donlon (Construction representative) replied in a previous meeting, the committee was unsuccessful in developing language that differentiated between a manufactured system and a system designed by a professional engineer, which is why he proposed a time criterion. The rationale was most likely, HLL systems that are going to be used for less than 6 months will not be designed from scratch.

SME (Manufacturer) stated that although most manufacturers employ an engineer to design their products, there may still be some that do not, and asked whether the proposed rule should only be applicable to systems that have documentation that they have been engineered.

Construction representative asked if Cal/OSHA will be requiring documentation from the employer to show that the manufactured system selected was designed by an engineer or would it be a given that well-known manufacturers are designed by an engineer.

SME (Engineering Firm) stated that the employers need to be told to ask for this documentation.

Construction representative stated that most products out there have some sort of certification backing their product, whether that be in the instructional manual, tag, or quality assurance tag.

SME (Manufacturer) stated that most manufacturers have a level of certification. Hopefully that is requested by the end user. It is available upon request. Most manufacturers that are in line with ANSI are going to have certificate or declaration of conformity. There may be some manufacturers out there that cannot provide such documentation, but it is up to the employer to request that documentation. A competent or qualified person should have no problem obtaining that document from the manufacturer.

Cal/OSHA stated that they can issue a citation to a manufacturer as a creating employer if it fraudulently claims that engineer(s) designed their system. Cal/OSHA is concerned about proposed subsection (c)(13)(B) because it does not hold the manufacturers to a standard.

Cal/OSHA stated that the manufacturer's instruction reviewed did not contain the information required in section 3.2 of ANSI Z359.6-2016.

The **Committee Chair** stated that the items in section 3.2 were listed in the reviewed manufacturer's instructions.

SME (Engineering Firm) stated that ANSI does not have an enforcement body that polices the claims of manufacturers.

Another **SME (Engineering Firm)** proposed to add a requirement for the employer to request a certification of conformance, so that the manufacturer would by default simply provide this information to their customers.

Cal/OSHA was concerned with a situation wherein the manufacturer does not have the necessary information. There are some manufacturers that are not that reputable and there is no standard as to what should be in the manufacturer's instructions.

The **Committee Chair** asked the SME from the manufacturer representative how they ensure that the HLL fall protection system achieves a factor of safety of 2. In a prior conversation outside of the advisory committee meeting, the SME (Engineer Firm) stated that the HLL systems are tested.

SME (Manufacturer) restated that their systems are tested at the rated strength. He stated that not all manufacturers will do that. ANSI is currently trying to develop a standard, ANSI Z359.17 for testing to provide a set of test parameters to anyone wanting to certify their product to a standard. The testing will have to be done by a laboratory accredited to International Organization for Standardization (ISO)17025. The scope of the testing must be identified in the new standard.

In the United States, the testing is to comply with Fed-OSHA's 2:1 safety factor and each entity creates their own test program. There is no official guideline that tells you how to erect or build a system, and how to test it. There is no formal testing method for use in the United States until ANSI publishes Z359.17.

3M created its own test method using ANSI for guidance. 3M has its own test facility for horizontal lifelines. They use a 310 pound test weight to simulate the weight of worker with tools per ANSI, others are still using Fed-OSHA testing with a 220 pounds test weight. 3M has adopted ANSI test method for SRL and shock absorbing lanyard and that's how they test the horizontal lifelines.

Canada has a published standard, but with limited capabilities. He stated that he believes that they can only do about 30-foot system.

Another **SME** stated that the Canada standard has been published a decade or more and the limited capabilities is a problem. The Canada standard is currently proposed to be amended to a self-certification standard, similar to ANSI.

The **Committee Chair** was trying to ascertain the effect of Cal/OSHA's proposal which is to use ANSI Z359.6 to design a system. There are four methods in the ANSI: static, dynamic, energy and testing method, but the testing method is not uniform.

SME (Manufacturer) replied that they test to satisfy the requirement of the known values and force parameters that are put in that system. If 3M states that the system is for three people, that means that it has been tested for three people using three test weights specimens that were released simultaneously as possible to test for the worst case scenario.

