

**OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS BOARD**

2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833  
(916) 274-5721  
FAX (916) 274-5743  
[www.dir.ca.gov/oshsb](http://www.dir.ca.gov/oshsb)

**ADVISORY COMMITTEE MEETING MINUTES**

California Code of Regulations, Title 8,  
General Industry Safety Orders, Section 5357

**Snow Avalanche Control Blasting**

Tuesday, August 7, 2018  
Sacramento, California

**Introduction**

Chair, Michael Nelmidia, Senior Safety Engineer, Occupational Safety and Health Standards Board (Board) called the meeting to order at 9:40 a.m. on Tuesday, August 7, 2018. Bernie Osburn, Standards Board Associate Government Program Analyst assisted the Chair. Jason Denning, Principal Safety Engineer, Research and Standards Unit and Principal Safety Engineer James Wittry, Mining and Tunneling Unit represented the Division of Occupational Safety and Health (Division). The Chair welcomed the advisory committee members and asked for self-introductions.

The Chair reviewed the Board's policy and procedures concerning the goals and objectives of the advisory committee process. The Chair then directed the advisory committee's attention to the agenda and proposal, which were electronically mailed out to each member before the meeting. The Chair stated that written comments were submitted by the Division (timely) and by the Ski Industry Association (untimely). Due to the late submittal of the written comments by the Ski Industry Association the comments were not distributed to the committee. The Chair noted that the comments submitted by the Ski Industry Association would be incorporated into the discussion and input from the representative Michael Reitzell would be solicited directly.

**Presentation by the Division**

Mr. Denning on behalf of the Division prepared a presentation concerning the basis for the Division's request for regulatory changes. Mr. Denning outlined the following necessity for the proposed amendment of General Industry Safety Orders Article 21, Section 5357:

- The existing standard does not contain written procedures for general avalanche control blasting.
- The current regulation does not include specific training criteria for the training of avalanche blasting crewmembers.
- The 100-foot distance to the position of safety needs to be clarified.

- The current regulation does not require alerting of avalanche blast crewmembers of the deployment of a charge.
- The procedures for initiating deployment of handcharges requires clarification.
- The non-active crewmembers are not adequately protected under the current standard.
- There is no temporal requirement for seeking a position of safety.

Mr. Denning cited accident history and expressed the Division's desire for the regulation to include training and written procedures for general (snow avalanche) blasting. The Division recounted incidents which resulted in the deaths to persons performing avalanche control blasting. The Division characterized the ski service industry as small and that the number of fatal incidents (four incidents in 18 years) while low was still significant.

Regarding Section 5357(a)(1), the Division sought to include written procedures for the deployment of charges, routine reassessment of those procedures, and emphasize the inclusion of input from rank and file employees who participate in snow avalanche control blasting when preparing the written procedures. Moreover, the Division sought interactive training of the blast crews whereby, those members undergoing training would be able to participate in a 'Q and A' session with the licensed blaster.

Regarding Section 5357(b)(4)(B), Mr. Denning explained that one of the points of contention involving a case in 2012, was that there was disagreement regarding the ski industries' perception of the 100 foot distance to a position of safety. Mr. Denning said that the position of the Division was that the existing requirement clearly described the point where the charge is ignited rather than where the ignited charge detonates. The Division viewed as flawed, an interpretation which would rely solely upon the detonation point as the reference point from which the 100-foot clearance would be imposed. Mr. Denning elaborated that it is the uncertainty of where the charge may land (once thrown) that negated the protection afforded by the 100-foot clearance. Mr. Denning explained that the clothing, equipment, and environmental conditions were factors that may hinder a blaster's ability to deploy a handcharge where intended.

Regarding Section 5357(b)(4)(E), the Division sought to include a system to require those affected by the detonation of a deployed charge to be alerted of the (imminent) deployment. This would ensure that the blast crewmembers are prepared and protected by the barrier (or are positioned at a safe distance) when the detonation occurs.

Regarding Section 5357(b)(6), the Division sought to restrict the blasting activities of igniting and deploying charges to licensed blasters and trained persons directly supervised by a licensed blaster for actions. Currently, the requirements only require (general) supervision of a Division licensed blaster. The Division sought to ensure that only competent persons or directly supervised persons ignite and deploy handcharges.

