

**OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD**

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MINUTES OF THE ADVISORY COMMITTEE FOR
GENERAL INDUSTRY SAFETY ORDERS, SECTION 3212, FALL PROTECTION FOR WORK
AROUND SKYLIGHTS

August 14, and October 22, 2014
Sacramento, CA

1. Call to Order.

The first day of the meeting was called to order by the chairman, David Kernazitskas, Senior Safety Engineer, Occupational Safety and Health Standards Board (OSHSB), at 9:05 am on Thursday, August 14, 2014, in Sacramento. The Chair was assisted by Leslie Matsuoka, Staff Services Analyst, OSHSB.

2. Opening remarks.

Mr. Kernazitskas went over the handouts and started the introductions of the attendees. He then reviewed the Standards Board policy regarding the use of advisory committees and provided general information about the rulemaking process.

3. Discussion of the proposed rulemaking:

Background

The Chair explained that the advisory committee was convened as a result of Petition 531 (California Solar Energy Industries Association (Cal-SEIA)), requesting that the Board consider alternative fall protection measures for work around skylights. Petition 531 was granted by the Board on June 19, 2014.

Discussion on Necessity

Dan Lecox (Greenberg Traurig, representing Cal-SEIA) and Jesse Elliott (Cal-SEIA, REC Solar) spoke on the necessity for a change to the current standard. Mr. Lecox stated that the current standard had clarity issues, explaining that the ANSI 1264.1-2007 standard appeared to allow the skylight itself to serve as a cover. He also shared an OSHA interpretation letter, which also implied that a skylight could serve as a cover if it met specific strength requirements. The confusion, he opined, was where the Title 8 standard stated that skylight covers installed over the skylight must meet certain strength requirements. The word "over" suggests that the skylight itself cannot be used as its own cover, he said. He suggested that this was a point in need of clarification.

He continued, citing another point of confusion where the standard discusses the use of a screen over the top of the skylight surface. The Title 8 standard prohibits the deflection of a screen above the skylight sufficient to break the glass below. Mr. Lecox said that the California Building Code recognized

differences in skylight glazing materials and that plastics, ceramics, and glass were treated differently. He referred again to the same OSHA interpretation letter and pointed out that the letter stated that the prohibition against breaking the skylight glass may not apply if a material other than glass is present. He suggested that the intent of the prohibition for breaking the skylight glass could be clarified in the standard.

Mr. Elliott spoke on the practicality of the current requirements for fall protection when working around skylights. He said that skylight screens can interfere with fire rated skylights and smoke vents on commercial roofs. He also pointed out that the screens must be custom built for each skylight, increasing costs and the time of exposure to the unguarded skylight. As a solar energy contractor, he places a “sea of modules” on a roof to protect skylight openings, which must be removed when the job is completed.

Regarding guardrails, he said that they too require assembly and disassembly, and some are required to be built in place around the skylight, exposing employees to a fall hazard. Wood guardrails can degrade due to environmental factors and may not last as long as the job, he said. Additionally, some roofs have special characteristics that do not allow guardrails to be used because of weight limitations or prohibitions on piercing the roof for installation.

He pointed out issues with personal fall protection too, stating that the lines can interfere with material handling and pose tripping hazards. He said that some roofs have anchorage challenges and disallow mobile anchorage carts because of weight limitations.

He said that covers can interfere with the operation of fire safety characteristics of certain skylights and, again, employees are exposed to a fall during installation. Roof load limits and high shipping costs also apply, along with increased installation time.

Finally he said that the fall protection plan option was an administrative control. He pointed out that the plan must be written by a qualified person (QP) and that not all employers have a QP on staff. He declared that no option is perfect and asked for more solutions to handle each circumstance.

Mr. Leacox said that more options would lead to more safety because they are more adaptable to certain situations and would encourage compliance.

Carlos Ramirez (Solar City) stated that he uses multiple options on a roof, but each of them can pose different challenges. He said that while using the options currently available, he still experiences injuries. For example, he said, guardrails can be blown off the roof in high winds, and covers require carpentry, which introduces new workplace hazards.

Steve Johnson (Associated Roofing Contractors) stated that he would like to see more options available.

Kevin Bland (Ogletree, Deakins, Nash, Smoak & Stewart, representing CFCA / RCA / WSC) stated that he would like to clarify certain elements of the standard.

Kathleen Barber (SMJATC 617, IBEW / NECA) said that the concerns about tripping over fall protection lines can be addressed by effective training. She continued saying that guardrails and screens, requiring specialized labor may require subcontracting, which can be burdensome. She said that more options for protecting against falls is beneficial, but cautioned against a rush to change any of the current requirements, except where clarification of the current language is necessary.

The Chair asked if anyone did not feel that there was a need to continue discussing changes to skylight fall protection. None of the attendees was opposed to proceeding. The committee agreed that more options would lead to more safety.

Rulemaking Language Discussion

Art Valentz (President, V-tech Skylights) delivered a presentation on the characteristics of V-tech Skylights, which he claims will meet or exceed the Cal/OSHA strength requirements for covers over a working life of up to 20 years. The Chair commented that he believed that V-tech and similar skylights can serve as models for manufacturers hoping to produce skylights able to meet the strength requirements of Title 8 and other standards.

Prevention of glass breakage when using personal fall protection

The Chair addressed the first item for discussion, regarding the breaking of glass when an employee falls through a glass skylight. He said that Petition 531 asserted that it was inconsistent to allow an employee falling through a skylight to break the glass, while prohibiting glass breakage from a screen placed above the skylight. In the Petition, the Petitioner asked if a prohibition on the use of personal fall protection around glass skylights was necessary.

The committee concluded that using personal fall protection offered more protection to an employee by limiting the fall distance than would be afforded by disallowing the use of such protection when the skylight glazing is made of glass. The Chair proposed not changing the language to prevent the breaking of glass when using personal fall protection. The committee agreed.

Screens below the skylight (i.e. burglar bars)

The Chair asked the committee for their thoughts on allowing a screen below the skylight to serve as fall protection.

Mr. Leacox said that the screen provides protection only if it is present. Because of fire protection requirements, some skylights cannot have screens installed above them. He said that screens underneath are plentiful and should be recognized as fall protection.

Mr. Elliott suggested adding language for the screen and cover to meet the strength requirements of a cover, but not the stenciling requirements. Jason Moore (C.S. Caulkins Co., Inc.) suggested removing the language in paragraph (e)(1) that prohibits the breaking of the glass by the deflection of the cover.