An **SME (Fall Protection Training, Engineering & Equipment)** pointed out that Z359.6 doesn't encompass testing of manufactured temporary horizontal lifelines. They do not test the temporary horizontal lifelines they make to ANSI Z359.6. ANSI Z359.6 is a design standard, not a testing and performance qualification standard and there is a big difference.

The **SME (Engineering Firm)** who is also the ANSI Z359 Chair was asked when ANSI Z359.17 is scheduled to be published. The **ANSI 359 Chair** replied, a very optimistic estimate would be 2024. The Z359.17 would complement Z359.6. The Z359.17 would handle the various components and some general tests that must be done by the manufacturer, but they would still rely on the overall design of the complete system by Z359.6.

The **Committee Chair** stated subsection (c)(13) will be tabled until ANSI Z359.17 comes out. It will take some time before the WWS rulemaking is ready for noticing. There are many more sections to review and it would be wiser to not finalize the proposed text for subsection (c)(13) at this time.

The **Committee Chair** moved on to subsection (d) and will return to outstanding portions of subsection(c) in the next advisory committee meeting.

SME (Fall Protection Training, Engineering & Equipment) asked what that would mean if someone is more than 310 pounds with tools. This would prohibit them from working at height.

Cal/OSHA stated that the federal standard includes language for when a worker is over 310 pounds. He asked if it was not copied over or if it was intentional.

The **Committee Chair** replied that it was probably omitted by mistake and will review it and fix it.

The Committee Chair misspoke and the omission of over 310 pounds was intentional. The Committee Chair intended to ask the committee how the test procedures for Fed-OSHA Appendix D can be modified to test a system for worker weights over 310 pounds. Since the question wasn't asked, subsection (d)(1)(A)6. was added and marked as outstanding in the post-AC text.

§3210.1 (d)
There was no comment on subsection (d)(1)(A)1.

The **Committee Chair** stated that the proposed subsection (d)(1)(A)2. is different from the federal standard and is consistent with ANSI Z359.13(2013), section 3.1.8.1 states that the deployment distance is 48 inches. The reason for the change from the federal standard 3.5 feet to 4 feet is to ensure that proper clearance distances are calculated. The other reason is to be clear that the deceleration distance does not include sag.

> **ANSI Z359.13 (2013). Personal Energy Absorbers and Energy Absorbing Lanyards**
> **3.1.8.1** 6 ft FF personal energy absorbers shall have an average arrest force no greater than 900 pounds (4 kN) and a maximum deployment distance of 48 inches (1.2 m) without exceeding 1,800 pounds (8 kN) maximum arrest force.

Construction representative stated that Werner Company said that all their lanyards energy absorber are designed and labeled to 4 feet.

SME (Engineering Firm) asked about a 12-foot free fall lanyard that deploys at 5 feet. Fed-OSHA's letter of interpretation stated that they would consider the violation de minimus if the deployment distance exceeded 3.5 feet, provided that you have the clearance and keep the impact below 1,800 pounds.

The **Committee Chair** replied, California's current regulation does not allow a free fall of more than 6 feet.

SME (Manufacturer) representative stated that ANSI has changed the deceleration distance to 42 inches to align with Fed-OSHA.

> **ANSI Z359.14 (2021). Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems**
> **3.3.1.4** The maximum arrest force shall not exceed 1,800 pounds (8kN), the average arrest force shall not exceed 1,350 pounds (6kN) and the arrest distance shall not exceed 42 inches (1,067mm) under ambient conditions.

Action Item:
SME suggested creating a table breaking down deceleration distance per equipment.

May 12, 2023: Committee Chair sent proposed text via e-mail to Thomas Kramer to review the deceleration distances for various fall protection equipment.

Subsection (d)(1)(A)3.
SME (Engineering Firm) suggested changing "potential impact energy" to "potential impact force".

The **Committee Chair** accepted the suggested change to be consistent with the other subsections relating to force.

