STATE OF CALIFORNIA GAVIN NEWSOM, *Governor*

DEPARTMENT OF INDUSTRIAL RELATIONS
Occupational Safety and Health Standards Board
2520 Venture Oaks Way, Suite 350
Sacramento, CA 95833
Tel: (916) 274-5721 Fax: (916) 274-5743
Website address www.dir.ca.gov/oshsb

SUMMARY MINUTES OF ADVISORY COMMITTEE MEETING AND FOLLOW-UP ON ISSUES

Use of Cone and Bar Barricade and Temporary Flooring – Skeleton Steel Construction in Multistory Buildings

(Petition 570)

Date: October 10, 2019
Address: Safety Center, Room 108
3909 Bradshaw Road
Sacramento, CA 95827
Time: 9:30 AM to 4:30 PM

Comments by the Chair

The meeting was called to order at approximately 9:30 AM by the Chair, Maryrose Chan, Senior Safety Engineer, Occupational Safety and Health Standards Board (OSHSB). The Chairperson was assisted by Leslie Matsuoka, Associate Governmental Program Analyst. Also present from OSHSB for part of the meeting were Michael Manieri, Principal Safety Engineer and Christina Shupe, Executive Officer.

The Division of Occupational Safety and Health (Division) was represented by Eric Berg, Deputy Chief of Health; Jason Denning, Principal Safety Engineer; Michael Frye, Regional Manager; Larry McCune, Senior Safety Engineer; and Spencer Price, Senior Safety Engineer.

The Chair welcomed the attendees of the meeting and briefed the members of the advisory committee regarding the advisory committee process https://www.dir.ca.gov/oshsb/acguidelines.html and the role of the committee stakeholders in the rulemaking process. The guidelines can be found in following link:

NECESSITY

- The Petitioner, Greg McClelland presented the reasons for filing Petition 570 regarding the use of Cone Bar Barricade (CBB) system. In the presentation, the Petitioner described the CBB, how the CBB is used, and the benefits of using the CBB.
- The Chair noted that the Board granted Petition 570 to discuss the issues raised by the Petitioner.

- The Chair reviewed several accidents that resulted in serious injuries due to falls from floor openings. The accidents may have been prevented by strict adherence to the CBB system.

Presentation by Greg McClelland (Western Steel Council)

Greg McClelland stated that the CBB petition was the result of several years of use and development of the CBB system. The reason for the development of the CBB system is to prevent fatalities and serious injuries associated with floor openings and the use of plank and plywood. In spite of extensive training and discussions, picking up the cover and walking forward into the opening continues to be a problem.

One of the members (erector) of the Western Steel Council instituted the use of visual barriers rather than physical barriers. In prior years, large sheets of expanded metal were used to cover openings. This allowed the ironworker to see the opening and observe the hazard. However, expanded metal did not stop welding sparks, metal dust, and grinding dust that created a fire hazard.

After the Northridge and the Loma Prieta earthquakes, the trade transitioned to doing extensive welding to meet the seismic, construction, and design requirements of complex structures being erected. The amount of welding and time spent on each welding point increased substantially, which resulted in the use of plywood as floor opening covers to stop sparks and fires caused by welding sparks that fell through the building. This led to an unintended consequence, increase of falls through openings when removing the plywood covers, caused by the temporary lack of awareness and the natural habit of walking forward.

Prior to the development of the CBB system, other forms of barricades were explored such as different colored cones and sizes, reinforced tape, and ¼ inch nylon rope. Over time, it was learned that these other forms of barricades were found to be displaced or removed by significant winds.

The current design include a telescopic bar that can be expanded to different lengths. The bar gives the worker a tactile feedback indicating that the worker is in an area where there is a potential hazard. Ironworkers were cautioned about walking backwards, but when moving a heavy cart, one naturally pulls the cart backwards. If you back into a flexible tape, you may not know or notice that you encroached on flexible tape.
The high visibility green color was chosen because over the years people have become accustomed or immune to safety orange. High visibility green catches people's attention because of the different color.

The International Ironworkers Union created the "Deadly Dozen Activities and Hazards" list. First on the list is falls through unprotected or inadequately covered floor openings.

What is an inadequate covered floor opening?

- Peeled back decking. Buildings require extensive brace frames and moment frame requirements, which means that the deck has to be peeled back and decking has to be cut in order to weld the diagonal bracing onto the vertical plate. Every time the decking is cut, the structural stability suffers. Decking is strongest when the deck is fully welded down and crimped. If the deck is cut around the vertical component, it weakens the end of the deck. The deck may not support the potential live load and a 250 pounds person.
- Cover placed with improper bearing surface.
- Cover that was dislodged by another trade.
- Cover that was dislodged by a strong weather event.

In summary, falls occur when the cover that someone trusted did not work. If there are no floor covers to trust, one will not accidentally fall through it.

Mr. McClelland rhetorically asked, how far do you remove plank and plywood in a project site and he answered, as needed. In some cases plank and plywood will solely be used and in some cases plank and plywood will be used in tandem with the CBB system. It is dependent on the physical condition and site requirements of the project.

Mr. McClelland presented multiple photos where the CBB system and plywood were used:

- Areas where plank and plywood were used because the cuts on the deck affected the structural stability of the deck; therefore plank and plywood were needed.
- Some openings are quite large and would need multiple sheets of plywood. Plywood would need to be removed repeatedly creating multiple instances or possibilities that the employee could fall as plywood was removed.
- Decking perpendicular to the brace frame and column line were covered by plywood.
- Individual working in the CBB system. The Petition letter states that the CBB be set 6 feet back. There may be work in progress in one to three floors above the individual where active steel erection is taking place. Some welds takes weeks to complete.
- Photos of personal fall protection system tie off point as part of the CBB system.

Western Steel Council member employers experimented with different types of barricades and were mindful of how heavy the materials are. An adequate base width

was needed to provide stability for the barricade and be applicable to the different types of deck.

Mr. McClelland showed photos of the cable fishing system to create a fall protection tie off points through the horizontal beams. The cable fishing system eliminates the use of a ladder to install the tie off points.

Mr. McClelland highlighted Western Steel Council's member companies experience with the use of the CBB system:

- 10,000,000 man hours.
- Elimination of serious injuries and fatalities associated with covers.
- Drastic reduction of soft tissues injuries.
- Hazard detection, openings are visible.
- CBB training is conducted in apprenticeship schools and jobsites.
- High visibility green cones are used to signify unusual circumstance. Workers are too accustomed to safety orange.

Video Presentations

The Chair showed a video by the International Association of Bridge, Structural, Ornamental, Reinforcing Iron Workers and Ironworker Management Progressive Action Cooperative Trust regarding the use of the CBB system. The video was shown to establish a common understanding among the committee members of what the CBB system is, its purpose, and its use. The Chair also showed a time lapse video of a construction site utilizing the CBB system to demonstrate how the system is used in the field.

Review of Accidents

The Chair reviewed with the committee a list of serious accidents in the steel erection industry due to falls from floor openings that occurred in California from 2003 to 2018. The list was generated by using the Federal OSHA website. The Division investigates accidents that result in serious injuries and submits the accident investigation summaries to Fed OSHA.

The review of the accident summaries indicates that accidents could be prevented by the use of the CBB system. Employees do not have to trust whether or not the covers were properly secured. The requirement to wear personal fall protection prior to entering the area demarcated by the CBB is key in preventing falls.

Discussions Regarding Accidents

- Bill Benham (Bill Benham Consulting, LLC) stated that the requirement to wear fall protection would prevent falls and a CBB rule would be helpful on that end.

- Russell McCrary (Iron Workers Safety Institute) stated that CBB works because you are only working on one floor. There cannot be an opening above you and there cannot be an opening below you. It is on one floor. It works as long as it is done right. Once you install the CBB and you open a hole, you are tied off. You are tied off 100% of the time before you step across the cone. CBB is to be set up 6 feet back, which equates to 2 pieces of decking. CBB use is only for the steel erection industry.

  Nowadays, you see CBB used by other trades to notify that you are coming upon something dangerous. For steel erection, the CBB system is used on the floor that the steel erection contractor is in charge of. A steel erection contractor can be moving around 1,000 sheets of plywood and 1,200 planks, so there are thousands of chances of doing it wrong and walking into the opening.

- Eric Berg (Division) stated that he has seen openings vertically lined using the CBB system and this is something to be aware of when the committee works through the regulation.

- Russell McCrary (Iron Workers Safety Institute) responded that the CBB system cannot be used as overhead protection. You cannot use it to protect the hole on another floor. Limiting CBB use to one floor makes it work.