Eric Berg (Division of Occupational Safety and Health) said that he wanted to keep the language prohibiting the glass from breaking by a deflecting screen above the skylight surface. The Chair asked him for his opinion on why it would be acceptable to break the glass using personal fall protection, but not when using a screen. Mr. Berg replied that he did not want to weaken the current standard.

Mr. Bland proposed a new subsection to specifically address skylight screens below the skylight. Doing so, he asserted, would not weaken the protections of the current regulation regarding screens over the top of skylights. The committee agreed and a new subsection (e)(2) was created to address screens below the skylight. Subsection (e)(1) was changed to begin with the words “Skylight screens installed above the skylight.”

The Chair asked the committee under which conditions the screens could be safely used under skylights for fall protection.

Mr. Berg said that the screens should be within 2 feet of the walking/working surface, based upon the fall arrest distance allowed in Section 1670.

Mr. Ramirez said that most screens are 6 inches to 2 feet below the walking/working surface. He continued saying that although some skylights have curbs that are several feet high, the screen is still within 2 feet of the walking/working surface.

Nigel Ellis (Ellis Fall Safety Solutions) said that we needed to define the strength of the screen underneath the skylight because it would absorb a much larger impact force than a screen over the top of the skylight.

The Chair asked the committee to address the increase in force hitting a screen placed below the skylight compared to the force on a screen above the skylight. Mr. Bland proposed language requiring the screen below the skylight to meet the strength requirements of subsection (b) with increased strength proportional to the increased fall distance below the walking/working surface.

The Chair asked if a professional engineer registered in the State of California (PE) would need to sign off on the calculated increase in strength requirements and Mr. Bland responded that whoever signs off on the strength requirements of subsection (b) now should be allowed to sign off on these calculations. Mr. Berg said that the person signing off on subsection (b) requirements should be a QP.

Ms. Barber asked how we could determine the strength of existing screens under the skylight. Monte Bridgewater (Hensel Phelps / Associated General Contractors) said that it could be burdensome on an employer to test and retest the strength of the skylight screen. Mr. Berg said that the manufacturer would be responsible for certifying that the screen would meet certain strength requirements. He said that it would need to be installed in accordance with manufacturer’s recommendations.

The Chair asked the committee members to research the strength of currently-installed burglar bars and provide the committee with information after the meeting.

The committee discussed the effect of the skylight glazing above the screen in reducing the impact force on the screen below. The Chair stated that because skylights degrade differently under environmental conditions, it would be necessary to assume that the screen would bear the full force of a worker and equipment impacting it in a fall and that none of the force would be reduced by the skylight glazing.

Mr. Berg said that he still had issues with a screen below the skylight: He did not want the skylight to be broken. He said that he was concerned that an employee falling onto a screen below the skylight could be injured by the glass captured in the grillwork of the screen. He also pointed out that the falling glass could injure employees on the level below the skylight. He said that a change to the standard to allow the glass to break would weaken the current standard. The Chair pointed out that the potential for injury from landing on glass captured by the screen was much smaller than the potential for injury from falling to the level below the skylight. Mr. Berg said that there was a range of injuries that could occur from landing on the glass, including minor cuts and serious puncture wounds.

Bob Downey (Construction Employers Association) asserted that although the glazing would be broken with a screen below the skylight, a fall would be prevented. Mr. Bland said that the current language only applies to a screen above the skylight. Using a literal reading of the language, the screen above the skylight may not deflect to break the glass below, but it does not prohibit a falling worker from breaking the glass and landing on a screen below because there is no mention of a screen below the skylight. Mr. Downey concurred, but Mr. Berg insisted that the skylight should not be broken while using a screen for fall protection.

The Chair asked the committee to discuss the concerns of the breaking glass. He said that the goal was to prevent serious injury or death by arresting the fall. Ms. Barber said that she understood the hazard of falling glass on people below, but that glass would fall on people below no matter how small the grillwork is on the screen below the skylight. She said that if another Title 8 standard protected employees from falling glass, then the ability to use screens below the skylight would increase safety and provide employee protection. Mr. Leacox pointed out that Title 8 Section 3273(e) required employers to provide protection from falling objects. He suggested that a reference to the section could be helpful in making employers aware of the need to protect employees below the skylight.

The Chair asked if it would be helpful to discuss the types of glass that could be broken, pointing out that not all glass produces shards when it breaks. Mr. Berg said that he would be less concerned about the hazards of falling onto the glass if the glass was tempered glass. He said that any glass that produced shards or another hazard when broken would be a concern.

Mr. Ellis said that plate glass should not be used because it can produce shards. He said that laminated or tempered glass should be used. The Chair asked if plate glass was still a concern if the openings in the screen grillwork were large enough to allow much of the broken glass to fall through. Mr. Ellis said that he still thought there was a risk of injury from plate glass even with large grillwork openings.

Mr. Berg said that the Division would not support the subsection for screens under skylights without some sort of requirement for safety glass or laminated material. Mr. Downey said that the primary focus

of the regulation is to protect against falls on roofs with existing skylights. He said that limiting the types of glass allowed would require retrofitting of skylights and negate the benefits of the rule change.

The Chair asked if we could specifically disallow the use of screens underneath the skylight when the skylight glazing is made of plate glass. Ralph Armstrong (IBEW 1245) agreed with the proposed exclusion because the screen underneath constituted a new option for fall protection and he felt it was reasonable to apply conditions for its use. He said that not all options currently available for fall protection can be used in all situations. Limiting the use of screens underneath would be no different, he opined. Mr. Leacox said that he supported the exclusion because the majority of skylights are made from materials other than plate glass.

The Chair asked Mr. Berg if he agreed with the exclusion. Mr. Berg said that he wanted to specify the safe options instead of disallowing a single unsafe option because he was not aware of all the materials that could pose impalement hazards to an employee lying on top of the screen. He preferred the standard to require safety, laminated, or tempered glass.

Mr. Berg said that a statement prohibiting the use of a screen below a skylight as fall protection when used under glazing that could pose an impalement hazard would be acceptable. The committee consensus was that screens installed within two feet of the walking/working surface could serve as fall protection as long as they met the strength requirements of subsection (b), increased for the added fall distance if the screen was below the walking working surface, and as long as the skylight glazing would not present an impalement hazard when the broken shards are captured by the grillwork of the screen.