Subsection (d)(1)(A)4.
No comment.

Subsection (d)(1)(A)5.
29 CFR section 1910.140(c)(2)(A) references Fed-OSHA Appendix D. California is proposing an equivalent requirement by referencing Appendix A to section 3210.1. Upon close examination, there are inconsistencies between Fed-OSHA Appendix D and the current ANSI standards.

Subsection (e)
Construction representative commented on subsection (e)(2), regarding the limitation on the free fall distance to 6 feet, noting that the free fall distance was tabled and may change.

Subsection (f)
The Committee Chair noted the discrepancy between the federal standard and ANSI. The ANSI standard uses a test weight of 282 pounds.

An **SME (Engineering Firm)** replied that the 282 pounds will be changed to 310 pounds, so subsection (f)(1) should be modified to 310 pounds. Everything that is 282 pounds will be changed to 310 pounds.

The **(SME Manufacturer)** clarified stating everything but the body harness under ANSI/ASSP Z359.11. The test for the body harness is based on the deceleration and fall distance of the test mannequin, so we have to achieve a force. It is not based on the weight of the mannequin.

Another **SME (Engineering Firm)** stated that anything that involves an energy absorber has the 310 pounds test mass.

The **Committee Chair** stated that subsection (f)(2) is not covered under the Z359 family. It is in the ANSI/IWCA I-14.1.

Cal/OSHA stated that the equipment in subsection (f)(2) is considered a positioning system, no free fall or limited free fall.
The **Committee Chair** stated that a note will be added to subsection (f) to section 3283.

Appendix A to Section 3210.1 (Fed-OSHA Appendix D) by Thomas Kramer, ANSI Z359 Chair

The **Committee Chair** approached Thomas Kramer to review Appendix D and propose changes to the Appendix to correct inaccuracies and make it more consistent with current ANSI standards. The text in bold denotes the recommendations by Thomas Kramer.

The Fed-OSHA Appendix D is not aligned with the ANSI standards.
- Technical: worker weight
- Testing requirements that are not covered

Subsection (a)
(a) General. The following sets forth test procedures for fall arrest systems as defined in section verifying system performance criteria as stated in 3210.1(d). The system is considered to be in compliance with the provisions of subsections (d)(1)(A)1. through (d)(1)(A)3. if the fall protection system is tested in accordance with subsection (b) or (c).

(1) An alternative to testing procedures in subsection (b) is use of fall protection equipment that meets the **applicable** ANSI Z359 standard as of the date of manufacture.

SME (Manufacturer) representative suggested adding "respective or applicable" to subsection (a), which is reflected above.

Construction representative suggested "labeled". The end user can read it and know that they are provided the right equipment.

Another **construction** representative agreed with the suggestion "labeled" and the proposed text that states alternative, meaning there is a choice to follow other portions of the Appendix.

Subsection (b) will contain a list of ANSI standards that would be incorporated by reference.

Subsection (c) will list the updated Federal Appendix D testing procedures.

(1) General test conditions.

~~(1)~~ (A) Lifelines, lanyards and deceleration devices ~~should~~ shall be attached to an anchorage and connected to the ~~body harness~~ **rigid weight** in the same manner as they would be when used to protect employees. *[Fed OSHA says rigid weight not body harness]*

~~(2)~~ (B) The fixed anchorage on the test structure ~~should~~ shall be rigid, and shall not have a deflection greater than 0.04 inches when a force of 2,250 pounds is applied. **The minimum natural frequency of the test structure shall be 200 Hz when measured along the vertical axis through the point through the fixed anchorage.** *[Fed OSHA says fixed anchorage]*

~~(3)~~(C) The frequency response of the load measuring instrumentation shall be 120 Hertz.

~~(4)~~(D) The test weight used in the strength and force tests **for lanyards and lifelines** shall be a rigid, metal, cylindrical or torso-shaped object with a ~~**girth of 38 inches plus or minus 4**~~ **diameter of 13 inches plus or minus 1 inch.**

~~(5)~~(E) The lanyard or lifeline used to create the free fall distance ~~should~~ shall be supplied with the system, or in its absence, the least elastic lanyard or safety line available to be used with the system.