Regarding Section 5357(b)(7), the Division sought to require crewmembers not immediately involved in the deployment of a charge to be in a position of safety before the deployment of the

charge. The proposal also requires that the crewmember report audibly to the supervisor or blaster that they have reached the terrain barrier or position of safety followed by an acknowledgment from their supervisor. Mr. Denning expressed that the proposal would ensure that non-essential personnel are safe prior to the detonation of the charges.

Regarding Section 5357(b)(8), the Division proposed to require immediate travel of the blaster deploying the charge to the position of safety once the charge is deployed. Mr. Denning stated that there is no temporal requirement within the existing standard that dictates when a blaster would need to seek a position of safety once the charge has been ignited. The Division's position was that this proposed change would ensure adequate time for the blaster to travel to a position of safety or behind a terrain barrier.

### **Frequency of Blasting and Number of Employees**

The Chair asked the committee about the blasting frequency and the number of employees that participate in blasting. Ken Bokelund, Ski Patrol Director, Alpine Meadows, stated that the frequency depended on the season but, could be upwards of 50 times per season. Alexander Kestley, Regional Director for Health and Safety for Vail Resorts Management, commented that it also depends on the ski area and elevation. Bill Netto, CT Maintenance Supervisor, CalTrans, commented that the weather affected the frequency of avalanches. Greg Miller, CT Maintenance Manager II, CalTrans, added that wind loading [of the slope] could also affect the frequency.

Mr. Bokelund stated that on a given day, he'd need 23 people for his resort. Squaw Valley Resorts and Mammoth Mountain Resorts representatives commented that they would have about 50 and 30 employees, respectively, participating in blasting operations on a given day.

### **"Deploy," "Terrain Barrier," and "Position of Safety"**

The Chair sought the committee's consensus regarding terms used both in the existing standard and the Division's proposal. The terms "deploy," "terrain barrier," and "position of safety" were not defined within Title 8 and the Chair surmised that the terms were part of the industry's jargon. The Chair pressed the committee to elaborate on the respective stakeholders' understanding of the terms to preempt disparate interpretations of the proposal during the discussion. Ultimately, a definition for "deploy" was devised and garnered committee consensus. The location for the definition of deploy, as proposed by the committee, was not set during the committee discussion.

Regarding the meaning of "terrain barrier", Mr. Bokelund mentioned examples of terrain barriers as positions 'behind a ridge, behind earthen barriers, rocks, cliffs...' Discussions related to terrain barriers revealed that terrain barriers were generally preferred and predominantly used. Moreover, the Division clarified that the distance requirements within the proposed standard did not apply to terrain barriers.

Mr. Bokelund stated that his understanding of "position of safety" was 100 feet from where the ignited charge landed. The Chair highlighted that the 100 foot distance from the ignited charge predated the previous rulemaking and queried the committee for reason behind the specific

distance. The committee was unable to provide a perspective regarding the derivation of the 100 foot distance. "Position of safety" was clarified later in the committee meeting during a discussion of Section 5357(b)(4)(B).

## **Proposal**

### **Section 5357(a) General Requirements**

Subsection 5357(a)(1) proposed new requirements for written procedures for avalanche control blasting. The Chair raised the subsection for discussion. Michael Reitzell, President, California Ski Industry Association, stated that the committee members affiliated with the ski industry had conferred and as stated in the submission by the California Ski Industry Association the new proposal requirements were acceptable. The Chair sought input from CalTrans who deemed the proposal acceptable.

Subsection 5357(a)(1)(A) proposed five minimum procedures (Section 5357(a)(1)(A)(1. - 5.)).

Subsection 5357(a)(4) was an editorial correction which changed "insure" to "ensure."

Subsection 5357(a)(2)-(7) were renumbered in response to the addition of subsection 5357(a)(1)

The committee members expressed support for the proposed changes to Section 5357(a).

