

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD

BOARD STAFF'S REVIEW OF  
PETITION FILE NO. 559

Petitioner: Daniel Gallet

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Submitted by: Michael Nelmidia  
Title: Senior Engineer-Standards  
Date: October 4, 2016

## **INTRODUCTION**

Petition 559 (Petition) was submitted by Daniel Gallet (Petitioner) on April 25, 2016. The Petition seeks to modify the means and methods of hoisting plywood sheets for use in containing excavation wall material.

## **BACKGROUND**

Board staff has identified no existing or pending California or Federal occupational standards, nor applicable consensus standards, that directly address the safety issues raised by the present Petition. Nor has any prior petition to the Board raised these issues.

## **REQUESTED ACTION**

Petition 559 is comprised of little other than an expanded version of *Title 8, Section 1541.1*, as the Petitioner proposes it be amended to include additional restrictions and requirements related to use of excavation wall containment (plywood) panels, and more particularly the means of attachment to those panels for purposes of installation and removal hoisting.

Petition 559 proposed amendments are comprised of an addition of one sentence to *Subsection 1541.1(d)(1)*, and addition of four new subparts to *Subsection 1541.1(e)(1)*.

Specifically, Petitioner requests the following (underlined) additive changes to *Section 1541.1*:

*(d) Materials and equipment.*

*(1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function. The addition of holes in plywood or similar materials may weaken it from manufacturer's specification and are prohibited unless a registered professional engineer has verified the material meets the minimum bending strength listed in Appendix D.*

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*(e) Installation and removal of supports.*

*(1) General.*

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*(C) All shoring installation/removal lifting devices shall be in compliance with the ASME B30.20, and the tabulated data shall reflect a maximum rated lifting capacity and shall not be exceeded.*

*(D) The use of damaged or unrated ropes for lifting are prohibited.*

(E) The use of chains alone to lift malleable shoring material is prohibited due to the increasing possibility of kick outs, falling loads and damage to the material.

(F) The use of Pallet Pullers for lifting are prohibited, as they are designed specifically for horizontal pulling on a smooth, flat surface and may present an unnecessary hazard to employees.

~~(C)~~ (G) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

~~(D)~~ (H) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

~~(E)~~ (I) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

~~(F)~~ (J) Backfilling shall progress together with the removal of support systems from excavations.

### **PETITIONER'S ASSERTIONS**

Given that Petition 559 is comprised of little other than the draft Title 8 language additions being proposed (accompanied by third-party literature, and photo exhibits), Board staff sought supplemental understanding of the Petitioner's intent and reasoning through direct discussions with him, and an associate. Beyond the petition itself, those discussions inform the following overview of Petitioner's assertions.

**Proposed expansion of Section 1541.1(d)(1)**, Petitioner asserts, would ensure that material removed from plywood sheets for attachment holes would not cause the plywood to fail during use as an excavation wall containment means, or when being hoisted incident to that use. It would require that use of plywood sheets modified with attachment holes have been preapproved by a registered professional engineer conditioned having verified that the hole modified panels still possess no less "bending strength" than Petitioner presupposes to be specified within a specified Appendix D of Section 1541.1.

**Additional proposed Subsection 1541.1(e)(1), Subpart (C)**, Petitioner asserts, would ensure that hardware used to lift and place plywood meets "testing, design, and construction" requirements per specified ASME consensus standard.

**Additional proposed Subsection 1541.1(e)(1), Subpart (D)**, Petitioner asserts, would more expressly prohibit use of substandard ropes for the hoisting of plywood sheets. Accompanying the Petition are images exhibiting what appear to be frayed or otherwise degraded ropes still in service for such purposes.

**Additional proposed Subsection 1541.1(e)(1), Subpart (E)**, Petitioner assert, would prohibit the practice of linking a hoisting means attachment hook directly to a chain slung plywood sheet. Petitioner's associate described chain slings being prone to causing sheet weakening edge damage. The associate also described hoisted chain slung sheets being unstable, and prone to abrupt tilting movement (termed "kick-out"). Not only were such kick-outs said to pose a risk of injury to proximate workers, but also risk of cave-in upon destabilizing impact against the excavation sidewall.