Skylights serving as a cover

The committee moved the discussion topic to the use of a skylight as its own cover. Mr. Bland said that he appreciated the clarity provided by the words “including the skylight itself” in the sentence that says “Covers, including the skylight itself, meeting the requirements of subsection (b) installed over the skylights...” He said that he had concerns with the requirements of subsection (b) which require labeling of the skylight cover. He cautioned that the labeling requirements could conflict with the use of a skylight serving as its own cover if they required the specific lettering to be applied to the skylight glazing.

Mr. Moore suggested that the skylight serving as its own cover only be required to meet the strength requirements of subsection (b) and not the labeling or other requirements. Mr. Leacox said that it was necessary to differentiate between a cover and a skylight used as a cover because a cover would still need to be secured and labeled in accordance with subsection (b). Mr. Bland suggested a new sentence to address skylights serving as covers specifically. He suggested that the sentence read, “Where the skylight itself is used as a cover, only the strength and displacement requirements of subsection (b) shall apply.” The Chair opined that the displacement requirements were not necessary because the proposed amendment is to a General Industry regulation and the skylight would already be installed on the roof. Mr. Berg agreed that the displacement requirements were not necessary.

Mr. Berg said he was concerned about a skylight being used as a cover unless it had some information about the service life that the skylight could be expected to meet the strength requirements. He said it should have a label with the necessary information on it. Mr. Bland said that he agreed with Mr. Berg and suggested that requirements be added to the subsection listing the necessary conditions for a skylight to serve as fall protection.

The Chair asked what information would be required to be on a label to ensure that the skylight could serve as a cover. Mr. Bland said that he would prefer not to require the label, but to instead require certification of the skylight strength, in case the manufacturer was unable to provide a label. Ms. Barber suggested that a warranty label from the manufacturer could be used to certify the strength requirements of the skylight for a period of 5 or 10 years or more.

Mr. Elliott cited a case where he took a 6 year old skylight off of a Costco roof and performed strength testing on it and it passed. He said that we shouldn't assume that all skylights are unsafe to be used as covers. Mr. Ellis said that all skylights will eventually fail when exposed to environmental degradation.

Ms. Barber said that we should require a warranty from the manufacturer that the skylight meets subsection (b) strength requirements, and certification from a QP that the skylight continues to meet those requirements. The Chair proposed language requiring that the skylight be certified by the manufacturer or a PE to meet the strength requirements of subsection (b). He also suggested a second requirement for an expiration date for the manufacturer or PE certification.

Mr. Moore pointed out that subsection (f) only allows a PE to certify the strength of a glazed surface, and not a manufacturer. He also observed that there is no time element to such a certification. He suggested using the language from subsection (f) in the current subsection (e)(4) addressing covers used for fall protection. The Chair pointed out that fall protection is required in addition to the PE certification under the terms of subsection (f).

Mr. Berg said that from the discussion, it seemed like skylights were not safe to use as covers. The Chair pointed out that ANSI A1264.1-2007 "Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrails Systems" and federal OSHA regulations allowed skylights to serve as their own covers if they met certain strength requirements. Mr. Johnson said that as long as we follow the language of federal OSHA and the ANSI standard, we can use them as covers safely.

Mr. Leacox said that their safe use depended on being able take into account the life expectancy of the skylight's ability to meet the strength certification. He said that the standard should require something from the manufacturer indicating that the skylight would meet the strength requirements of subsection (b) for specified period of time. He said that it didn't need to be a label, but it did need to be verifiable by the manufacturer. Secondly, he said that the standard should allow for onsite testing and verification of the strength requirements of subsection (b).

The Chair asked if certification by the manufacturer was required in addition to certification by a PE. Mr. Leacox and Mr. Bland stated that either certification would suffice, but both should not be required.

Mr. Berg said that the testing of more than one skylight was necessary. Mr. Leacox said that testing the worst case example should be required. Ms. Barber said that a situation could occur where a skylight is replaced after the surrounding skylights had been installed. If the newly replaced skylight were tested, she said, it would be newer than the others and would not be representative of the surrounding skylights. She felt that more than one skylight should be tested. Mr. Bland said that allowing the employer to choose a representative skylight would force the employer to justify to the Division that the skylight tested was the skylight most exposed to environmental degradation.

Ms. Barber asked who would test the skylights. The committee decided that a QP would be sufficient to perform the testing. Mr. Ellis opined that plastic skylights should not be allowed to serve as covers due to the detrimental effects of weathering on the skylight system. Mr. Leacox said that under the proposed language, skylights not meeting the testing requirements would be excluded regardless of the material from which they were made.

The Chair told the committee that another day of meeting would be necessary to finish the discussion. He asked the committee to research information on burglar bar specifications and consider the progress made so far. In the next meeting, he said that we would lightly review the progress made today on skylight screens and focus on skylights used as covers and netting over skylights. He also said that he would email the proposed language so far to the committee members.

Day 2

The second meeting was called to order by the chairman, David Kernazitskas, Senior Safety Engineer, Occupational Safety and Health Standards Board (OSHSB), at 9:10 am on Wednesday, October 22, 2014, in Sacramento. The Chair was assisted by Leslie Matsuoka, Staff Services Analyst, OSHSB.

The Chair reviewed the purposes of the advisory committee and provided some background on the Standards Board for those that were not present for the first meeting.

After introductions, the Chair reviewed the progress made in the first meeting and explained a change that he made to the proposed text from Day 1. He said that he reorganized the language dealing with skylight screens below a skylight to make the requirements easier to identify.

Screens below the skylight (i.e. burglar bars)

The Chair reviewed the proposed language for screens under the skylight to the committee.

Mr. Berg commented that the proposed text in subsection (e)(2)(B) discussed screens up to 2 feet below the walking / working surface, but did not prohibit screens greater than 2 feet below the surface. The Chair asserted that the committee's intent was to prohibit screens more than 2 feet below the walking/working surface from being used for fall protection. He proposed adding a sentence to prohibit such screens. Mr. Berg said that would be acceptable to the Division.

The Chair asked the committee to investigate whether or not the screens needed to be allowed more than 24-inches below the walking/working surface and to report back if they found anything compelling. Barring additional information, the committee agreed that 24 inches should be the maximum distance below the walking/working surface.