Finding of Necessity

The Chair asked if there is anyone who objects to moving forward to develop rules regarding the use of the CBB.

- Kevin Bland (Ogletree Deakins, Nash, etc) stated he finds that there is necessity for the rule.

- Karl Pineo (Iron Workers Local 118) supported the necessity for the rule. He stated that the use of plywood as a cover gives a person a false sense of security.

REQUIREMENTS FOR PROPOSED REGULATORY TEXT

Prior to the discussion regarding the proposed regulatory text, the Chair reminded the advisory committee members of the Administrative Procedures Act (APA) criteria to

keep in mind when proposing changes to the proposed regulatory text. Proposed amendments must be:

- Consistent with the Labor Code.
- At least as effective as the federal standard. Fed OSHA has a steel erection standard, so California rules need to be at least as effective as the federal standard.
- Reasonable and enforceable.
- Clear or understandable.
- Consistent.
- Non-duplication.
- Performance based standard to the extent possible. In this particular situation, the rulemaking is to standardize the use of the CBB system. For example, the proposed rule would prescribe the components and how the CBB will be set up.
- Explore alternatives. The Chair asked the committee members to discuss alternatives, such as the CBB height and color. We also need to discuss possible alternatives that can accomplish the same goal as CBB.

DISCUSSSIONS AND CRAFTING OF PROPOSED REGULATORY TEXT TO AMEND SECTIONS 1504, 1635(c), AND 1710(*l*)

Section 1504. Definitions.

Ultimately, the advisory committee decided not to add a definition of the CBB system. The Chair will not add the Petitioners' proposed definition for access openings.

The Advisory committee members rejected the Petitioners' and Board staff's proposed definition for CBB. The Petitioners' proposed definition for access openings was not discussed. The proposed term "access openings" did not come up during the discussions regarding the use of CBB.

Discussion

The Chair opened the discussion regarding the proposed definition by the Board staff and the Petitioner.

- Kevin Bland (Ogletree, Deakins, Nash, etc) commented that "traffic cones" should not be used in the definition because it implies that cones are orange. He suggested to identify the color in the text and call them safety cones or green hazard cones.

- The Chair pointed out that there will be proposed text in a different Section that contains more detailed specifications for materials, such as color, height, etc.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) restated that it is important not to call them traffic cones.

- The Chair asked if the committee members would like to use the term hazard cones.

- Bill Benham (Bill Benham Consulting LLC) stated that when you make an on-line to purchase of the cones, they are called traffic cones.

- The Chair stated that this is why the proposed definition used the term traffic cones.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) commented that the color needs to be specified in the definition because they do not want to be in appeals someday with the issue that they used a traffic cone and not a cone and bar cone.

- Tom Davies (Herrick Construction) stated that it is important to identify the color and the base.

- The Chair restated that there is a separate proposed text for the specifications of the CBB.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that the definition may cause more confusion. By creating a definition in §1504 and then having the definition repeated more specifically in §1635 would add ambiguity.

- Spencer Wojcik (Clark Construction) commented on the use of the term cone and not including delineators.

- The Chair proposed to add a cross reference to §1635 to the proposed definition. Section 1635 is proposed to contain detailed specifications and rules regarding the use of the CBB system.

- Christina Shupe (OSHSB) stated that the alternate definition proposed by the Chair would entail that the employer look at two sections to know the definition of the CBB.

- The Chair responded stating the proposed definition describes the purpose of the CBB and that the more detail requirements will be in §1635.

- Russell McCrary (Iron Workers Safety Institute) suggested to amend the proposed definition by deleting “traffic cones and retractable” from the definition. He also commented that delineators do not work.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) commented that there is no need for a definition because the proposed regulation in Section 1635 will have a definition.

- Greg McClelland (Western Steel Council) withdrew the Petitioners' proposed definition and stated that he does not want to define the application of the CBB.

- Larry McCune (Division) stated that creating a definition would create confusion because the specifications are spelled out within the §1635. Adding a definition in §1504 is not needed.

Section 1635. Floors, Walls and Structural Steel Framed Buildings.

➢ **Post meeting text, subsection (c)(2) was amended to read:**
The ~~floor area adjacent to the~~ floor opening shall be barricaded~~,~~ by guardrails, Cone and Bar Barricade (CBB) system, or the floor opening shall be covered when not attended by steel erection personnel.

The committee members discussed other forms of barricades and decided that the CBB system other than guardrails will be the only form of barricade for floor openings. [See the discussion under subsection (c)(2)(A)]. The committee members decided not to define work in progress, but as a counter measure, amend subsection (c)(5) to require inspection of the CBB system at the start of the shift.

Discussion

- Eric Berg (Division) commented that he wanted to limit the type of barricade to the CBB system, which would disallow the use of caution tape or other types of barricade materials.

- Bill Benham (Bill Benham Consulting LLC) asked about the use of control lines when you are up on the deck and the deck is not fully installed. Control lines are installed when you are waiting for the deck to come. See §1671.2 below for reference

  §1671.2. Controlled Access Zones and Safety Monitoring Systems.
  (a) Controlled access zones.
  (1) When used to control access to areas where leading edge and other operations are taking place, the controlled access zone shall be defined by a control line or by any other means that restricts access. Signs shall be posted to warn unauthorized employees to stay out of the controlled access zone.

(2) When control lines are used, they shall be erected not less than 6 feet nor more than 25 feet from the unprotected or leading edge, except when erecting precast concrete members.

(3) When erecting precast concrete members, the control line shall be erected not less than 6 feet nor more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge.

(4) The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

(5) The control line shall be connected on each side to a standard railing or wall, or securely anchored on each end.

(6) Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

(A) Each line shall be flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material.

(B) Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the working level/working area and its highest point is not more than 45 inches.

(C) Each line shall have a minimum breaking strength of 200 pounds.

- Eric Berg (Division) replied that the scenario described by Bill Benham is not a floor opening.

- Michael Frye (Division) suggested language that the floor adjacent to the opening shall be barricaded by a guardrail, CBB system or the floor opening shall be covered when not attended by steel erection personnel.

- Eric Berg (Division) supported Michael Frye's suggestion.

- Bill Benham (Bill Benham Consulting, LLC) stated that the "floor area adjacent to" the floor opening creates confusion.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) responded that §1632(c)(2) does not apply to unfinished deck.

- The Chair asked if "floor area adjacent to" should be removed from the proposed language. The committee's consensus recommendation was to remove "floor area adjacent to."

- Tom Davies (Herrick Construction) supported the change and believes the change would clarify to the general contractors that the floor openings do not have to be covered at the end of the day.

- Cindy Sato (Construction Employers' Association) said that some contractors represented by CEA want a requirement to cover the floor opening at the end of the day.

- Tom Davies (Herrick Construction) stated that covering the floor opening at the end of the day defeats the purpose, because iron workers would be required to handle hundreds pieces of plywood again, putting them down and removing them again.

- Note to Section 1635(c)(2) - Greg McClelland (Western Steel Council) will provide an illustration or photograph to be used in Appendix C-38.

Clarification on Work In-Progress

The Chair stated that subsection (c)(2) applies only when "work is in progress". The Chair asked if at the end of the day, is there still "work in progress?" See §1635(c) for reference.

> §1635. Floor, Walls, and Structural Steel Framed Buildings.
> (c) Special Provisions Applicable to Floor Openings. Section 1632(b) applies to floor openings at locations where steel erection work is taking place. This subsection applies where work is in progress that requires floor openings to be uncovered. For such work, all of the following requirements shall apply:
>
> ****

Discussion

- Kevin Bland (Ogletree Deakings, Nash, etc.) and Greg McClelland (Western Steel Council) stated that work is still in progress because the work has not been completed.

- Michael Frye (Division) stated that the understanding of work in progress is that you are still working on it and not leaving the openings uncovered for 2 or 3 weeks.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that the reason for proposing the rule is to address the hazards of covering and uncovering openings. If openings are uncovered at the beginning of the shift and covered at the end of the shift then there is the same exposure twice a day. They are not talking about leaving it for period of 10 weeks. For example, it may take 2 days to weld the moment connection or column flashing and get the work done. The work may not be finished on the same day and the floor will not be covered at the end of that day. Iron workers are the only ones on that floor.

- Chair asked the Division how work in progress is enforced.

- Eric Berg (Division) agreed with Kevin Bland, stating that while you are welding in an opening and the work takes 2 days, the work is in progress for those 2 days.

