

## DEPARTMENT OF INDUSTRIAL RELATIONS

**DIVISION OF OCCUPATIONAL SAFETY AND HEALTH**

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**To:** Marley Hart  
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**Date:** March 1, 2013

**From:** Ellen Widess, Chief  
Division of Occupational Safety and Health

*E. Widess*

**Subject:** Evaluation Report, Petition #531  
Bryan Crabb, California Solar Energy Association

**Introduction**

This letter is in response to Petition #531 which was received from the OSH Standards Board by the Division on November 5, 2012. The Petition was submitted by Bryan Crabb on behalf of the California Solar Energy Industries Association (CAL-SEIA), and requested an amendment to Title 8 California Code of Regulations (CCR), Chapter 4, Subchapter 7, Article 2, Section 3212. The request was "...to allow installers of solar photovoltaic and solar heating systems (collectively referred to herein as "Solar") to utilize some innovative and effective fall protection solutions as a means of compliance with Section 3212." This Section addresses work on roofs around exposed skylights. The petitioner is requesting that the Board adopt alternatives to existing requirements, and proposes language changes to the standards as noted in the analysis section if this report.

**Existing Standards**

Guarding of skylights and other roof openings is covered in T8 Section 3212(e) and provides five methods which can be used to protect employees from the fall hazard:

*8 CCR 3212(e)*

*Any employee approaching within 6 feet of any skylight shall be protected from falling through the skylight or skylight opening by any one of the following methods:*

*(1) Skylight screens. The design, construction, and installation of skylight screens shall meet the strength requirements equivalent to that of covers*

*specified in subsection (b) above. They shall also be of such design, construction and mounting that under design loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork, with openings not more than 4 inches by 4 inches or of slatwork with openings not more than 2 inches wide with length unrestricted, or of other material of equal strength and similar configuration, or*

*(2) Guardrails meeting the requirements of Section 3209, or*

*(3) The use of a personal fall protection system meeting the requirements of Section 1670 of the Construction Safety Orders, or*

*(4) Covers meeting the requirements of subsection (b) installed over the skylights, or*

*(5) A fall protection plan as prescribed in Section 1671.1 of the Construction Safety Orders when it can be demonstrated that the use of fall protection methods as contained in subsections (e)(1-4) of this Section is impractical or creates a greater hazard.*

### **Federal Regulations**

The Code of Federal Regulations, Title 29, Section 1926.501(b)(4)(i) of the Construction Safety Orders contains the following requirements:

*"Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above the lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes."*

Section 1910.23(a)(4) of the general Industry Safety Orders also contains similar requirements:

*"Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides."*

### **Review of Petition**

This petition raises three issues under Section 3212 (e):

1. Can the skylights themselves be considered a cover if they meet the design criteria stated in Section 3212(b), and
2. Can the use of personal fall protection be limited to skylights that are not constructed of glass?
3. Can safety nets be used as a method of guarding the skylight?

The petitioner asserts section 3212(e) is ambiguous regarding the skylight serving as a cover for the opening. The petitioner has specifically requested changes to the standard to allow the use of safety nets and permanently installed screens for fall protection as follows:

3212(e)(proposed) Any employee approaching within 6 feet of any skylight shall be protected from falling through the skylight or skylight opening by any one of the following methods:

(1) Skylight screens and nets. The design, construction and installation of skylight screens and nets shall meet the strength requirements equivalent to that of covers specified in subsection (b) above. The screen or net may be above, below, or within the waterproof covering of the skylight opening. The screen or net material shall be resistant to the momentary abrasion of sharp edges. The screen or net shall also be of such design, construction, and mounting that under design loads and impacts, they will not displace so as to expose the skylight opening and will not deflect so as to create an opening in the screen of more than 12 inches in any direction. When the skylights are glass, flexible nets are not sufficient. The screens shall be of such design, construction and mounting that under design loads or impacts, they will not deflect downward sufficiently to break the glass below them and the construction shall be of grillwork, with openings not more than 2 inches wide with length unrestricted, or of other material of equal strength and similar configuration, or

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- (3) The use of a personal fall protection system meeting the requirements of Section 1670 of the Construction Safety Orders when the skylight is not constructed of glass.
- (4) Covers, including skylights, meeting the requirements of subsection (b) installed over the skylight opening, or

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### **Analysis of Petition Issues**

In 2004, the Board adopted modifications to Section 3212 with the assistance of an advisory committee. In evaluating this petition, the Division re-examined the record of the advisory committee, public hearing, public comments and Board responses, and the Board's actions.

### **Use as Covers**

In its Final Statement of Reasons (FSOR) the Board covered items 1 and 2 above. On page 4 of the FSOR, the Board staff provides the following comment: "Furthermore, many skylight manufacturers currently design and build their skylights with UV resistant

materials that already meet the proposed 400-pound strength requirement *thereby obviating the need for any of the fall protection methods provided in the proposal*" (emphasis added).