~~(6)~~(F) The test weight for each test ~~should~~ shall be hoisted to the required level **to simulate the input energy required of the system** and shall be quickly released without having any appreciable motion imparted to it. **The maximum offset of the fixed anchorage and the test weight shall be 12 inches.**

~~(7)~~ (G) The system's performance ~~should~~ shall be evaluated taking into account the range of environmental conditions for which it is designed to be used.

~~(8)~~ (H) Following the test, the system need not be capable of further operation.

Thomas Kramer cautioned federal subsection(c) is missing the environmental testing (wet, hot, cold, abrasion, salt spray) and edge test that is required in the ANSI standards. Equipment meeting the Z359 standard would be more robust.

SME (Fall Protection Training, Engineering & Equipment) asked who test using Fed-OSHA Appendix D, if manufacturers use Fed OSHA Appendix D for testing. Their company has not tested equipment to Fed OSHA Appendix D.

SME (Manufacturer) stated that some manufacturers use the Fed-OSHA testing requirements in some capacity, because of the increase in a lot of requirements in some of the ANSI standards. There were transitional phases where some of the anchorage connectors would not meet the ANSI standards, so the manufacturers requalified their equipment to the Fed-OSHA requirements. It is not certified, because Fed-OSHA is not a certification body, but they can say that the equipment has been tested to conform to the requirement of Fed-OSHA. Some manufacturers and 3M does that in some cases.

The **SME (Manufacturer)** has also seen end users refer to the testing standard for the development of their horizontal lifeline testing. They rig up between two stanchions and they

put sandbags out there and push it off the platform and they are using the guidance provided by the testing methods by Fed-OSHA.

Cal/OSHA representative stated that they would use it if the ANSI standard is not referenced.

Thomas Kramer asked the SME for the manufacturer if products labeled as meeting ANSI and Fed-OSHA are tested to the ANSI standards and Fed-OSHA Appendix.

SME (Manufacturer) replied yes. The end users prefer products meeting 29 CFR sections 1926.502 and 1910.140, not just ANSI or CSA.

SME (Engineering Firm) asked if the SME (Manufacturer) labels their products as meeting state regulations.

SME (Manufacturer) stated no, only the Fed-OSHA standard.

Subsection (c)

~~(c)~~(2) **Dynamic** Strength Test.

~~(1)~~(A) During the testing of all systems, a test weight of ~~300~~ **310** pounds plus or minus 3 pounds ~~should~~ shall be used. (See subsection (b)(4))

~~(2)~~(B) The test consists of dropping the test weight once. A new unused system shall be used for each test.

~~(3)~~(C) For lanyard systems, the lanyard length shall be 6 feet plus or minus 2 inches as measured from the fixed anchorage to the attachment on the body harness.

~~(4)~~(D) For rope-grab-type deceleration systems, the length of the safety line above the ~~centerline~~ **bearing point** of the grabbing mechanism to the safety line's anchorage point ~~should~~ shall not exceed 2 feet.

~~(6)~~ (E) For deceleration device systems with integral safety lines or lanyards which automatically limit free fall distance to 2 feet or less **and are intended to be rigged such that the anchorage is above the attachment point of the harness,** the test weight shall be rigged to free fall a distance of 4 feet.