### **Section 5357(b) Hand Deployed Charges**

Subsection 5357(b)(4) was discussed by the committee. Subsection 5357(b)(4)(B) was initially discussed by the committee then tabled to allow for discussion on the remaining proposal. The first segment of the discussion regarding 5357(b)(4)(B) focused on positions of safety, terrain barriers, historical positions of safety and the distance from the ignited charge. The committee members from the ski industry observed that the discussion inferred that terrain barriers and position of safety were distinct and separate from each other. Committee members from the ski industry clarified, from their perspective, that a terrain barrier was a subset of a position of safety.

Representatives of the ski industry also sought to clarify that, in general, handcharges are deployed from behind a terrain barrier. The representatives believed that verbiage requiring blasters to "move to" rather 'than remain' behind a terrain barrier would imply that the blasters would have to travel to a different position of safety.

Representatives of the ski industry described historically identified locations which have reliably served as positions of safety. Representatives claimed that such locations had been empirically determined. The claim, according to ski industry representatives, is supported by, in some cases, over 40 years of snow avalanche blasting experience. The Division raised concerns that the safety and viability of historical positions of safety would still vary from year to year depending on such factors as the amount of snow the location received. The Chair later concluded during

discussions of Section 5357(b)(4)(B), that the inclusion of historical positions of safety into the regulatory scheme was disfavored.

Ski industry representatives maintained that the phrasing of “100 feet from the ignited charge” referred to the destined location of the ignited charge rather than the location where the charge is ignited. The Division expressed the position that, a portion of the intent is to ensure that forethought was applied when formulating an escape to a position of safety in the event of a fumbled deployment of an ignited handcharge. The Division argued that the blaster may not avail themselves of a predetermined position of safety in the case of a mishandled, ignited charge. Presumptively, the blaster would identify a position of safety that the blaster is capable of seeking refuge before the detonation of the charge (and escape the ensuing avalanche).

Mr. Bokelund commented that traveling 100 feet from where the charge was ignited and where the charge lands may be impractical. Mr. Bokelund elaborated on the impracticality, reasoning that in cases where blasters were working downhill, that to relocate to a position 100 feet from where the charge is ignited and where the charge lands would require the blaster to hike uphill. It could be inferred from Mr. Bokelund’s comment that a charge could detonate prior to a blaster reaching 100 feet from the point of ignition.

Subsection 5357(b)(4)(C) and (D) are re-lettered, existing requirements and were not discussed by the committee.

Subsection 5357(b)(4)(E) was raised by the Chair for discussion. The Chair highlighted that the bracketed addition of “deploy” was a suggestion that departed from the Division’s proposal and was added by the Chair. Scott Quirsfeld, Ski Patrol Manager, Mammoth Mountain questioned whether the proposal was intended to address the entire blast team or the entire “patrol.” Mr. Denning responded that the intent was to cover any crewmembers affected by the blast. Mr. Denning for clarification, further recalled statements that crewmembers work in teams ‘one over here and one over there’ then reaffirmed that the intent was to notify the people that were affected by the blast. Mr. Denning explained that the term “active” [crewmembers] was disfavored in that not all crewmembers may be active [participants of the blasting operation] but could be affected. Mr. Denning suggested “affected [crewmembers]” Michael Gross, Ski Patrol Manager, Squaw Valley, added that the phrasing of “all crewmembers” required clarity. The Chair solicited additional suggestions regarding the phrasing. Nathan Heit, Ski Patrol Manager, Mammoth Mountain, inquired whether the proposed section referred to the “Fire, Fire, Fire” call out. The committee consensus was to add “affected” to the proposed text.

The Chair sought the committee’s opinion regarding the use of the term “deployed” in place of the Division proposed “ignited and thrown or released.” Mr. Bokelund favored “deploy.” Mr. Bokelund took the position that “deploy” encompassed the relevant portion the Division’s proposed text. CalTrans and Mammoth resort representatives express support for the term “deploy.” Mr. Wittry supported the use of the term as long as the definition of “deployed” was included in the regulatory text.

Subsection 5357(b)(5) was raised by the Chair for discussion. The Chair described the proposal as a correction of the existing “run out” to “runout.” There was no objection from the

committee. Reflected in the Division's proposed change replaces, "igniter shall be attached to the safety fuse and immediately activated" with "blaster shall attach the igniter onto the safety fuse, immediately activate the igniter to ignite the charge and deploy the charge..." There was no objection to the proposed change.