- The Chair asked if the Division inspector is left to determine this on a case by case basis. The Chair was concerned with the hazard associated with leaving openings uncovered for an extended period of time if nothing is occurring with that opening.

- Eric Berg (Division) stated that openings are left for a week, then the CBB gets moved around. The Division has inspected sites where there is CBB everywhere and you cannot tell what is protected for a long period of time.

- Larry McCune (Division) stated that the regulation was drafted so that work in progress is a broader term than stopping to get a welding rod or if the job takes 2 days then the inspector went there on a Thursday, that is still work in progress in that temporary opening.

  The intent was to allow the cone and bar to be in place barricading a temporary opening to allow the floor opening to be uncovered during the time to complete work within the opening. It is understood that there would be interruptions of work within the barricaded opening to go for materials, obtain tools and delays for inspection prior to replacing the covers or decking. [LM clarification 3/20/20].

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that “work in progress” is no different than going on a 15 minute break. He asked, is that not work in-progress even though you are not there?

- Spencer Wojcik (Clark Construction) commented that the terminology is frightening especially with the hazards that exist, if you are saying that work in-progress is a 2 day period. From his own experience, when he was working on the Sales Force Tower, there were extremely high winds creating a real possibility for the CBB being displaced overnight. He opined that covering the openings at the end of the shift is better than leaving the openings uncovered while work in progress.

- Larry McCune (Division) stated that there is a requirement that barricades be inspected before the work begins. However the requirement to inspect in §1635 (c)(5) applies only to covers, therefore subsection (c)(5) should be amended.

- The Chair asked for further clarification for the use of the term "work in progress."

- Eric Berg (Division) replied that "work in-progress" is a performance based standard, evaluated on a case by case basis and it will be the Division's burden to prove that there is work in progress.

- Greg Olmsted (JD2 Innovative Steel Solutions, Inc.) stated that the CBB is currently used and the committee is trying to get the use of CBB codified.

- Spencer Price (Division) stated that the Division looks at "work in-progress" in terms of hazard or exposure. If work is stopped overnight, there is no exposure. For example, if work stopped 6 weeks due to rain that is called "demobilization." If there is temporary "demobilization," there is no one there, therefore there is no exposure. "Work in progress" is other than "demobilization."

- The Chair was not in favor of "work in progress" defined as other than demobilization.

➢ **Post meeting text, subsection (c)(2)(A) was proposed to read as:**
<u>Where CBB system is used instead of a floor cover, the CBB system shall be designed and used as follows:</u>

****

The advisory committee discussed the pros and cons of delineators versus cones. It was necessary to have this discussion to determine if it would be necessary to propose general requirements for different types of barricades other than the CBB system or just the CBB system.

There was a concern about the final height of the bar when using 28 inch cones. The committee favored the cone because of its stability and the fact that a cone is a one piece system versus the 2 piece delineator.

Discussion on Delineators vs. Cones

- Kevin Bland (Ogletree, Deakins, Nash, etc.) proposed the above post meeting text instead of the Board staff's proposal under "Specifications".

- Spencer Wojcik (Clark Construction) brought up using delineators as a possible alternative barricade to using cones. The use of other options with heavier weight at the bottom (such as delineators) prevents the barricade from falling over and is a viable option. The height of the barricade prevents workers from hopping over the bars. The cone height of 28 inches is potentially too low. If someone were to step over, it creates more of a risk or a hazard. As a function of providing a physical barrier, if someone bumps into a higher bar, they are hit in the waist or thigh rather than the calf.

- Tom Davies (Herrick Construction) stated that he has been using CBB for 10 years. He stated that delineators did not work.

- Prior to continuing further with the discussion, the Chair asked what delineators are. The members described the delineators and the Chair understood what was being referred to.

- Bill Benham (Bill Benham Consulting, LLC) stated that in another CSO standard, the term stanchions is used, the stanchion is used to hold something up.

- Greg Olmsted (JD2 Innovative Steel Solutions Inc.) stated that the ironwork industry has been using the CBB system for about a decade. It is called CBB because it works best with cones and bars, not stanchions, delineators, other devices.

- The Chair stated that members of the committee need to explore alternatives and asked the members to discuss the pros and cons of delineators and CBB.

- Spencer Wojick (Clark Construction) stated that the height requirement for the cone is too low. After the bar is placed, the height of the bar is approximately 2 inches lower than the cone, so the bar height is below 28 inches. The use of the delineators provides added height, so you have more of the barrier aspect versus

something that someone can step over. It protects the employees more because if you bump into a delineator bar, the bar will hit the employees on the thigh.

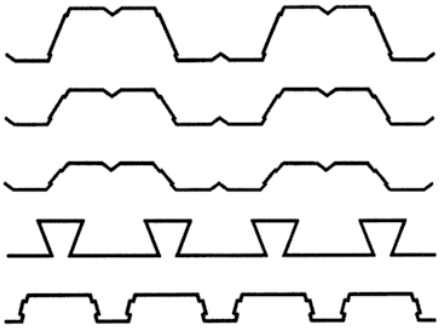
- Tom Davies (Herrick Construction) stated that the problem with delineators is they come in 2 pieces, the base and the delineator tube and you have to keep the two pieces together. With the CBB system, before they go into the hazard zone, employees are required to be tied off and you step over the bar, not hop. If you use delineators instead of cones, you have to take the bar out, and taking the bar out exposes other employees behind the delineator. The purpose of the lower cone is so that the employee can tie off and then step over the bar.

- Russell McCrary (Iron Workers Safety Institute) stated that the delineators are no different from the tape and can be blown around. They bend over due to heat. If an iron worker is carrying a light load, the iron worker can step over the bar of the CBB. Other ironworkers outside of the CBB who are not tied off are not exposed to the hazard zone when the bar is removed. He stated that he does not know of any major steel erectors who would use delineators over the CBB system.

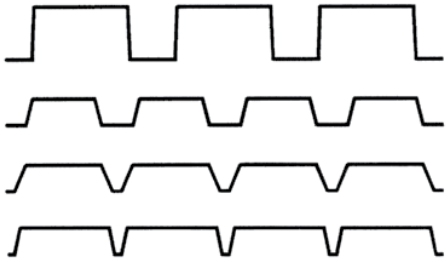
- The Chair asked Spencer Wojcik (Clark Construction) what type of cross members are used with the delineators. He responded that there are manufactured bars for use with delineators and he has seen them successfully used.

- Greg McClelland (Western Steel Council) commented against the use of the delineators because of the profile of the deck. He drew a picture of the profile of structural deck.

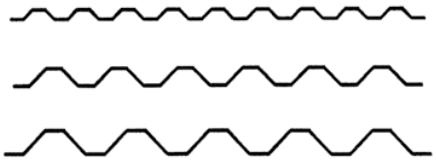
  Below is not what was drawn, just examples of deck profiles



Typical Composite Floor Deck



Typical Roof Deck Profiles



Typical Form Deck Profiles

A delineator is a two piece system. The base is not fixed to the vertical portion of the delineator. The delineator is taller with a base that extend approximately 14 inches, which covers approximately 1 high cell to the center of another high cell. The delineator base can fall through the groove of the deck (see profile) and can easily be dislodged laterally by wind, meaning that the vertical portion will be separated from the base.

The purpose of the bar component of the CBB is to signal to the individual the presence of a hazard. The design is not to prevent someone from going over it. It is not a physical barrier to keep cows or sheep out of the pen. CBB use is specifically for ironworkers who are trained to recognize the hazards on the floor.

- Bill Benham (Bill Benham Consulting Company LLC) stated the CBB is a great system. However in the interest of consistency, he suggested that a 36 inch cone be used. Warning lines for roof hazards are at a 34 inches minimum, control lines for control access zones are at a 39 inches minimum, and guardrails

are at a 42 inch minimum, so the required range of heights are in the same vicinity. The problem with the 28 inch cone is by the time bar is placed, the height of the barricade is lower than 28 inches, so I think it is a tripping hazard. The proposed text indicates that it is an option to use 36 inch high cones. See §1730(b)(2), §1671.2(a)(6)(B) and §1620(a)(1) for reference.