~~(5)~~ (F) For lanyard systems **which can be rigged that free fall equals to 6 feet**, for systems with ~~deceleration devices~~ **locking mechanisms** which do not automatically limit free fall distance to 2 feet or less, and for systems with ~~deceleration devices~~ **locking mechanism** which have a connection distance in excess of 1 foot (measured between the ~~centerline~~ **bearing point** of the safety line and the attachment point to the body belt or harness) the test weight ~~should~~ shall be rigged to free fall a distance of 7.5 feet from a point that is 1.5 feet above the anchorage

point, to its hanging location (6 feet below the anchorage). The test weight shall fall without interference, obstruction, or hitting the floor or ground during the test. In some cases, a non-elastic wire **rope** lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

~~(7)~~(G) For systems with deceleration devices which can be rigged such that free fall exceeds 6 feet the test weight ~~should~~ shall be rigged to free fall a distance of 12 feet from a point that is 6 feet above the anchorage point, to its hanging location (6 feet below the anchorage). The test weight ~~should~~ shall fall without interference, obstruction, or hitting the floor or ground during the test. In some cases, a non-elastic wire rope lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

~~(7)~~ (H) Any weight which detaches from the belt or harness ~~should~~ shall constitute failure for the strength test.

Thomas Kramer stated that the name of the subsection was changed to more accurately describe the type of testing. Since a test weight is being dropped, the test is dynamic as opposed to static testing. Subsection (c)(1) was amended to reflect the change in the weight.

SME (Engineering Firm) commented that the idea of the strength test was to prove that there is a good factor of safety, a good robustness to the product. As the test mass was increased, the test mass for the dynamic strength test remained. It used to be 220 pounds for the dynamic performance test and 300 pounds for the dynamic strength test. Now, it is the same test mass for both. He asked if we are getting the appropriate safety factor?

Thomas Kramer added that in the dynamic strength test, we are trying to break the product and subject it to a higher force. Whereas the dynamic performance test is used to get information such as the deceleration distances, which is used in labeling.

Subsection (c)(2(F)) is for a free fall distance equal to 6 feet.

The Fed-OSHA standard does not have test for that, whether it be energy absorbing lanyards or SRDs.

Subsection (c)(2(G) was added to test equipment used for free falls greater than 6 feet.

The test procedures for SRDs anchored below the feet still need to be to be addressed. That is what people used to refer to SRL-LE. The ANSI committee in 2020 changed that to Class 2 Device. The draft text does not include a test for when it is anchored below the dorsal D ring.

Cal/OSHA commented about proposed subsection (c)(2)(G), which may confuse the reader to thinking that they are allowed (free fall over 6 feet).

Construction representative stated that employers in California cannot rely on the labeling that states that it meets Fed-OSHA, because it was not specific to Cal/OSHA. He also stated that there may be circumstances where a free fall of greater than six feet is safer for the employee and that option should not be eliminated. That configuration may make easier to rescue someone.

Thomas Kramer stated that there are many situations where there is a free fall greater than six feet. This is typical in steel erection, roofing, and scaffold builders. Sometimes they are in situations where they don't have an above anchorage point.

SME (Manufacturer) referred the committee to proposed subsection (d)(1)(A)3. and stated that there are systems available where the free fall is greater than six feet, but still keep the impact force less than 1,800 pounds or less. There are devices that permit a free fall greater than six feet. One can fall greater than six feet with an SRD and is definitely common in construction.

Thomas Kramer stated that Fed-OSHA has accepted free fall greater than six feet provided that the impact forces is less than 1,800 pounds, but there is additional risk when you fall greater than six feet.

SME (Engineering Firm) representative stated that is common for window washers to exceed the free fall distance of six feet if they do not use a very short lanyard. They want to use a six foot lanyard. If you take into consideration the lock off distance of the arrestor with a six foot line, then the free fall is about 12 feet.

Cal/OSHA stated that greater free fall would increase the potential for injury. As Greg referenced earlier, not having enough clearance is a big problem and this would increase the clearance requirement.

Thomas Kramer stated that there will be significant ramifications to construction if the rule to limit free fall distance to six feet were to apply to construction.

SME (Manufacturer) stated Fed-OSHA already permit a free fall greater than six feet. It is written in the ANSI standards on how to test products. Earlier it was stated that one of the goals is to align general industry with construction. SMEs do not like a free fall more than six feet, but in reality, it happens. Steel workers at the top do not have anywhere to tie off except for the iron flange. There is no configuration wherein free fall can be limited to six feet. SME (Manufacturer) asked the committee to consider the ramifications of maintaining a six foot free fall limit. It could be detrimental to products, availability and applications in the state of California.