The Chair asked if there should be any changes to proposed paragraph (e)(2)(C) regarding impalement hazards of broken skylight glazing. Bill Benham (Construction Employers Association) asked if there was any data suggesting that a worker would be impaled by falling through the glazing. The Chair said that newer skylights were made with safety glass similar to what is used in automobiles. He said that safety glass would not pose an impalement hazard, nor would old and brittle plastic skylights. He stated that the Division was concerned about someone falling through an older plate glass or hard plastic skylight that could create shards.

Larry McCune (DOSH) said that the building code required glass to be designed for human impact to prevent the creation of shards. Mr. Armstrong said that he did not want to allow an option for fall protection that would create another hazard. He did not support the use of a screen below the skylight if it would create an impalement hazard to the employee lying in the glass trapped on top of the screen.

Mr. Johnson said that disallowing the use of a screen below the skylight because of a potential impalement hazard would negate the benefits of burglar bars as a fall protection option. The Chair pointed out that the impalement hazard we were trying to prevent was for workers who had fallen through the skylight glazing and were lying on the screen below. He said that workers are currently allowed to fall through skylights and that there are no prohibitions for injuries sustained while falling through the skylight frame or broken glazing. The injuries we were discussing now would be those presented by a shard of glazing that was entrapped in the grillwork in a way that could injure a worker who was falling onto the screen. He speculated that the injury would be very unlikely.

The Chair summarized that industry's concern was that the burglar bars would not be used for fall protection because of a fear of being cited over a potential, though unlikely, hazard. He asked how we could re-word subsection (e)(2)(C) to be more palatable to industry. Mr. Bland suggested adding language to the subsection exempting tempered, laminated, plastic, and similar glazing from the materials that could pose an impalement hazard. The Division agreed with Mr. Bland's suggestion.

The Chair asked if anyone in the committee had a concern about the proposed language. Mr. Elliott asked if listing the glazing types would limit the options for glazing in architectural skylights. Mr. Bland responded that the words "or similar materials" would allow for other types of glazing materials such as those used in architectural skylights. Gregg Tinker (Tower Safety Services, Inc.) said that plastic glazing could potentially form shards, and as discussed on the first day, it could pose an impalement hazard. He added that he was not opposed to the language, however. The Chair asked if anyone in the committee felt that a change should be made to the proposed language in subsection (e)(2)(C). Nobody indicated disagreement.

The Chair moved on to paragraph (e)(2)(D), which addressed the opening in the grillwork of the screen. Mr. McCune stated that screens below skylights during construction can be very effective at preventing injuries from falls, but that the 4-inch by 4-inch maximum grill work spacing would prevent someone from cleaning the skylight from below. He pointed out that grillwork spacing under 12-inches would allow the skylight to be cleaned from below and would still be considered a hole instead of an opening. He said that the 4-inch by 4-inch opening would be too small. The Chair said that he had proposed a 6x6-inch square on the grillwork, based upon the ANSI A10.11-2010 requirements for fall protection nets in construction, to begin the discussion today.

Mr. Johnson said that he did not think that a slatwork screen would be used under the skylight. The Chair said that it would be difficult to clean a skylight from below if it was made from slatwork like a screen over the top of a skylight. The committee agreed to remove the language addressing slatwork screens from paragraph (e)(2)(D). The Chair proposed that subsection (e)(2)(D) read only as follows: "The screen construction shall be of grillwork, with openings not more than 6 inches by 6 inches."

The Chair then asked if 6 by 6 inches was sufficient or if we should discuss 8 by 8 or another hole size. Mr. Bland said that anything smaller than an opening would be sufficient because they do not require covers. Mr. Leacox again referred to the burglar bar specifications and pointed out that they reference 8 by 8 and 12 by 12 inches. Mr. Tinker said that he felt that a 6-inch square for the grillwork was the correct spacing. He said that a worker could fall through an opening and be injured by the impact with the screen. He opined that at 12-inches by 12-inches, a worker's head could go through the screen and cause serious injury. He said that the openings should be as small as possible. The Chair pointed out that more safety was afforded workers by allowing currently available screen designs to be used for fall protection. He also pointed out that employees would fall a maximum of 2 feet onto the screen, but that based on the current discussion, most of the screens would be installed at the roof level or within a few inches of roof level.

Mr. Bland pointed out that the burglar bar designs for the 12 by 12 inch spacing were measured from center to center. The opening created by the grillwork would be less than 12 inches by 12 inches because of the diameter of the rods making up the burglar bars. He cautioned that the more we try to exclude what is already available in the market, the less opportunity we have to provide for a safe work environment.

Mr. Berg said that 8 by 8 inches would work and that he was not convinced that 12 by 12 would be a safe surface to fall on. The Chair asked the committee to identify the hazards of wider grillwork spacing. Mr. Benham said that he would rather have a 12 by 12 grill below him than nothing and that his arm or leg could go through a 6 by 6 just as easily as a 12 by 12 opening. He said that stopping the fall was the important aspect to focus on. He said that the 12 by 12 would be reasonable to use. Steve Phetteplace (Safety Training Seminars) said that as the grillwork spacing widens, the diameter of the bars would also increase to provide the necessary strength. Mr. Johnson said that using 12 by 12 would meet current roof opening fall protection requirements and would not need further guarding. Mr. Bland said that we should accommodate what is currently available in the market. He said that going home with a bruise is better than not going home at all and opined that a larger opening was arguably safer than a smaller opening

because there were less crossbars to catch a finger or arm on. Ms. Barber agreed with Mr. Bland. She said that the larger opening would allow tools and equipment to fall through the screen more easily, capturing only the falling worker, and reducing the potential injury from landing on items in the screen. She said that since industry is already producing burglar bars with 12 by 12 inch spacing, we should not limit employers' options.

Mr. Armstrong asked what the construction netting standard required. The Chair responded that the nets had 6 by 6 inch openings. Mr. Armstrong said that because we were only talking about a 2-foot fall, the 12 by 12-inch opening would work. The Chair asked how the proposed text should read. Mr. Berg said that requiring "less than" 12 inches would work. The committee agreed that 12 inches by 12 inches was the correct spacing for the grillwork. The Chair pointed out that 12-inch by 12-inch grid spacing, measured off center, would comply with the current requirements because the opening would be less than 12-inches, due to the width of the bars.