> §1730. Roof Hazards
> (b) Slopes 0:12 to 4:12 -Single-Unit (Monolithic) Roof Coverings.
> (1) Employees shall be protected from falls from roofs of a height of more than 20 feet by use of one or a combination of the methods in this section. Whenever felt laying machines or other equipment that is pulled by an operator who walks backwards is being used, this provision shall apply regardless of the height.
> (2) Warning lines consisting of rope, wire or similar material, flagged with highly visible material hanging from the warning lines at approximately 6-foot intervals, shall be installed **34 to 45 inches** above the roof surface to warn employees that they are approaching the edge of the roof.
>
> §1671.2. Controlled Access Zones and Safety Monitoring Systems.
> (a) Controlled access zones.
> ****
> (6) Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:
> (A) Each line shall be flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material.
> (B) Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than **39 inches** from the working level/working area and its highest point is not more than **45 inches**.
>
> §1620. Design and Construction of Railings.
> Railings required by these Orders, except as otherwise provided, shall conform to the following standards:
> (a) Railings shall be constructed of wood or in an equally substantial manner from other materials, and shall consist of the following:
> (1) A top rail not less than **42 inches** or more than **45 inches** in height measured from the upper surface of the top rail to the floor, platform, runway or ramp.

- The Chair stated that typical cone height sizes available for purchase are 18, 28, 36 inches.

- Eric Berg (Division) noted that the existing regulation is a performance regulation and any type of barricade system is permissible.

- Spencer Wojcik (Clark Construction) stated that he is in full agreement that the cone is a more viable option when compared to the delineator. The reason for the delineator exercise is the height requirement. In addition, if the regulatory language is specific to cones, then employers are inhibited from using anything else that would be manufactured in the future. It prevents the employer from using another option.

- The Chair responded that the Petition process is available to anyone who would like to suggest a different system other than CBB. Write a petition letter to the OSHSB. Petitions will trigger the Board staff and the Division to evaluate the system and will likely result in another committee being convened.

  The Chair asked for a vote to determine whether the committee members would like to move forward to write a proposal for the use of CBB as the only form of barricade allowed. The committee members decided to move forward.

- Kevin Wojcik (Clark Construction) asked if any of the members tried using signs on the bars.

- Tom Davies (Herrick Construction) replied “no”. “Danger floor opening” is stenciled on both sides of the cone. The size of the letters allow for someone from far away to read the label. Furthermore, trained iron workers are the only ones permitted to use the CBB system.

Discussion on the Bar

- The Chair asked about the bar, if the item has to be shop made or can be purchased.

- Tom Davies (Herrick Construction) replied that the bars are purchased.

- Michael Frye (Division) asked why the bar color is not green.

- Tom Davies (Herrick Construction) responded that the he could not find a manufacturer that would make the bar in the color green. The bar is reflective.

- Michael Frye (Division) stated that orange color of the bar should be changed.

- Bill Benham (Bill Benham Consulting LLC) stated that the bar needs to be high visibility.

- Greg McClelland (Western Steel Council) stated that they considered the economic impact of the having to fabricate a system versus one that is readily available.

- Russell McCrary (Iron Workers Safety Institute) stated that the green cone will stand out making the entire system visible.

➢ **Post meeting text, subsection (c)(2)(A)1. was added to read as:**
<u>The cones shall be firmly connected to each other by plastic pipe, or a similarly rigid and substantial connecting medium.</u>

The proposed post meeting text came from the Petitioners proposed text 1710 (I)(8)(E) with revisions. The words "warning/support", "solid", and "rod" were deleted. "Warning/support" is not proposed to be used in the proceeding text. Solid and rod were removed because a plastic pipe is hollow.

Discussion

- Bill Benham (Bill Benham Consulting, LLC) asked if the committee members should specify a particular tensile strength or tearing strength the manufacturer may have, similar to a warning line. Someone may try something lighter and it may not be sufficient.

- Greg McClelland (Western Steel Council) said that the Petitioners were careful not to specify a specific manufacturer. Similarly "rigid and substantial" does not allow for a loose or soft type system. He felt it was not appropriate to specify a manufacturer.

- Spencer Wojcik (Clark Construction) stated that a barricade should be required to be continuous.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) responded that a barricade is not always continuous. Barricades are not always arranged in a circle and the description that a barricade is continuous will confuse people.

- Spencer Wojcik (Clark Construction) clarified that a barricade should have zero gaps or no limiting gaps.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that the manner in which the CBB is connected must be continuous.

- The Chair stated that the issue will be addressed when the committee members discuss the set up requirements.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) suggested that the word "solid" be removed in the text describing the bar.

- Jason Denning (Division) suggested to remove "rod" in the text describing the bar.

- Mike Manieri (OSHSB) stated that there are bars available that are designed to pass through an opening at the top of the cone.

- Bill Benham (Bill Benham Consulting Company, Inc.) suggested that there should be a strength requirement for the bar. The control line has to be continuous.

- Larry McCune (Division) stated that the current standards allow for other types of barricades.

➢ **Post meeting text, subsection (c)(2)(A)2. was added to read:**
The CBB system shall remain in position and maintain its integrity during the duration of use.

The text was from text originally proposed by Board staff with revisions to ensure the integrity of the cone during the duration of use. There were comments from committee members stating that 36 inch tall cones would lose their shape under high heat conditions.

➢ **Post meeting text, subsection (c)(2)(A)3. was added to read:**

The cones shall consist of high visibility green with a minimum nominal weight of 10 pounds, ~~minimum~~ nominal height of 28 inches, and labeled with two inch black lettering on both sides of the cones stating: "DANGER FLOOR OPENING".

A majority of the members were in favor the 28 inch high cone. The Chair was concern about restricting the requirements to only allow for 28 inch high cones. The Chair informed the members that other contractors will be contacted to solicit their opinion on the matter.

** Blue italicized are statements and comments added after the meeting.*

After the advisory committee meeting, the Chair contacted California members of Steel Erectors of America, but was only able to speak with 3 contractors, 2 were both in favor of the 36 inch high cone, and one in favor of delineators.

The Chair decided to amend the post meeting proposal to permit contractors to use cones with a height greater than 28 inches, because the thickness and the type of material is the determining factor in the cone maintaining its integrity in a hot environment. Subsection (c)(2)(A)2. addresses the material integrity issue. The proposal was amended to add "per cone" after the weight criteria for clarity.

The cones shall consist of high visibility green with a minimum nominal weight of 10 pounds per cone, minimum nominal height of 28 inches, and labeled with two inch black lettering on both sides of the cone stating: "DANGER FLOOR OPENING".

Discussion

- The Chair asked the committee members what height the cone should be. Cones are available in 18, 28, and 36 inch in height. The height of the cone on display was 28 inches.

- Greg McClelland (Western Steel Council) replied, speaking from experience, the 18 inch high cone did not provide the type of warning their employers were looking for. Western Steel Council tried to be flexible so that if there were cones out there manufactured differently or the individual employer wanted to use a temporary stanchion, they potentially could. However from experience, the 36 inch high cone under high heat days would deflect and bend over. Their employers currently use 28 inch high cones based on experience.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) suggested to use proposed text very similar to the Petitioner's proposed text §1710(*l*)(8)(D). The text was then collaboratively edited by the committee members to use the term "high visibility green", minimum nominal height, and to specify the size of the lettering for the labeling of the cone. The term "nominal" is to address the variability in the height of the cones by various manufacturers.

- The Chair suggested that instead of the "CBB shall consist of", it should be the "The cones shall.." The Chair changed the labeling requirement to "DANGER FLOOR OPENING" based upon the cones on display during the meeting and the cones showed in the video.

- The Chair asked the committee members if they intended to require 28 inch high cones only and exclude the use of 36 inch high cones. The Chair posed the question, if the employer used 36 inch high cones while working in temperate weather (not in hot weather), would it be considered a violation?

- Multiple committee members responded "yes."

- Greg McClelland (Western Steel Council) replied "yes" based on the text proposed in their Petition. Their concern is that the weather may be cold in the morning, but warm or hot in the afternoon. Employers started with 36 inch high cones because it seemed better from a safety experience standpoint, but the cones did not withstand the heat and the temperature changes in the project site. Regarding the use of the term nominal, he stated that he has a manufacturer's specification stating that the variability of the cones is +-3/4 of an inch.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) agreed that there is manufacturing variability.

- Spencer Wojcik (Clark Construction) stated that he is in favor of using the text "nominal minimum height", because he is not in favor of being restricted to 28 inch high cones and not being able to use 36 inch high cones.

- Karl Pineo (Iron Workers Local 118) stated that the 28 inch cone height is the only proven system with 10,000,000 man hours used in the field. He represents members who currently use the CBB system.

- The Chair was hesitant about restricting the use of the cone height to 28 inch only, especially when the employer is not working under high heat conditions.

- Spencer Price (Division) suggested to keep the text "nominal minimum height," but add a condition that the cone maintain its dimension through all conditions of climate.