While the Board staff comment would suggest that a properly engineered and installed skylight may serve the purpose of a cover, however this concept was not adopted as an alternative in the final rulemaking.

### **Glazed Work Surfaces**

The second item that the Board discussed and documented in the FSOR was the issue of glazed skylights or working surfaces. While their discussion was not directly related to §3212(e), it was discussed as a part of the following section, §3212(f). In addressing the question of access or working from an existing glazed surface as referenced in Section 3212(f); the Board provided the following response in the FSOR, page 5:

"The designation "tempered" only refers to its durability or endurance not its ability to support a load (strength). Tempered glass used as glazing on a roof, canopy, or skylight is typically designed to endure the impact of small objects (e.g. rock, hand-tool, etc.) without shattering into shards that could fall and severely injure persons below. A worker using a glazed roof, canopy, etc., as a working surface, however, can only do so if the working/walking surface is able to *safely support the load* (emphasis added). When available, the glass manufacturer's specific product documentation bearing the seal/stamp of a California registered engineer, substantiating the glazed roof's load bearing capacity/structural integrity to safely support all anticipated loads, including workers, tools and equipment, would satisfy the standard. Board staff notes that in the absence of any such documentation, the only scientific way to ensure that a section of glazing would be sufficient to support the anticipated loads is to have the glass evaluated by a competent individual who could determine whether given the anticipated loads, manufacturing documentation, physical characteristics, etc., the glass would be able to safely support the intended load."

These comments are clearly intended to focus on the load-bearing qualities of the skylight, not the construction materials, per se. These comments are also supportive of the previous discussion concerning skylight covers, in that a skylight designed to support a load of 400 pounds would in fact comply with the requirements of this standard, regardless of the construction and/or materials used. The Division concludes that the use of fall protection equipment, where required by location, would not be exempted by the design or materials used in the construction of a skylight, unless the design clearly demonstrates, and documents, the capability to support the minimum of 400 pounds on any one square foot or twice the anticipated load, as required by Section 3212(b).

### **Use of Safety Nets**

The third issue raised by this petition is the use of safety nets to cover a skylight and provide employee protection from falling through the skylight. The use of safety nets is covered in the Code of Federal Regulations, Title 29, Section 1926.502(c), and in 8 CCR Section 1671.

Subsection 1671(a) states:

"Where the elevation is 25 feet or more above the ground, water surface, or continuous floor level below, and when the use of personal fall arrest systems, personal fall restraint systems, positioning device systems or more conventional types of protection are clearly impractical, the exterior and/or interior perimeter of the structure shall be provided with an approved safety net extending at least 8 feet horizontally from such perimeter and being positioned at a distance not to exceed 10 feet vertically below where such hazards exist, or equivalent protection provided safety nets shall extend outward from the outermost projection of the work surface as follows... (Table follows)... *Nets shall be hung with sufficient clearance to prevent user's contact with the surfaces or structures below. Such clearances shall be determined by impact load testing.*" (Emphasis added).

Safety nets are disfavored because they provide less protection. Nets do not prevent a fall, they are used when all other methods are "clearly impractical" to lessen the fall distance, and to absorb shock, therefore, hopefully, lessening the severity of injuries resulting from the fall. The existing language would clearly prohibit the use of safety nets for protection of skylights in that there would be no practical way to install them in accordance with the included table, such that they could be effectively tested to prevent contact with obstructions or surfaces below. An employee falling on the net would contact the skylight, which is a failure to comply with Section 1671(a). Further, this Section indicates the use of safety nets is allowed only when the more conventional types of fall protection/restraint are "clearly impractical". This requirement is also mirrored in the Federal OSHA regulations, 1926.502(c). It is the consensus of all relevant standards and regulations that safety nets NOT be rigged in such a manner that an employee falling into the net can strike an object below the net.

Subsection §1671(c) states that safety nets must meet either the ANSI A10.11-1989 or ANSI A10.11-1979 "Safety Nets Used During Construction, Repair and Demolition Operations", depending on the year of purchase. This ANSI A10.11 Standard contains specific manufacturing and testing criteria for safety nets, which include requirements for an on-site drop test after the safety net has been installed, and each time it is relocated. These test requirements are found in Section 9 of the ANSI standard.

### **Conclusion**

The petitioner has not explained why this industry can not follow the existing standards, which are equivalent to, and at least as effective as, federal standards. The changes suggested by the petitioner would reduce protection against falls through skylights or skylight openings.

**Recommended Action**

The petitioners suggested changes would reduce the level of protection provided to employees. Furthermore, adoption of the Petitioner's recommended changes would have the effect of rendering the State's occupational safety regulations less protective than the federal counterpart regulations discussed above. For these reasons the Division recommends that petition no. 531 be DENIED.

cc: Patrick Bell  
Deborah Gold  
Dick Roberts