The Chair reviewed the proposed language in subsection (e)(2)(A) and (e)(2)(B) for screens installed below the skylight, both at the roof level and within 2 feet of the walking/working surface. He asked if the committee had any concerns. Hearing none, he moved on subsection (e)(2)(C) regarding impalement hazards of glazing laying on top of the screen below the skylight. He also read the proposed language for (e)(2)(D). No concerns were expressed for any of the proposed language regarding screens installed below skylights.

Skylights serving as a cover

The conversation moved to skylights serving as covers. The Chair read the text of proposed subsection (e)(6) regarding covers. The Chair reviewed the progress made in discussing covers on the first day of the advisory meeting.

Mr. Bland said that the most important safety element for using skylights as covers is to include a date range for the certification that a skylight can be relied upon as a cover. He also said that the option for using a skylight as a cover needed to be clearly written into the standard to avoid confusion when enforcing the standard.

Mr. Berg said that the Division had an issue with subsection (e)(6)(b), which allows the employer to verify that a skylight meets the strength requirements of a cover by testing a representative number of skylights. He said that the Division has seen falsification of the testing by employers that has resulted in employee fatalities. He continued saying that the Division agreed with subsection (e)(6)(a), which allows a skylight to be used as a cover when the manufacturer provides documentation that the skylight will meet the strength requirements of subsection (b).

The Chair asked the committee if documentation from the manufacturer would be sufficient to allow the skylight to be used as its own cover. He explained that he envisioned that the manufacturer would certify that the skylight would meet the strength requirements of a cover for 10 or 20 years. He asked if documentation or labeling indicating such information would be sufficient. Mr. Berg said that as long as the employer has a written document, attesting to the strength and the period of time that the strength can

be relied upon, the Division agreed with the proposed language. Mr. Bland suggested that the language not use the word certification, stating that there were many different types of certification and the use of the word could lead to confusion over the standard's requirements. The Chair proposed using the word "documentation" and said that such documentation would be provided by the manufacturer, attesting to the strength of the skylight for a period of time. He reminded the committee that subsection (b) requires a cover to safely hold the greater of 400 lbs. or twice the weight of the employees, equipment and materials that may be imposed on any one square foot area of the cover at any time. He said that it could be difficult for a manufacturer to provide such documentation without knowing the anticipated weight of the employees and their equipment.

Mr. Phetteplace asked where the documentation should be stored. Mr. Berg said that it should be immediately available for employees to review. The Chair added that an inspector could shut down a job for not providing the proper fall protection for employees. He said that it was in the employer's interest to have the documentation handy to avoid a work stoppage from an imminent hazard. Mr. Tinker suggested moving the language requiring the documentation to be available upon request to a new subsection (e)(6)(c) so that the requirement would apply to documentation provided by the manufacturer or created by the employer as the result of onsite testing. The committee decided that (e)(6)(c) should read "Such documentation shall be made available upon request."

The Chair moved on to subsection (e)(6)(b), regarding employer testing of skylight strength, and asked Mr. Leacox to explain why the subsection was necessary. Mr. Leacox explained that onsite testing was necessary because not all manufacturers would be able to provide the necessary documentation attesting to the strength of a skylight.

Mr. Bland said that he had a case where an employee fell through a skylight after it had been certified by the manufacturer to meet the strength requirements of subsection (b), but there was no information on the date range that such certification could be relied upon. He said that being able to field test the skylights may have prevented the death.

Mr. Berg repeated his concern with employers falsifying their testing records. He said that the Division can verify documentation of strength requirements from manufacturers, but not always from employers.

The Chair asked the Division if the testing would be sufficient if it were not fraudulently done. Mr. Berg said they were concerned that the testing would not be done on the worst case skylights, such as those in the shade, instead of those in full sunlight. He also had concerns with who would oversee the testing. The Chair suggested that a QP would be more protective than a California PE because not all PE's would be qualified to evaluate the strength of skylights. Requiring a QP would require a California PE with knowledge and training specific to skylight structures, glazing, and environmental degradation.

Mr. Elliott said that he is the QP for his company. He says that his employees video tape the strength tests and provide him with information on the skylights. When he is satisfied that the tests have been performed properly, he signs off on the tests, although he is in Colorado while the skylights are tested in

California. He says he gets verification from an onsite superintendent that the tests were properly performed.

Mr. McCune said that a 3rd party tester could be used to perform the tests and reduce the risk of falsification. Mr. Berg agreed saying that a 3rd party laboratory would be much better than having an employer self-certify. Mr. Elliott said that the employer's QP is entrusted to make plywood covers. He continued saying that a QP can also design a horizontal lifeline system.

Discussion ensued on whether a PE or a QP should be used to verify the strength of the skylights. Mr. McCune said that a PE was necessary. The Chair stated that just because someone held the PE designation did not mean that they were qualified to perform the analysis. He opined that the definition of QP was more protective because it would require someone who holds the necessary licenses in addition to having the necessary experience and training. Mr. Berg cautioned that some employers would read the requirement and not understand that they are not qualified to perform the task.

Mr. Bland said that we should develop testing methods that can be verified so that we do not need to use a 3rd party PE to confirm the strength of existing skylights.

The Chair noted that the management representatives did not like the proposed requirement for 3rd party testing of existing skylights. He asked the committee how they would feel about videotaping the tests with a cellphone so that they could be verified. He proposed requiring that the testing be maintained for a year for the Division's review. Mr. Berg asked how the Division would be able to confirm that the videotaped test occurred when and where the employer said it did. Mr. Bland pointed out that an employer could be lying under oath if the videotape was fraudulent. The Chair said that the test could be required to be performed onsite with landmarks that could be verified. Mr. Berg said that he would consider language after it was developed.

The Chair asked for proposed language for the testing requirements. Mr. Bland suggested discussing language for a load dropped from a height above the skylight. Mr. Berg said that subsection (b) required a static load. The Chair read some of the requirements from the ANSI/ASSE A1264.1-2007, which defined a load bearing element as a "component or surface designed to support twice the anticipated load, including dynamic effects." He mentioned that a proposed ASTM standard which Mr. Ellis is working on proposed dropping 300 lbs. from 36-inches above the surface. The Chair asked if we should require 300 lbs. from 36 inches. Mr. McCune suggested that we require static load testing to validate the strength requirements of subsection (b).

Mr. Bland suggested language requiring the tests to be videotaped and performed by a QP. A weight of 400 lbs. or twice the anticipated load would be placed on the center 1 square foot of the glazing with no obstruction to the downward deflection of the skylight. Employers would be required to test a representative number of the skylights, using skylights that would be expected to have the worst environmental degradation.