- Spencer Wojcik (Clark Construction) stated he supports Mr. Price's suggestion.

- Russell McCrary (Iron Workers Safety Institute) stated that it's not just the heat. There is also the wind and the height of the bar. If the bar is too high you cannot step over the bar while you are carrying a light load. The bar will have to be removed if the cone is 36 inches high.

- Bill Benham (Bill Benham Consulting, LLC) asked the Division what would happen if someone was injured while stepping over the bar. There is a requirement for accessing a building. In California, the building has to be no more than 18 inches from the ground. When you are using the CBB and are tied off, to access the barricaded area, you can either step over or the cone or take off one side of the bar and walk in. It is not necessary to step over the bar of the CBB.

- Tom Davies (Herrick Construction) stated that there are other ironworkers on the floor and as soon as the bar is taken off, other employees are exposed to the opening.

- Bill Benham (Bill Benham Consulting Company LLC) asked if there is a tripping hazard by stepping over the CBB.

- Eric Berg (Division) replied that workers are tied off and there is no specific regulation that says you cannot step over things.

- Bill Benham (Bill Benham Consulting LLC) There is a requirement to have a step for access if the scaffold is over 24 inches high. You are required to have a step, stair or ramp if you are getting into a building that is over 18 inches high. See §1637(n)(2)4. and §1629(a)(3) for reference.

  §1637. General Requirements.

  *****

  (n) Access

  *****

  (2) Climbing ladders or stairways on scaffolds used for access and egress shall be affixed or built into the scaffold by proper design and engineering, and shall be so located that their use will not disturb the stability of the scaffold.
  (A) Manufactured hook-on and attachable ladders shall be securely attached to the scaffold and:

  *****

  4. Shall be positioned so that their bottom rung is not more than 24 inches (61 cm) above the scaffold supporting level; and

§1629.Stairways and Ladders
(a) General

*****

(3) Stairways, ramps or ladders shall be provided at all points where a break in elevation of 18 inches or more occurs in a frequently traveled passageway, entry or exit.

*****

- Eric Berg (Division) opined that stepping over the bar of the CBB is not a problem. It would be more difficult to pick up the bar on one end when you are carrying items.

- Michael Frye (Division) commented that not everyone is 6 feet tall and can easily step over the bar. He pointed out that in the video, the worker depicted on the right hit the cone and the cone almost flipped over. He stated a preference for 36 inches as the minimum cone height. He was not in favor of the practice of stepping over the bar all the time.

- John Konechne (California Erectors) stated that 36 inch high cones did not withstand the wind and heat. The 28 inch high cones work in all environments.

- Russell McCrary (Iron Workers Safety Institute) was initially against the CBB idea. They started with using the 36 inch high cones and the cones rolled and fell over. They had a problem with the small one as well. The bar of the CBB is not a handrail. The bar is a warning system for the floor. He stated that 36 inch high cones are too tall and he does not like the 18 inch high cones. The 28 inch high cones appears to be middle of the road and work the best.

- Eric Berg (Division) supports Spencer Price's proposed language regarding CBB maintaining its integrity.

- Spencer Wojcik (Clark Construction) stated that an unsafe condition is created if employees are allowed to hop over the bar with material in their hands. He strongly believes that the bar needs to be tall. If someone needs to get into the area while carrying materials, then someone needs to help that person enter the area.

- Karl Pineo (Iron Workers, Local 118) reiterated that the CBB system requested by the Petitioner has been in use for 10 million man hours, no loss time due to injury, and no fatality. The cones used were 28 inches tall.

- Tom Davies (Herrick Construction) disagrees with the characterization that people hop over the bar. People do not hop over, they step over the bar.

- Greg Olmsted (JD2 Innovative Steel Solutions) agrees with Mr. Pineo.

- Russell McCrary (Iron Workers Safety Institute) stated that there are contractors that use taller cones, but they did not have the 10 million man hour experience. The 28 inch high cones work. The CBB is a visual barricade. It's not handrail.

- Spencer Wojcik (Clark Construction) replied regardless of how many hours, it only takes a millisecond for an accident to occur. He agrees that employees are not hopping over. As a general contractor, he wants the ability to increase the size of the cone if needed. If something happens while using the 28 inch high cones, he would like the option to use the 36 inch high cones.

- Tom Davies (Herrick Construction) replied that the contractor can write their own requirement.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied that he would prefer to get out of the practice of writing things into contract. You are not writing into contract something safer. Just because something is taller, doesn't mean that is safer.

  In other words, the regulation should govern the acts of the workplace and not a contract unless the contract is more protective than the regulation. Here, the ironworkers in the room have determined that 28 inch cones are safer option than 36 inch cones. To allow a contract to override the safe height is contrary to safety and therefore contrary to public policy. One can only contract within the bounds of lawful activities. [KB Clarification 4/13/2020].

- John Konechne (California Erectors) stated that their company tried the 36 inch high cones and they did not work. The 28 inch high cone is safer.

- Greg Olmsted (JD2 Innovative Steel Solutions, Inc.) stated that ironworkers are transient workers and it is important to have uniformity in their training.

- Spencer Wojcik (Clark Construction) strongly supports the language requiring minimum nominal 28 inch high cones to allow the use 36 inch high cones.

- Mike Manieri (OSHSB) stated that the cones come in two weights, 7 or 10 lbs. Kevin Bland (Ogletree, Deakins, Nash, etc), Greg Olmsted (JD2 Innovative Steel

Solutions), and Tom Davies (Herrick Construction) stated that they are in favor of 10 lbs.

- The Chair stated that she will continue the discussion with other contractors.

➢ **Post meeting text, subsection (c)(2)(A)4.**
<u>The bar shall be a high visibility color, solid or pattern. The bar shall be placed within 6 inches of the top of the cone.</u>

Discussion

- Kevin Bland (Ogletree, Deakins, Nash, etc.) suggested measuring from the top of the cone.

- Greg McClleland (Western Steel Council) stated that the reason for measuring from the top of the cone is because the deck is corrugated, so measuring from the top of the cone would provide a consistent measurement.

- The advisory committee reached a consensus on the visual criteria of the bar.

- Michael Frye (Division) stated that based on the proposed text, the bar will be at 22 inches, lower than his knee.

➢ **Post meeting text, subsection (c)(2)(A)5.**
<u>Prior to creating the opening, the CBB system shall be set-up and maintained at least 6 feet and no more than 10 feet from the entire unprotected edge of the opening until the task is completed or the opening is covered.</u>

Discussion

- The Chair clarified the distance where the cone and bar will be set up. Members Kevin Bland (Ogletree Deakins, Nash, etc), Greg McClelland (Western Steel Council), and Tom Davies (Herrick Construction) suggested that the CBB should be set up at least 6 feet and no more than 10 feet from the opening.

- The Chair asked the members of the committee if the person creating the opening should be protected from falls. Members expressed general agreement that the employee creating the opening should be protected.

- Larry McCune (Division) asked if the openings are cut on the floor or existing openings on the decking.

- Greg McClelland (Western Steel Council) replied "yes". These are not openings that are covered in other sections of the standards such as opening that are decked over and cut open later. These openings are created specifically for the work in progress below the floor level. The reason for 6 feet is deck width, 3 feet wide standard sheet of decking to be reinstalled, still giving room of 3 feet for the individual to work safely and the covering of that opening and pick up 3 foot piece of decking so the opening can be covered.

- The Chair asked about openings that are created due to a job change.

- Greg McClelland (Western Steel Council) stated that the proposed §1632(c)(2)(A)5. can be used for that as well.

- John Konechne (California Erectors) suggested using the term "created floor opening."

- Spencer Wojcik (Clark Construction) brought up the concept that the CBB needs to be set up with no gaps.

Discussion on the idea of a continuous barricade, no gaps

- Spencer Price (Division) suggested using the term "contiguous."

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated the he does not like "contiguous," because the dictionary definition uses the word "touching," meaning the bar would touch the cone, but they are not always touching.

- Bill Benham (Bill Benham Consulting, LLC) cited language from §1671.2 as an example of language that can be used "…extend from the entire length of the unprotected edge and shall be approximately parallel to the unprotected or leading edge." Using the above language as a guide, he suggested that CBB shall be installed along the entire length of the protected edge. §1671.2 refers to the control line of the controlled access zones, not openings.

- The Chair added on the suggested language, "entire unprotected edge of the opening."

- The advisory committee members' consensus was to have staff add the language shown above regarding the unprotected edge of the opening.