Subsection 5357(b)(6) was raised by the Chair for discussion, and the committee provided no comments.

Subsection 5357(b)(7) was raised by the Chair for discussion. Mr. Reitzell referred to the comments submitted by the Ski Industry Association. The representatives of the ski resorts conferred with the Ski Industry Association and raised a concern regarding the addition of the term "crew supervisor" within section 5357(b)(7). Representatives of the resorts clarified that "crew supervisor" was not a term used in the standards and preferred to retain the term "blaster-in-charge." The Division questioned whether a "blaster-in-charge" was a supervisory employee. A committee member responded, "not always, not all the time." Mr. Wittry provided additional clarification and confirmed that the "blaster-in-charge" indeed functions in a supervisory capacity. Mr. Miller mentioned that the title of the "blaster-in-charge" may not be supervisory, however Mr. Miller also confirmed that the blaster-in-charge was responsible for the "shot." The Division did not further oppose the deletion of the term "crew supervisor."

In addition to the deletion of "crew supervisor," Mr. Reitzell suggested the phrase "be behind the pre-selected terrain barrier" within the proposal rather than "move behind..."

Mr. Bokelund expressed that it was preferred that crewmembers that were not actively involved in the shot, be behind a terrain barrier or in a position of safety. Mr. Bokelund reasoned that it was undesirable to have crewmembers 'move' during the deployment. There were no objections to the replacement of "move."

Subsection 5357(b)(8) was raised by the Chair for discussion. Mr. Denning explained that it was assumed that the blaster would have to move after deploying the charge, but the point was that the blaster would move to "be in" a position of safety or behind a terrain barrier. Mr. Bokelund raised the tabled discussion regarding 5357(b)(4)(B) as a prerequisite. Mr. Reitzell mentioned the possibility that the blaster may already be in a position of safety and that the proposal implied that the blaster would need to move from the position of safety to another location. Mr. Reitzell suggested "move or remain" behind a preselected terrain barrier or a position of safety.

Definition of "deploy" was raised by the Chair in reference to the discussion related to Section 5357(b)(4)(E). The Chair recalled concerns raised by committee members regarding the use of the term "deploy" in the context of the standard. The Chair sought input from the committee regarding the perceived definition of deploy.

Mr. Bokelund commented that the descriptions are contained in the regulations. Mr. Bokelund suggested that the definition include "thrown, placed on the snow..." Mr. Reitzell advised against such a definition suggested by Mr. Bokelund and added that the committee should not pick specific methods of deployment. The Chair suggested the definition describe the "effect" of deploying to avoid preparing a list of activities that would collectively be viewed as "deploy."

Mr. Heit sought from the Division, an explanation regarding the necessity for a definition of deploy. Mr. Heit further pointed to subsection (a)(5)(A) through (E) and others within the standard. Mr. Denning explained that the Division wished to reduce any ambiguity within the standard where the term deploy is used. Mr. Denning added that Mr. Heit's references were "regulations and actions" rather than "definitions". Mr. Denning explained that the definition was needed so that in the context of when the term is used in the regulation, there would be agreement on the meaning of the term "deploy." Consensus was achieved by the committee for the definition of deploy as follows:

*"Deploy." The act of throwing, placing, tethering or propelling a charge into position for detonation.*

Section 5357(b)(4)(B) was raised by the Chair who resumed the discussion. The Chair queried the committee of the feasibility of incorporating "historical positions of safety" into the proposal. The Chair elaborated that if there has been an established position of safety, that basis could serve as an exception to the 100-foot requirement from where the charge is ignited. However, if the 'historic' position of safety was no longer viable, that such factors would impact the decision to use the historical position of safety.

Mr. Denning raised concerns on behalf of the Division that conditions could change "by the hour or by the minute" and that a blanket statement regarding historical positions of safety was disfavored.

The Chair reiterated that the use of historical positions of safety would be an exception, as part of the options of where blasters would seek refuge.