The Chair asked the committee to develop language to mitigate potential testing fraud. Mr. Bland said that the QP could be required to attest to the location, date and time of the test. Mr. Berg said that he

wanted more than one skylight tested. He also said that any language developed in committee regarding skylights serving as covers, would need to be reviewed by enforcement before the Division would agree to it.

Mr. McCune suggested that all skylights on the roof would need to be tested to serve as covers. Mr. Tinker said that some of each type should be tested at a minimum. The Chair hypothesized that it would be unnecessary to test every skylight on a large warehouse roof containing hundreds of skylights if they are all equally exposed to environmental conditions. Mr. Ramirez said that employer testing sometimes destroys the skylights, which must then be replaced. Mr. Johnson said that random sampling in industrial hygiene sometimes suggests testing 20% of the employees. He proposed requiring 20% of the skylights to be tested. The Chair asked if testing 10% of the skylights, but at least 2 or similar language would be acceptable. Mr. Bland said that testing 10% of the skylights on a roof with 300 skylights would mean testing 30 skylights. He cautioned against using a percentage.

Mr. Bland proposed testing at least 2 or 3 skylights, but not more than 10% of the skylights present. He said that a roof with 5 skylights would not need to have 3 of the 5 tested.

Mr. Tinker proposed requiring the testing to be performed in situ. He asserted that the standard should require the testing of each type or size of skylight. He also suggested that the language require testing a representative sample, but no less than two, and that we not mention a percentage.

The Chair asked if Walmart had 300 skylights on its roof and a solar panel installer was required to remove 30 of them for testing, would that present a major obstacle for employers? Mr. Ramirez said that removing and testing 30 skylights would be easier than building covers for 300 skylights. The Chair asked about safety concerns in removing skylight covers. Mr. Ramirez responded that it was easier to outfit a couple employees with fall protection for removing the skylights than it would be to outfit the entire crew.

Mr. Bland reviewed his proposed requirements for performing skylight testing. He recommended the testing of at least 1 skylight from each area of the roof that would have different environmental exposure. He also suggested that the passing criteria for a skylight serving as a cover would be no breakage or cracking. Mr. Berg added that there should be no permanent deformation either.

The Chair reviewed the language for proposed subsection (e)(6) regarding the use of skylights as covers. He read subsections (e)(6)(a) and (e)(6)(c) and the committee had no objections to the language. He said that he would work outside of the committee to develop language for (e)(6)(b) to address employer testing of skylights.

Skylight netting

Brent Smith (AES Raptor) delivered a presentation discussing skylight nets and their specifications. The Chair read the proposed text for subsection (e)(3)(A), regarding the netting and the frame holding the net. He explained that the proposed language was primarily taken from ANSI A10.11-2010 *Safety*

Requirements for Personnel and Debris Nets—American National Standard for Construction and Demolition Operations.

Mr. Elliott asked whether or not a competent person was required to inspect the nets and how frequently. He proposed that the net be visually inspected daily before use by an authorized user. The Chair mentioned that the ANSI A10.11-2010 standard required that construction nets be inspected not less than once per week after initial installation by a competent person. The Chair proposed requiring a weekly inspection by a competent person and a daily inspection by the authorized user. Mr. Ramirez clarified that the competent person would be a competent person as used in fall protection requirements of Title 8.

Mr. Benham suggested using the term “authorized person” in the same manner that the personal fall protection standard requires an authorized person (or user) to inspect his/her harness and other fall protection equipment. Mr. Bland clarified that only one person should be required to inspect the nets, not each and every employee in the area. The committee agreed upon the language on subsection (e)(3)(B).

The Chair read the proposed language for subsection (e)(3)(C) regarding employee training on the use of the skylight nets. The Chair explained that the requirements for instruction on the tested limits of the net, fall avoidance, recording and reporting of training, and the location of inspection records and the person responsible for the inspections were based upon ANSI A10.11-2010. He said that he added the language for the requirement to train employees on the proper way to retrieve a fallen worker from a net.

Mr. Bland suggested removing the recording and reporting requirements from the required training because it did not directly contribute to the safe use of the nets. The Chair proposed removing the requirement and the committee agreed that it would be required by other sections of Title 8. The Chair also proposed a requirement for installation according to manufacturer’s instructions. Mr. Leacox suggested not using the word “installation”, but replacing it with the word “use.” He proposed that the training include instruction on the use and limitations of the net as provided by the manufacturer.

Mr. Bland proposed requiring that the training include the manufacturer’s inspection requirements for the nets.

Mr. Ramirez asked if the inspections needed to be documented. Mr. Berg stated that employees have the right to see the inspection records. Mr. Johnson said that the weekly inspections should be documented, but that the daily visual inspections by an authorized person do not need to be documented, as is typically done with fall protection equipment. The committee agreed.

The Chair asked if anything else should be added to the training requirements, but nothing else was suggested.

The Chair explained that proposed subsection (e)(3)(D), regarding the care, maintenance and storage of the nets, was based upon the ANSI A10.11-2010 standard. The Chair asked if there was anything else that needed to be done to the subsection.

Mr. Leacox proposed that the language requiring that the nets be stored out of the elements when not in use be removed because it could lead to confusion as to when the nets are “not in use”.

Mr. Bland recommended removing the language requiring “due attention” to factors affecting net life because it would be difficult to prove or disprove. He said that the net should be cared for as instructed by the manufacturer. The Chair suggested placing the requirement in the training requirements of subsection (e)(3)(C). Ms. Barber agreed saying that employees should be trained on factors that could affect net life.

Ms. Barber asked if we needed to address storage more completely. She said that our proposed language only required storing it according to manufacturer’s instruction. She asked if we should delete the reference. Mr. Berg objected to deleting the reference because a manufacturer could have requirements that should be enforced. The Chair mentioned that Section 14 of ANSI A10.11-2010 recommended that nets not in use be protected from sunlight. Mr. Bland cautioned against specific storage requirements because they would be difficult to enforce. For instance, he said that storing a net in the back of a truck may comply with storage requirements, but the net could be exposed to sharp tools or substances that could damage it. He said that the net inspection by a competent person would be more important in verifying the safety of a net than a requirement for a storage location.