- Someone suggested adding the word "length" to read "entire length of the unprotected edge." The advisory committee members rejected adding the word "length," because it is not necessary and may decrease the clarity because an opening also has a width.

➢ **Post meeting text, subsection (c)(2)(A)6.**
Employees setting up, walking, or working inside the demarcated area shall be protected from falls using personal fall protection in accordance with Section 1670.

- The advisory committee members reached consensus on the proposed text, no discussion.

➢ **Post meeting text, subsection (c)(2)(A)7.**
The CBB system shall not be used in lieu of falling object protection.

Discussion

- Larry McCune (Division) suggested language that would require workers below a multi-level floor opening to have overhead falling object protection.

- Russell McCrary (Iron Workers Safety Institute) stated that employees working below the opening will be ironworkers because no other trade is working below that floor.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that for falling object protection, there is a regulation that states you cannot work underneath where someone else is working. See §1710 (j)(2) for reference.

  § 1710. Structural Steel Erection.
  (j) Falling object protection.
  *(2) Protection from falling objects other than materials being hoisted. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided.**

If you have an ordinary floor (less than 15 feet between floors) and you can open up that one floor and get in that opening and work with no overhead protection because there is floor covering above. But if you have multiple floors with openings and the ironworkers are exposed to falling objects, either below the area that is turned over to other trades or the area that is still under the control of the steel erection contractor, one will likely still need falling object protection. [KB Clarification 4/13/20].

- Spencer Wojcik (Clark Construction) commented that the multi-level wording is not needed. For falling object protection, the requirement should be that while steel erection is still taking place, workers shall not be allowed to be working underneath the opening or there shall be some type of falling object protection underneath the opening.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) asked if there is no CBB, what is the current rule above or below the worker?

- Larry McCune (Division) replied that normally there is continuous decking unless it is covered.

- Russell McCrary (Iron Workers Safety Institute) added that you cannot work below the opening. You are required to have a decked floor every 30 feet. The CBB use as proposed, does not allow the building to have another opening on the floor below if there is opening in the floor. The floor below is not turned over yet.

- Greg McClelland (Western Steel Council) stated that they are not proposing to change the two floor rule or 30 foot floor restriction.

- Larry McCune (Division) stated that §1710 states that the decking be complete in each level.

- Spencer Wojcik (Clark Constructions) suggested that workers should not be allowed to work below openings.

- Bill Benham (Bill Benham Consulting, LLC) stated that workers shall not be allowed to work below a floor opening unless there is falling object protection.

- Larry McCune (Division) stated nobody should work on an opening with 10 floors open above you.

- Greg McClelland (Western Steel Council) responded that the scenario posed by Mr. McCune (Division) would violate the 2 floor, 30 foot requirement. Western Steel Councils is not suggesting to have CBBs directly overhead each other. See §1710(l)(7) for reference.

§1710. Structural Steel Erection

*****

(*l*) Temporary Flooring - Skeleton Steel Construction in Multistory Buildings

*****

(7) Where skeleton steel is being erected, a tightly planked and substantial floor shall be maintained within two stories or 30 feet, whichever is less, below and directly under that portion of each tier of beams on which any work is being performed.

- Bill Benham (Bill Benham Consulting, LLC) commented that if someone is working within the CBB area and there is a floor below, you have to barricade the area or cover the floor below.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) If the 3rd floor and 5th floor needs moment connection work, there will be no one on the second floor and no one on the 5th floor.

- Eric Berg (Division) stated that you should not have vertically aligned openings.

- Michael Frye (Division) asked if you can have the CBB on multiple floors as long as the floor is not turned over to GC (general contractor).

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied yes.

➢ **Post meeting text, subsection (c)(2)(A)8.**
<u>Unauthorized employees shall be prohibited from disturbing or entering area demarcated by CBB system.</u>

- The advisory committee members reached consensus on the proposed text, no discussion.

➢ **Post meeting text, subsection (c)(2)(A)9.**
<u>Employees shall be trained in the proper set up and use of CBB system. Training shall be documented in accordance with Section 3203(b).</u>

- The advisory committee members reached consensus on the proposed text, no discussion.

- **Post meeting text, subsection (c)(5)**
  The placement of covers <u>and CBB system</u> shall be verified by a qualified person prior to each shift and following strong wind conditions.

  The requirement for the CBB to be inspected is to be consistent with proposed §1635(c)(2). Since the CBB system will be permitted to be in place until work is completed, the inspection requirement ensures that the CBB system is properly set-up at the beginning of the shift. This practice gives the employer a chance to reposition the CBB system in case it was displaced overnight.

  Discussion

  - Larry McCune (Division) stated that all barricades have to be verified. He also added that the floor area has to be barricaded as well. Subsection (c)(1) currently states that the floor or working level shall be barricaded. The proposed revision of subsection (c)(5) is intended to address the change in subsection (c)(2).

  - Advisory committee members all agreed with the change.

  - Spencer Wojcik (Clark Construction) stated that according to subsection (c)(1), in order for the CBB system to apply, you are required to barricade the floor to limit the access to only steel erection workers. See §1635(c)(1) is for reference.

    §1635. Floor Walls and Structural Steel Framed Buildings.

    (c) Special Provisions Applicable to Floor Openings. Section 1632(b) applies to floor openings at locations where steel erection work is taking place. This subsection applies where work is in progress that requires floor openings to be uncovered. For such work, all of the following requirements shall apply:
    (1)The floor or working level where such work is in progress shall be under the exclusive control of the steel erection employer and shall be barricaded to prohibit entry by unauthorized personnel.

  - Bill Benham (Bill Benham Consulting Company, Inc.) stated that he does not think that subsection (c)(5) needs be amended.

  - Kevin Bland (Ogletree, Deakins, Nash, etc.) stated to disregard the barricade comment related to subsection (c)(1). Because subsection (c)(2) was modified, subsection (c)(5) was modified to add CBB.

  - Eric Berg and Jason Denning (Division) opined that they favored the proposed change.

- Bill Benham (Bill Benham Consulting LLC) asked if the CBB cannot be used if workers from other trades are in the same floor.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied that the steel erection contractor needs to take back exclusive control of the floor before the CBB can be use. Unless iron workers have exclusive control of the floor, the CBB system cannot be used.

- Greg McClelland (Western Steel Council) stated that custody will have to be released to the iron workers for exclusive control in order to use CBB.

➢ Appendix B

Photo: Western Steel Council will provide a photo at a later time

COST AND BENEFITS

The Chair explained that OSHSB is required to provide answers to the following questions.

Greg McClelland (Western Steel Council) stated that based on the experience and the amount of practical application of the system, Western Steel Council can provide the data for the previous 10 years accident history for moving plank and plywood. Mr. McClelland sent his responses via e-mail.

- **What are the total number and types of business that will be impacted?**

  General Contractors
  According to the US Census Bureau, there are 16,718 commercial general contractors, but not all these contractors will be affected. This number is high because it is hard to differentiate between commercial general contractors who build buildings that involve structural steel erection. For example, some multifamily residential construction require steel erection and others do not.

  The Chair asked if the committee members have a better estimate of the number of general contractors that will be impacted.

  Steel Erection Companies
  According to the Licensing Board, there are 1,255 contractors with a C-51 Structural Steel license.

  Are all C-51 license holders affected by the proposal?

- **What are the types of jobs and number of jobs that are impacted?**

  Iron workers. According to the Bureau of Labor Statistics, there are 9,670 iron workers working in California

- **What is the Fiscal Cost?**

  The Chair is assuming that local and state government contract out the construction of state and local buildings.

- **Where is the cost coming from?**

  Cost of Materials – cones, bars, training materials.

- **What is the benefit in terms of dollars?**

  - Decrease in accidents.
    Greg McClelland (Western Steel Council) stated that the total cost of 10 related injuries involving falls, back/soft tissue, strains, and increased insurance costs when using the plank and plywood to cover openings was $930,000 or $93,000/year.

  - Time savings.

  - Less plywood used.
    Greg McClelland (Western Steel Council) stated that for the average employer, the decrease in plywood would create a net savings of approximately $8,000 per year, per employer. The cost of plank and plywood that would be eliminated would be $11,000 per year to be replaced by the cost of the CBB of approximately $3,000 per year.

    As an example:
    The new installation cost per 10'x15' opening using plank and plywood (equipment and materials): $1,300 per opening.

    Note: Plank and plywood requires 2 people plus use of equipment;
    The new installation cost per 10'x15' opening using CBB: $400 per opening.

    Plank and plywood have a useful life of approximately 2 years. Note: Plank lasts longer but replacement plywood is purchased 2 to 3 times/year.