Mr. Kestly and Mr. Gross stated that blasters plan their routes to include positions of safety that may not have historical designations and that historical positions of safety, could be too limiting. Mr. Gross disfavored a requirement that blasters would have to "move" 100 feet because "they had to move." Mr. Ferrari suggested a clause that 'if moving would increase the hazard' that the blasters would not be required to move. The Division preferred Mr. Ferrari's suggestion over the incorporation of historical positions of safety. Mr. Reitzell questioned whether selecting a position 100 feet away from the point of ignition results in a position of safety. Mr. Reitzell posed that moving to another location could be hazardous. Mr. Reitzell suggested allowing the blaster to determine whether traveling 100 feet from the ignition point would create a greater hazard.

Mr. Denning clarified that the 100-foot distance alone does not constitute a position of safety. Mr. Denning explained that the 100-foot distance and the position of safety were two separate concepts. The 100-foot distance was a radius, outside which, a position of safety would be selected.

Mr. Bokelund agreed, but called attention to Mr. Reitzell's position which pondered, 'if the blaster-in-charge deemed that it is less safe to move the 100-foot distance.' The Chair suggested, "If the blaster-in-charge deems that moving from the position where the charge is ignited would result in an increased hazard..." Mr. Denning suggested, "unless moving to a position of safety

would expose the employee to a greater hazard...” Mr. Gross stated that the ski industry was comfortable with the language that Mr. Denning proposed.

Mr. Denning raised that such an exception assumed that where the charge was ignited was already a position of safety. Mr. Bokelund opined that such a proposal which included ‘where the charge is ignited,’ ‘where the charge lands’ and an exception could be confusing. Mr. Bokelund suggested simplifying the proposal with “be at least 100 feet from where the charge is intended to land, except where [the blaster] deems it not safe [to move].” Mr. Denning commented that such a change would change the intent of the proposal. Mr. Denning reiterated that the proposal required 100 feet from both where the charge is ignited and where the charge lands for the proposal to be effective.

A committee member opined that in some cases the location where the charge is ignited might be a position of safety. Mr. Denning commented that the requirements should apply to all cases. Mr. Denning further cautioned that including an exception could negate the requirement.

The Chair suggested, “unless the blaster-in-charge deems that moving 100 feet from where the charge is ignited poses a greater hazard.” Mr. Denning suggested removing “[the] blaster-in-charge [deems that].” Mr. Wittry suggested that the proposed language with the committee amendments to Section 5357(b)(4)(B) may not consistently be interpreted. Rob Baker, CT Maintenance Supervisor, CalTrans, suggested separating the subsection further.

Mr. Reitzell suggested the progression where:

- (B) preselect a position of safety
- (1) select a terrain barrier
- (2) if a terrain barrier is not available...

Mr. Bokelund concurred with the progression but raised the concern that the proposal implied that the blaster might need to be in two locations at once. The Chair commented that the actions contained within Section 5357(b)(4) appear to be a decision made by the blaster before the igniter is attached. Mr. Bokelund sought to clarify the Chair’s opinion that intent was that the blaster would know where they are going to go before they attach the igniter. The Chair so affirmed.

Mr. Denning raised the concern that because Section 5357(b)(4) was a pre-selection activity, the exception could serve to exempt the blaster from the activity of pre-selection. The proposal could be interpreted that, in the absence of a terrain barrier or a position of safety 100 feet away the blaster would be exempt from the pre-selection activity.

Based on committee input to refine Section 5357(b)(4)(B) into subsection (b)(4)(B)(1), (b)(4)(B)(2) and an exception to (B)(2) consensus was achieved regarding the recommendation as follows:

(B) Determine a pre-selected position of safety as follows;

(1) a terrain barrier or,



(2) if a terrain barrier is not available, a position of safety at least 100 feet from both the location where the handcharge is intended to land and the location where the blaster deploys the charge;

EXCEPTION B(2): The location of deployment is a position of safety that is no less than 100 feet from the location of detonation and where moving to the pre-selected position of safety creates a greater hazard.

### **Summary**

The Chair determined that there was insufficient time remaining to deliberate over the cost of the rulemaking. The Chair tabled the discussion while inviting prompt post meeting submissions to the Chair of written comments regarding cost estimation. Committee members suggested that given the consensus recommended changes to the Division's proposal as discussed, the cost of implementing the proposal would be minimal.

The Chair thanked the committee participants for their assistance to the Board. The Chair concluded the committee meeting at 3:00 p.m.