The Chair moved the discussion to developing subsection (e)(3)(E), discussing criteria for removing the nets from service. Mr. Leacox proposed that the nets be removed from service if any of the following conditions occurred: the frame become warped, bent, or distorted; the netting becomes torn, unraveled, cut, or has excessive slippage of knots; the net has been modified from the original manufacturer’s design or specification; or the net reaches the expiration date provided by the manufacturer to regulate service life. Mr. Benham suggested that the nets be removed from service under any condition specified by the manufacturer that was not covered in the committee. Mr. Leacox agreed.

Mr. Tinker suggested that the net should be removed from service if it has been used to arrest a fall. Mr. Berg agreed. The Chair asked if the net must be thrown out or if it could be re-inspected. Mr. Berg insisted that the net be removed from service after it has experienced a shock load. The Chair argued that the numerous strands in the net would not experience the same shock load as a single lanyard or fall protection harness used to arrest a fallen employee. He opined that the net could still be used if it was inspected by a QP and deemed safe. Mr. Tinker said it was necessary to throw away the net in the same way we throw away harnesses after a fall. He said that was standard for fall protection equipment.

Mr. Leacox said that the cost of the net was minimal compared to the convenience of using the net. He said he would support discarding the net if it was conditional on allowing the use of the net. Richard Lane (IBEW 1245) said that if the net was to be discarded, it would need to be destroyed to prevent reuse. He said that he preferred to have a competent person inspect the net after a fall to see if it was still safe to use rather than throw it away.

The Chair pointed out that the ANSI A10.11-2010 standard requires inspection by a competent person after impact loadings to ensure the integrity of the net. He also mentioned that field testing of the

construction nets involved dropping 400 lbs. from 25 feet high, which is significantly more impact force than a skylight net would incur.

Mr. Leacox asked that if the net met the inspection criteria after a fall, why it would need to be thrown away. Mr. Ramirez said that fall protection nets in the steel industry are used and reused to catch falling people and equipment. He said that the committee may be trying to solve a problem that doesn't exist.

Mr. Benham asked Mr. Smith what he as a manufacturer of a net recommends. Mr. Smith replied that the net must be removed from service immediately for inspection. If the net passes the inspection, it can be returned to service, he said.

The committee discussed who should inspect the net to see if it should be returned to service. Mr. Ramirez said that because a competent person put the net into service, the competent person should be the one to inspect it after a fall. Other suggestions from the committee included requiring a QP to inspect the net, or sending it back to the manufacturer for recertification. Mr. Ramirez suggested that requiring someone other than the competent person to inspect the net could imply that the competent person was incapable of inspecting it, invalidating the inspection process from the beginning.

Mr. Bland pointed out that if someone trips and falls onto a skylight cover, there is no requirement to throw the plywood cover away.

The Chair asked Ms. Barber for her thoughts on what to do with the net after a fall. She replied that the net should be inspected and reused unless it had physical damage. She said her question was who would do the inspection, whether it would be a competent person or someone else.

The Chair then asked Mr. Armstrong and Mr. Lane for their feelings on the matter. Mr. Armstrong pointed out that we were only talking about a fall of a couple feet. He said that it should be inspected for cuts or other damage, but that it could be reused afterwards if it was still in good shape. He said that he understood the arguments for throwing it away similar to other fall protection devices, especially since we are not talking about a large number of nets that would be discarded. He said that he could go either way as long as the net was still safe to reuse.

The Chair asked Mr. Berg for his opinion. Mr. Berg responded that the net and frame should be thrown away or inspected by the manufacturer or a 3rd party inspector. Ms. Barber asked Mr. Berg if a 3rd party company would be comfortable doing the inspection without being in control of the net and process. She repeated that she didn't think the net should be thrown away if it is not damaged. Mr. Berg responded that people take shortcuts in business all the time and he was not confident that they would properly inspect the net.

Mr. Armstrong said that he was more concerned about the net being cut by glass than being damaged from a shock load. Ms. Barber agreed.

The Chair said that the consensus of the room was that the net could be reused after a fall if certain criteria were met. He noted that Mr. Berg did not agree with the consensus, but suggested that we move forward discussing the inspection criteria.

The Chair discussed expiration dates for the net. He proposed that in the absence of a manufacturer's recommendation for the expiration date, the standard should mandate that they be discarded after 5 years of use. Mr. Bland agreed.

Mr. Tinker said that the nets should expire 5 years after placed in service. The Chair asked how one would know when the net was first placed in service. Mr. Smith said that there was a tag on the net that stated the date of manufacture. Mr. Ramirez asked why the nets only lasted 5 years. Mr. Smith said that the UV coating on the nets is rated for 5 years of protection according to the net manufacturer. Mr. Ramirez said that we should defer to the manufacturer for the expiration because they could create nets with longer lasting coatings.

Ms. Barber asked for clarification on 5 years from date of service or from date of manufacture. Mr. Ramirez said that it should be 5 years from date of service because nets can sit in a warehouse for several years before being used. He said that his company scans the tag on the net to log when the net is placed in service. Mr. Berg said that employers should be required to track the dates that the nets are first placed in service. Mr. Ramirez says that he tracks all equipment used for fall protection to know when it was placed in service and last inspected. Mr. Berg said that as long as the employer tracks each piece of equipment to know when it was placed in service, the expiration period can begin from the date of service. The Chair suggested that the service life begin on the date of manufacture unless the employer effectively tracks and documents the date the net was first placed in service.

The Chair asked the committee how long the nets should be allowed to be continuously employed for fall protection. Mr. Elliott said that nets are installed and remain on the roof for the duration of the job, which could be up to 3 months. The Chair asked Mr. Berg if he had any concerns with leaving the nets on the roof for 3 months. Mr. Berg replied that it did not make sense to remove the nets daily due to safety concerns.

Mr. Elliott asked why the nets could not be used as permanent fall protection for the lifetime of the net. The Chair said that he had concerns with a net being left on the roof and future contractors relying on it for fall protection without inspecting it. Mr. Elliott said that as a construction contractor, he would collect his nets at the end of the job and take them with him, but a building owner may want to establish a procedure for weekly inspections and leave the nets on the roof so that he doesn't have to provide fall protection for workers on the roof. He stated that if the netting has the ability to be permanent, it should be allowed to be used as such.