CBB has a useful life of 8 to 10 years or more. Western Steel Council employers estimate conservatively the CBB system to last at least 8 times longer than plank and plywood. To date, the employers have little to no replacement of CBB over a 10 year period.

- **What is the initial cost and reoccurring cost to a typical business?**

  What is the cost to a typical steel erection business?

  Greg McClelland (Western Steel Council) stated that the initial cost is approximately $3,000 per year for employers.

  Advisory committee members stated that they believe that reoccurring or ongoing cost is about 5% of the initial cost.

- **What is the initial and reoccurring cost to a small business?**

  Small business criteria according to 13 CFR, Title 13, Section 121.201:

  Structural steel contractors with an average annual receipts of $16.5 M or less.

  New multi-family, industrial building construction, commercial and institutional building contractors with annual receipts of $39.5 M or less.

  Advisory committee members were in consensus that reoccurring or ongoing cost is about 5% of the initial cost.

Section 1710. Structural Steel Erection.

- **Post meeting text, subsection (*l*)(1)**
  (*l*) Temporary Flooring - Skeleton Steel Construction in Multistory Buildings.
  (1) The derrick or erection floor shall be solidly planked or decked except for access openings. Planking ~~or~~ and decking of equivalent strength, shall be of proper thickness to carry the working load. Planking shall be not less than 2 inches thick full size undressed, and shall be laid tight. Both planking and decking shall be secured.

  There were no substantive changes from the pre-meeting proposal.

  Discussion

  - The Chair stated that the proposal did not include the Petitioner's text in the proposal because of the conflict with the Labor Code.

- Greg McClelland (Western Steel Council) asked if the only way to revise this subsection is to go to the legislature, regardless of the current work practice.

- Chair responded that Mr. McClelland was correct.

➢ **Post meeting text, subsection (*l*)(3)**
The exposed edges of all temporary planked and metal decked floors at the periphery of the building, or at interior openings, such as stairways and elevator shafts shall be protected by a single 3/8-inch minimum diameter wire rope of 13,500 pounds minimum breaking strength located between 42 and 45 inches above design finish floor height. Other guardrail protection may be used if equal fall protection is provided.

NOTE: If the periphery fall protection is intended to be used as a catenary line, it shall meet the provisions of Section ~~1710(m)(4)~~ 1670.

There were no substantive changes from the pre-meeting proposal.

Discussion

- The Petitioner's proposed text in effect creates an exception to the use of guardrails if the fall protection system used is engineered by a registered California State Structural Engineer.

- Greg McClelland (Western Steel Council) stated that the reason for the request is Compliance Safety Health Officers (CSHOs) from the Division have inspected the site and have used this section to cite for areas where CBB is being used.

- The Chair asked Mr. McClelland if there is no need to change subsection (*l*)(3) now that we have a CBB proposal.

- Greg McClelland (Western Steel Council) responded "yes".

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated that the Petitioner's proposed change had become mute.

➢ **Post meeting text, subsection (*l*)(4) Midrail protection.**
(A) Midrail protection shall be installed as soon as the metal decking ~~has been installed; and~~ installation is complete and the floor is ready to be turned over to the custody of the controlling employer; and

(B) Shall be installed prior to the decked area being used by trades other than the steel erector or decking crew.

NOTE to Section 1710(*l*)(4): See subsection (o) regarding custody of guardrails.

After further examination, the Chair determined that the post meeting text was not as effective as the federal standard. See Federal Register excerpt below.

Federal Register Volume 66, Number 12 (Thursday, January 18, 2001)
Rules and Regulations
Page 5214

The claim that field-installation of shear connectors will increase the likelihood of falls (Exs. 13-176; 13-180; 13-210) is based on the assumption that workers installing shear connectors will have greater exposure to fall hazards. The provisions of this standard, however, will protect these workers. For example, Sec. 1926.754(c)(i) prohibits the installation of the connectors until the metal decking (or other walking/working surface) has been installed. Once the decking has been installed, under Sec. 1926.760(a)(2), perimeter safety cables must be installed. Therefore, **those installing the shear connectors will have a safe walking/working surface to work from, and will be protected from the exterior fall hazard by the perimeter safety cable.**

Based on the above information, “metal decking has been installed”, means that the decking has been laid out, secured, and sufficiently safe to walk or work on by experienced workers.

The Chair is proposing:

(A) Midrail protection shall be installed ~~as soon as the metal decking has been installed;~~ after the decking is installed and prior to the installation of shear connectors~~; and~~

~~(B) Shall be installed prior to the decked area being used by trades other than the steel erector or decking crew.~~

NOTE to Section 1710(l)(4): See subsection (o) regarding custody of guardrails.

If midrails are installed after the deck is installed and prior to the installation of shear connectors, then midrails will be available to other trades, therefore (l)(4)(B) is not necessary. Furthermore §1710(o) addresses custody of guardrail systems.

Discussion

- Greg McClelland (Western Steel Council) stated that the text proposed in the Petition letter was in response to several decking contractors. There is a wide variation in the interpretation of the word "installed" as it pertains to the requirement for midrails to be installed as soon as metal decking has been installed. Mr. McClelland would like confirmation on whether "installed" means complete installation or installation in progress. The work entails longs sheets of metal decking that are heavy and need to be pulled, propped on one edge and slid diagonally. A midrail prevents them from sliding it through the perimeter of the building which has a top rail. The top rail gives them a visual or physical cue where fall protection is necessary and ironworkers are wearing them.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) stated in the past advisory committee meeting, the intent was that the midrail be installed after the decking is done and prior to the turnover to another tradesman.

- Larry McCune (Division) stated that the problem exists when installing flashing in the perimeter of the building. If you don't have midrail, you have to use personal fall protection. The Division found employees working with just the top-rail when installing flashing, no fall protection. Mr. McCune thinks having a midrail would add safety.

- Greg McClelland (Western Steel Council) stated that if the flashings were 6 inches in height, he agrees in having the midrail installed. However, the metal flashings are quite tall and heavy and difficult to handle with both the midrail and top rail installed. They are seeing more injuries because they are having to work between 2 metal cables to install bent plates, flashing, and individual caps.

- Greg Olmsted (JD2 Innovative Steel Solutions, Inc.) opined that fall protection is required when installing flashing. Having a midrail contributes to soft tissue injury making it difficult to handle the material at the edge of the building.

- The Chair stated that the proposal has to be at least as effective as the federal standard.

- Bill Benham (Bill Benham Consulting, LLC) asked if the guardrail is not complete, is it reasonable to expect employees within 6 feet of the perimeter be tied off?

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied "yes". The Petitioner's text is not proposing to change the tie off requirements.

- Greg McClelland (Western Steel Council) stated that the problem is understanding what "installed" means. Some say installed means as soon as a sheet of decking is welded down. Western Steel Council does not think that decking is installed until the inspector on record or site inspector has agreed that decking is installed.

- Spencer Wojcik (Clark Construction) stated that there is a sequence of work activities. Metal decking is complete before the bent plates are installed.

- Chair asked for the timeline when the midrails are installed. In the videos that the Chair viewed, the top rail is up when the decking gets to the edge.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) suggested that in order to be as effective as the federal standard "installation" should be defined. "Installed" should be considered after ironworkers are completely done, after the bent plate and flashing have been installed.

- Russell McCrary (Iron Workers Safety Institute) stated that it should be made clear that midrails should be installed when ironworkers are done with the floor.

- The Chair explained the federal register stated that midrail installation is intended to protect workers during the installation of shear connectors.

- Greg McClelland (Western Steel Council) stated that the deck is complete if the shear studs are being installed. The deck has been signed off if the shear studs are being installed. The decking operation is considered complete when the edge metal, flashing and bent plate installation is complete. The deck has been welded and has mechanical pins. It is then that the shear connectors are allowed to be installed. There is no issue of having a midrail requirement prior to the installation of shear stud, because the workers are no longer handling long awkward pieces of material.

- Greg Olmsted (JD2 Innovative Steel Solutions) agreed with Mr. McClelland.

- The Chair asked the committee's thoughts on creating a definition aligned with Mr. McClelland's statement.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) proposed a definition of "installed" to state as soon as metal decking installation is complete and the floor is ready for turnover to, and acceptance of custody by, the controlling contractor and prior to the installation of shear studs. Mr. Bland suggested using the Petitioners'

proposed "(B) Shall be installed (ii) prior to the decked area being used by trades other than the steel erector or decking crew".