**Additional proposed Subsection 1541.1(e)(1), Subpart (F)**, Petitioner claims, would prevent the use of a certain class of clamping devices not intended for use with plywood, nor intended for hoisting purposes. Pallet Pullers, the Petitioner asserts, are intended for use in industrial settings to drag pallets along the floor. The publication of one pallet puller manufacturer, provided with the Petition as an exhibit, specifically warned users against use of the product for hoisting purposes. The Petitioner also raised concern about the risk of damage to plywood sheets posed by the gripping nubs or spikes typically incorporated into such tong or scissor type Pallet Puller designs. Such damage was described as not only risking failure of the plywood as a means of soil containment, but also of the hoisted sheet breaking apart and falling.

### **POSITION OF THE DIVISION**

The Division Evaluation, dated July 27, 2016, recommended denial of the Petition.

### **STAFF EVALUATION**

In evaluating Petition 559, Board staff engaged the Petitioner in discussions, conducted related technical research, and surveyed existing related governmental regulations, and advisory national consensus standards.

### **Relevant Standards**

#### **Federal Standards:**

Federal 29 CFR 1926, Subpart P is the Excavations orders. Appendix D of the California Standard Title 8, Section 1541.1 (See California Standards below) is based on the Federal Standard.

Federal 29 CFR 1910.184 and 29 CFR 1926.251 are the requirement for slings and rigging equipment.

### **California Standards:**

Board staff examined the following California's standards relevant to excavation wall shoring and containment, and methods of rigging and hoisting excavation shoring and containment materials and equipment.

- *Title 8, Section 1541.1* provides options for protective systems for the protection of trenches (excavations) from cave-ins. Petitioner's proposal focuses exclusively upon amending additions to this particular section.
- *Title 8, Section 1541.1 Appendix A*, classifies soil types from most to least stable, as each of the four soil classifications, *Stable Rock, Type A, Type B and Type C*, effect the type of required excavation sidewall shoring and containment protective system. Only protective systems for use with *Type C soil* involve use of sidewall containment plywood sheets.
- *Title 8, Section 1541.1 Appendix D*, specifies requirements for aluminum hydraulic trench shoring protective systems—including specifications for plywood sheets which may be used between vertical shoring members to prevent sloughing (i.e. raveling, spalling) of material into the excavation.
- *Title 8, Article 101* (encompassing *Sections 5040 – 5049*), governs use of slings in conjunction with material handling equipment for the movement by hoisting. *Title 8, Article 101* addresses equipment associated with *ASME B30.9*, as distinct from equipment the subject of *ASME B30.20* (see Consensus Standards below).
- *Title 8, Subsection 3328*, establishes broadly applicable General Industry Safety Order requirements, including that workplace machinery and equipment be designed and used in accordance with well-established engineering principles, and in accordance with manufacturer recommendations.
- *Title 8, Subsection 1593(n)*, specifies use, care and maintenance of slings used in lifting suspended loads with excavators, loaders, and similar equipment, to comply with the *Title 8, Article 101* requirements.
- *Title 8, Subsection 1616.1(aa)*, requires employers to comply with the requirements of *Article 101* when using slings in conjunction with cranes in construction.

### **Consensus Standards**

Board staff examined the following industry consensus standards, addressing design, use, and care of load suspension rigging equipment and devices. While none of the below listed ASME standards were referenced within existing *Title 8, Section 1541.1*, a proposed additional subpart

to *Subsection 1541.1(1)*, would incorporate by reference *ASME B30.20*.

- *ASME B30.20-2013*, Below-the-Hook Lifting Devices, applies to equipment used for attaching loads to a hoist.
- *ASME BTH-1-2014*, Design of Below-the-Hook Lifting Devices, provides minimum structural and mechanical design and electrical component selection criteria for ASME B30.20 below-the-hook lifting devices.
- *ASME B30.9-2014*, Slings, specifies proper use of slings made from wire rope, chain or other synthetic and natural materials.

### Analysis

Board staff discussions with Petitioner brought to light, as a motivating basis for proposed amendment to Title 8, Section 1541.1, the following perceived occupational safety hazards related to use of plywood sheets as a means of excavation sidewall soil containment:

- workers being struck by falling or unstable hoisted plywood sheets;
- unintended disturbance of excavation sidewall soil by poorly controlled or falling plywood sheets causing sidewall instability;
- attachment-hole weakened plywood sheet failure to contain sidewall soil.