The Chair asked if the nets could be left up for longer periods of time since they would be inspected weekly for defects. Mr. Bland said that he preferred not to have a maximum time on the nets as long as they passed inspection and were not used beyond the expiration date. He said that some jobs could last a day and some could last a year. The Chair said he was concerned that the nets would be left up on a roof

and relied upon like a guard rail for permanent fall protection. He said that leaving the net up for the duration of the job was as long as he would prefer to leave them. Mr. Johnson agreed.

Mr. Benham said that the usage instructions from the manufacturer of the net should govern the time that the net can be left on the roof. Mr. Smith said that his nets could be left up for the lifespan of the net.

Mr. McCune said that the regulation should state that the nets are to be temporary and not left in place for more than 1 year at a job site. The Chair said that although the nets are designed to be temporary, so are covers and the regulatory text addressing covers does not say they are temporary. He continued saying that if a net has a 5-year lifespan, we need to accept that an employer could leave it on a skylight for the full 5 year period unless we write language to prohibit the practice.

Mr. Elliott asked why we don't use the word "temporary." The Chair responded that the word could be unclear in its application. The Chair said that he preferred to place limits on the use of the nets, which would specify their temporary nature, instead of using the word and allowing employers and others interpret the word. Mr. Bland suggested allowing the nets to be left in place for up to one year to accommodate the different work situations. Mr. McCune said that the building code allows temporary protections to be left in place for up to 1-year. Mr. Tinker said that he supported the 1-year time limit.

The committee decided that the nets should be removed from the skylights after the completion of the job or one year, whichever is less.

Mr. McCune asked if any nets were manufactured with natural fibers. The Chair replied that ANSI A10.11-2010 mentioned that nets could be made from natural or synthetic fibers and preferred leaving the term in the proposed language. Mr. Berg said that he preferred to remove natural fiber as an option for nets. Ms. Barber said that it should be left in because we don't know what manufacturers will develop in the future. She also pointed out that they could make a hybrid net using both types of materials. She preferred to leave both terms in the standard, focusing instead on the strength requirements of the net instead of the materials. Mr. Berg concurred.

Mr. Tinker asked if we should limit the distance a net is allowed to stretch when arresting a fall. He said that a 15 x 15 feet net could allow the employee to fall a considerable distance. If the net was placed over an architectural skylight shaped like a pyramid and an employee fell, the additional material used to cover the full skylight could allow the employee to fall an increased distance. The Chair suggested proposing a maximum net size so that there was not a lot of extra material to allow the employee to fall an excessive distance. Mr. Smith said that the maximum frame size he produces is 12 x 12 feet. Mr. Leacox said that he had no issues with limiting the net size to 12 x 12. Mr. Tinker agreed with limiting the size of the net.

Mr. McCune suggested a prohibition from striking a lower level similar to what is required in Section 1671 of the Construction Safety Orders. The Chair said that Section 1671 prohibits construction nets from contacting surfaces or structures below the net. He was concerned that the skylight glazing would be considered a surface below the net. Mr. Berg and others suggested that the language prevent contact

with surfaces or structures “below the skylight” to avoid confusion with the skylight itself acting as a surface below the net.

The Chair reviewed the proposed language for inspecting the nets. Then the Chair asked if anyone had anything else to add to the proposed language regarding skylight nets. Finally, he asked if anyone had anything else to add to the proposed rulemaking.

A discussion on establishing a hierarchy for the list of options available for protecting employees from falls through skylights ensued. Mr. McCune suggested that guardrails, then fall protection nets, and then fall protection plans could be an example. The Chair asked if anyone had a source for a study that addressed the issue. Mr. Leacox said making the list could be very problematic. Mr. McCune said that the hierarchy of controls requiring engineering before administrative controls could be used. The Chair responded that each of the available options had elements of both administrative and engineering controls, except for the fall protection plan. Mr. Berg said that we could reorder the options in order of security. The Chair said that he would consider a request from the Division on the matter if one comes in the future, but that he did not feel that such a change could be justified by the current committee participants.

8. Economic Impact.

The Chair explained to the committee that an important and required part of the rulemaking process is the identification of the cost impact of the proposed rulemaking, and he asked the committee members for their assistance.

The committee determined that there would be no economic impact from the proposed changes because they would expand the options currently available for compliance. No single method for compliance is required by the proposed changes and an employer is able to determine whether or not they will use an additional or an existing option for fall protection.

9. Conclusion.

The Chair reviewed the rulemaking process with the committee. He noted that the advisory committee had determined a necessity for changes and had reached a consensus on changes proposed. He stated that committee members will receive a copy of the meeting minutes, along with a copy of the final consensus proposal within 2-3 months. They will have an opportunity to comment on them before he moves forward with preparation of a formal rulemaking proposal. The Chair noted that although consensus on the proposal was achieved, there will be additional opportunities for public comment. A formal rulemaking proposal will be noticed and he estimated that could be several months out. The notice will be mailed-out to the committee members, so he urged them to be sure they signed the attendance roster if they want to receive a copy. The notice will also be on the OSHSB website for viewing.

There will be a 45-day public comment period, concluding with a public hearing. Anyone may attend the public hearing and provide oral comments. Changes may result from public comment and/or during the review process. If any substantive changes are made, there will be one or more additional 15-day periods

for public review and comment. After that it will go to the Board for adoption at a Business Meeting. After adoption by the Board, the proposal will go to the Office of Administrative Law (OAL) which will have 30 working days to review it for compliance with the Administrative Procedures Act. Finally, the proposal will be filed with the Secretary of State and, unless otherwise specified, will become effective (enforceable) on a date determined in accordance with the APA.

The Chair estimated that the rulemaking process could take up to a year from when the formal notice is published for public comment.

The Chair thanked the committee members for their attendance and participation and adjourned the meeting at 3:15 p.m.

**OCCUPATIONAL SAFETY
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Attachment #4
Updated January 27, 2015

OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**Advisory Committee Roster****Fall Protection for Work Around Skylights**

(+) Denotes Attendance at August 14, 2014 Advisory Committee Meeting)

(*) Denotes Attendance at October 22, 2014 Advisory Committee Meeting)

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Occupational Safety and Health Standards Board
ADVISORY COMMITTEE ATTENDANCE ROSTER
 Fall Protection for Work Around Skylights

Please print legibly

August 14, 2014

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Occupational Safety and Health Standards Board
ADVISORY COMMITTEE ATTENDANCE ROSTER
 Fall Protection for Work Around Skylights

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August 14, 2014

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October 22, 2014

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October 22, 2014

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