- Bill Benham (Bill Benham Consulting, LLC) asked how to protect other iron workers who are not decking and not installing the bent plates. Do they have to be tied off within 6 feet of the perimeter of the building? The top rail is up, but not yet stretched if it is being used as a catenary line. How are the other employees protected?

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied that if there is a fall hazard and they are working in an area where they need to be tied off, then they need to be tied off. The midrail requirement is separate and apart from the requirement to tie off. It is the same as the current requirement. If you have a deck that is not yet finished, you have to put one line across, there is with no midrail.

- Greg Olmsted (JD2 Steel Innovative Solutions) CBB is applicable to the ironworkers involve in bolting and welding installation of supplemental steel. The deck will be completed and after the ironworkers doing the bolting and supplemental steel installation have moved up to the higher floor.

- Bill Benham (Bill Benham Consulting, LLC) commented that placing the midrail and tightening the top rail is fall protection. He asked what is protecting the other workers.

- Greg McClelland (Western Steel Council) responded to Mr. Benham and said training, recognition of the hazard and the current fall protection requirements in §1710.

- Eric Berg (Division) replied that passive protection is more effective than personal protective equipment (PPE), guardrail protection is more effective than personal fall protection.

- Spencer Price (Division) wanted clarification on the sequence of work. Connectors go up, then the bolt up, then the plumb up crew. He asked if there are deckers present when the bolt up crew and the connecting crew are there.

- Kevin Bland (Ogletree, Deakins, Nash, etc) and Russell McCrary (Iron Workers Safety Institute) replied that crews of ironworkers go up there simultaneously.

- Russell McCrary (Iron Workers Safety Institute) added that most of the time the deckers are finishing up the flashing around the perimeter of the building. There

are hardly any other workers there. The Bolt-up and Plumb-up crew have moved up.

- Greg McClelland (Western Steel Council) added that there are occasions due to sequencing of work, depending on the restrictions of the footprint or long billboard style structure that you really have to track the different aspects of steel erection. You may have steel erection taking place and one day behind them are the decking crew spreading the deck as a safety floor. Deckers may be on the level where the connectors are or they may be on the floor below. The floor is the area to stage material or effect a rescue. These iron workers are under the 15 to 30 rule trigger heights for fall protection except for connecting and controlled decking zone. Leading edge work may require PPE.

- Bill Benham (Bill Benham Consulting, LLC) stated when other ironworkers show up on the deck and there is no midrail, then they are subject to 15 to 30 tie off rule.

- Chair stated that without Petitioners' proposed subsection (B) the Petitioner's text has the same regulatory effect.

- Spencer Price (Division) suggested to try to narrow down who is still exposed when the inspector is there. The building inspector is there for building safety. He disagrees with including the inspector language as part of the definition of installed.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) suggested leaving out the text regarding the inspector.

- The Chair stated that without the text pertaining to the inspector, the Petitioner's proposed text without the proposed subsection (B) has the same regulatory effect as existing text, which is to require midrails to be installed prior to allowing other trades to use the floor. In order for other trades to use the floor, the general contractor is required to inspect the guardrail system and accept custody of the guardrails (toprail and midrail). See Petitioners' proposed text and existing text for reference.

Petitioners' proposed text

(*l*) Temporary Flooring-Skeleton Steel Construction in Multistory Buildings

*****

(4) Midrail protection.

(A) Midrail protection shall be installed: ~~as soon as the metal decking has been installed; and~~ (i) as soon as metal decking installation is complete and the floor is ready for turnover to and acceptance of custody by the controlling contractor; and

~~(B) Shall be installed~~ (ii) prior to the decked area being used by trades other than the steel erector or decking crew.

(B) The deck shall be deemed complete when the erector has established that the entire decking process for a specific elevation or floor is finished and has bee inspector or record or other inspecting agent.

Existing text

(*l*) Temporary Flooring-Skeleton Steel Construction in Multistory Buildings

*****

(4) Midrail protection.
(A) Midrail protection shall be installed as soon as the metal decking has been installed; and

(B) Shall be installed prior to the decked area being used by trades other than the steel erector or decking crew.

*****

(o) Custody of guardrail systems. Wire rope or other guardrail protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative:
(1) Has directed the steel erector to leave the wire rope or other guardrail protection in place; and
(2) Has inspected and accepted control and responsibility of the wire rope or other guardrail protection prior to authorizing persons other than steel erectors to work in the area.

Listening to the recording, it appeared that the Chair did not clearly explain why the Chair believes that the Petitioners' proposed text is equivalent to existing text. The existing text states that both conditions (A) and (B) be met before midrail protection is required.

If after the condition in subsection (A) is reached, midrail protection is required, then this would mean that midrail protection would be provided for any worker, even other trades. Therefore subsection (B) would not necessary. However, the existing text after subsection (A) states" ;and (B) shall be installed prior to the decked area being used by trades other than steel erector or decking crew",

therefore this means that both conditions must be present before midrail protection is required.

Furthermore, subsection (o) states that the general contractor must have custody of the guardrails before allowing other trades to be present. This means that both the toprail and the midrail are installed prior to floor being used by other trades.

- Greg McClelland (Western Steel Council) stated the reason for the proposal is the lack of clarity of "installed." This is the main issue. Putting a majority of the decking down does not mean "installed," it means "installing."

- The Chair stated that if we added Petitioners' proposed (*l*)(4)(B) then the proposal might be deemed not as effective as the federal standard.

- Greg McClelland (Western Steel Council) disagreed with the Chair's statement regarding the effectiveness of the proposed language.

- Spencer Price (Division) stated that if the decking is complete in one area, and not complete in another, that portion of the decking is considered complete for the workers in the completed area.

- The Chair stated that adding the Petitioners' subsection (B) would render the proposal to be not as effective as the federal standard because the city inspector who is not an ironworker would be exposed to the hazard of not having a midrail.

- Greg McClelland (Western Steel Council) agreed with the Chair's preceding statement.

- The Chair asked the committee to differentiate between the current standard Petitioners' proposed standard.

- Kevin Bland (Ogletree, Deakins, Nash, etc.) replied that the Petitioners are adding "as soon as decking completed and accepted." By including this language, they are defining "installed."

- Larry McCune (Division) commented that delaying the installation of midrail would be exposing a lot of ironworkers to a fall hazard.

- The Chair found it challenging to determine the difference in effect between the Petitioner's text and the current text, because other trades are not allowed to use a floor that has not been signed off or turned over.

- Spencer Price (Division) asked what document is required to turn over the floor.

- Greg Olmsted (JD2 Innovative Steel Solutions) replied that there is a document between the subcontractor and the general contractor.

- Greg McClelland (Western Steel Council) added that there is no document between the subcontractor and the other trades. The controlling contractor directs the other trades. There is a document that shows that the general contractor has accepted custody and the floor is open for other trades. The steel erection contractor then removes their sign that restricts access to other trades. The general contractor decides which trades will access the floor. There is written requirement for turning over.

- The Chair referred to §1710(o) that contains requirements for custody. See §1710(o) for reference.

  §1710. Structural Steel Erection.
  ****
  (o) Custody of guardrail systems. Wire rope or other guardrail protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative:
  (1) Has directed the steel erector to leave the wire rope or other guardrail protection in place; and
  (2) Has inspected and accepted control and responsibility of the wire rope or other guardrail protection prior to authorizing persons other than steel erectors to work in the area.

- Tom Davies (Herrick Construction) explained that the general contractor typically flags the safety cable to indicate that the floor has been turned over.

- The Chair inquired if other trades use the deck area without the floor being turned over.

- The advisory committee members replied that other trades do not use the floor if the floor has not been turned over.

- **Post Meeting Text, subsection (*l*)(6)**
  Metal decking holes ~~and~~ or openings shall not be cut until immediately prior to ~~being permanently filled with the~~ installation of equipment or structure ~~needed or intended to fulfill its specific use~~ for which the hole or opening is needed or intended and which meets the strength requirements of Section 1632(b) of these orders, or the hole or opening shall be immediately covered.

  NOTE: See Section1635(c) for work in progress that requires floor openings to be uncovered.

  There is no substantive change.

  Discussion

  - The Chair asked the committee members to explain why the Petitioners' proposal strikes out "temporary."

  - Greg McClelland (Western Steel Council) replied that the opening may not be permanently filled, such as trash chutes, temporary air ducts, shoring, and falsework.

Larry McCune (Division) stated that it is important that the equipment covering the opening meets strength requirement of §1632(b). The advisory committee was in consensus on the proposal to retain the existing strength requirement.