SME (Engineering Firm) stated that many regulations around the world have gotten away from limiting free fall and limiting deceleration distance. The important factors to consider are the impact force and clearances. When you are 120 feet off the ground, a free fall criterion is irrelevant.

In a prior employment as a railway bridge engineer, their engineering department tried to provide fall protection for a maintenance worker working on top of a railway bridge by providing fall protection that fastened onto the rail, but that was rejected by the safety department, because it would allow an 11 to 12 feet free fall, which violated the federal standard at the time. While the engineering department was trying to find another solution, trying to figure out a way to provide an overhead anchor, a person fell off the bridge.

Cal/OSHA asked how the industry complied when Fed OSHA hasn't allowed 12 feet for many years.

Thomas Kramer replied that there is a letter of interpretation about 10-20 years ago that allowed for a 12-foot free fall as long as the impact forces were less than 1,800 pounds.

SME (Manufacturer) stated that 3M and DBI Sala prompted Fed-OSHA to investigate and draft the letter of interpretation, because they know that these applications were happening in the industry. The caveat is to limit the maximum arresting force to the body to 1,800 pounds or less. It is no different from a system with a six foot free fall. The challenge is clearance, that is something that manufacturers have to take into consideration when they provide charts for clearances.

General Industry representative asked how steel erectors build buildings with the free fall restrictions. No one was able to answer the question directly.

The **Committee Chair** decided to table the discussion regarding the greater than six foot free fall in order to read the federal register one more time to review what it says about a 12 foot free fall or free fall greater than six feet.

Action Item: Committee Chair to review the federal register.

Construction representative noted that the Appendix is being changed from non-mandatory to mandatory.

The **Committee Chair** replied that it is mandatory if the employer chooses to exercise subsection (d)(5) to determine if they meet the system performance criteria.

Thomas Kramer stated in summary that the Appendix can be updated by changing the weights and distances. There are also some nominal definitions and word choices to clarity items that

need to be updated. The more significant items deal with the conditioning tests and the edge tests. Also, whether or not free fall is going to be limited to six feet. The later would require significant more language in the Appendix, which are already covered in majority by the ANSI Z359 standards.

The Committee Chair asked if the committee is in favor of amending Appendix D or should the Appendix just reference the ANSI standard.

A couple of SMEs favored referencing the ANSI standard.

Construction representative wants to include the Fed-OSHA Appendix D in title 8.

SME asked if that would exclude Fed-OSHA's testing methods if we just state ANSI only, because in some cases the product will not meet ANSI, but we still have Fed-OSHA testing methods that we can go back to certify their conformance to Fed-OSHA.

Thomas Kramer concluded based on the information discussed that those products would not be an option in California.

Construction representative was in favor of amending Appendix D with the simple changes and not go into details of what ANSI Z359 has.

The Committee Chair will update the discussion draft and the committee will review the Appendix again at the next meeting.

California existing regulation requires personal fall protection equipment must meet the requirements of ANSI A10.14-1991 or Z359.1-1992 through the use of products labeled as meeting the standing.

The committee has two options. One option is to update Fed OSHA Appendix D and the other is to require the use of equipment that are as labeled as meeting ANSI standards. The latter is what is currently required in section 1670 (l). If the committee choose a similar approach as section 1670, then we will list updated ANSI standards.

Section 1670
(l) All personal fall arrest, personal fall restraint and positioning device systems purchased or placed in service after February 1, 1997, shall be labeled as meeting the requirements contained in ANSI A10.14-1991 American National Standard for Construction and Demolition Use, or ANSI Z359.1-1992 American National Standard Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components.

The **Committee Chair** adjourned the meeting. The next meeting will be another two day meeting sometime in October or November. There was a request to hold the meeting in Orange County.

The agenda for the next meeting will include a discussion on a proposal submitted by a stakeholder regarding section 3210.