*Proposed Subsection 1541.1(d)(1)*, would require employers to engage the services of a Registered Professional Engineer, to verify whether plywood sheets, from which material has been removed for attachment holes, still meet “bending strength requirements” Petitioner presupposes to exist within *Section 1541.1, Appendix D*. However, as below quoted, *Appendix D* requirements specify plywood sheet thickness and type, absent specification of actual strength, or bending strength:

*(g)(7) Plywood shall be 1.125 inches thick of wood or 0.75 inch thick, 14 ply, arctic white birch (Finland form). Please note that plywood is not intended as a structural member, but only for prevention of local raveling (sloughing of the trench face) between shores. Equivalent material may be used if it has been approved in accordance with Section 1505(a).*

Plywood thickness and type requirements within *Section 1541.1, Appendix D(g)(7)*, (indirectly) provide for plywood strength adequate to the intended function of the plywood as a nonstructural, non-shoring, soil spalling prevention means. Further, given that *Appendix D(g)(7)* expressly precludes use of plywood sheeting as a shoring structural member, it is the opinion of Board staff that these existing requirements provide for a margin of strength, even with introduction of lifting attachment holes, adequate to the plywood’s safety function solely as a loose soil containment (not shoring) means.

Proposed Subsection 1541.1(e)(1)(C), would require that devices used for the installation and the removal of shoring comply with *ASME B30.20*. However, application of *ASME B30.20* is inappropriate because of that consensus standard's primary intended application being fixed and mobile cranes—not loaders and excavators. As such, devices the subject of *ASME B30.20* (unlike those the subject of *ASME B30.9*) are non-compatible with the types of heavy equipment, such as loaders and excavators, most typically used for lifting of excavation protective system plywood.

Proposed Subsection 1541.1(e)(1)(D), would preclude the use of “damaged or unrated ropes.” However, more in-depth applicable lifting rope requirements can be found in existing *Title 8, Section 5047, “Natural and Synthetic Fiber Rope Slings.”* Thus, the proposed section would be less adequate, and duplicative, of existing *Section 5047*.

Proposed Subsection 1541.1(e)(1)(E), would prohibit the use of chains when lifting plywood, absent concerted use of attachment accessories such as shackles or a master link. However, the proposed preclusion of reliance upon “*chains alone to lift malleable shoring material*” would not preclude kick out or damage incident to unstable use of other (non-chain) slings. And as a general preclusion of resort to insecure lifting means attachment, chain sling or otherwise—existing *Title 8, Subsection 5042(a)(6)* would seem both applicable and adequate:

*Section 5042(a)(6) Slings shall be set to avoid slippage.*

Proposed Section 1541.1(e)(1)(F), would prohibit the use of Pallet Pullers. “Pallet Puller” is a term used by at least four different manufacturers to describe at least three different types of devices. The device described by the Petitioner (one of the three) is a tong (scissor style clamp which accomplishes pulling attachment by gripping the inner “stringers” of a wooden pallet. Its manufacturer warns users: “*DO NOT use as a below-the-hook lifting device.*” Beyond that, if the plain meaning of that manufacturer recommendation did not serve as authoritative enough warning against use for hoisting, existing *Title 8, Section 3328* renders that preclusion mandatory:

*Section 3328. All machinery and equipment...(a)(2) shall not be used or operated under conditions of speeds, stresses, loads, or environmental conditions that are contrary to the manufacturer's recommendations or, where such recommendations are not available, the engineered design.*

### Conclusion

Having researched and analyzed the safety concerns raised by Petitioner in support of requested amendments to *Title 8, Section 1541.1*, and given due consideration to other safety, and *Title 8* related issues implicated by those requested amendments, Board staff concludes that the asserted concerns are adequately addressed within existing *Title 8* standards. Further, the requested amendments, in part, would conflict with existing *Title 8* standards, and therefore would provide for less than equivalent safety.

**STAFF RECOMMENDATION**

Consistent with the proceeding evaluation, Board staff recommends that the Petitioner's request be DENIED.