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Occupational Safety and Health Standards Board
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**PROPOSED PETITION DECISION OF THE
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD
(PETITION FILE NO. 585)**

INTRODUCTION

The Occupational Safety and Health Standards Board (Board) received a Petition on June 2, 2020, from Marisa “Reese” Fortin, Area HS&E Manager, Sundt Construction (Petitioner). The Petitioner requests the Board amend title 8, California Code of Regulations, Construction Safety Orders, subsection 1711(e)(3), to allow the internal guying/bracing of reinforcing steel (rebar) assemblies when the guying/bracing system is designed by a Registered Professional Engineer (RPE) and to clarify that external guying and bracing of rebar assemblies shall be prohibited.

Labor Code section 142.2 permits interested persons to propose new or revised regulations concerning occupational safety and health and requires the Board to consider such proposals, and render a decision no later than six months following receipt. This timeline has been extended 120 days by Governor Gavin Newsom’s Executive Orders N-63-20 and N-71-20, in recognition of the State of Emergency caused by COVID-19.

Further, as required by Labor Code section 147, any proposed occupational safety or health standard received by the Board from a source other than the Division of Occupational Safety and Health (Division) must be referred to the Division for evaluation. The Division has 60 days after receipt to submit an evaluation regarding the proposal; this timeline, running concurrently with the Board’s timeline as described above, has also been extended 120 days pursuant to Executive Orders N-63-20 and N-71-20.

SUMMARY

Subsection 1711(e) contains stability requirements for vertical and horizontal columns, walls, and other reinforcing assemblies, while subsection 1711(e)(3) prohibits the use of reinforcing steel as a guy or brace. The Petitioner requests to amend subsection 1711(e)(3) to specify that rebar shall not be used as an external guy or brace. Additionally, the Petitioner requests to allow RPE-designed internal bracing to prevent collapse of reinforced steel assemblies.

Specifically, the Petitioner requests the proposed additions to 1711(e)(3) below in underline:

§1711. Reinforcing Steel and Post-Tensioning in Concrete Construction.

* * *

(e) Stability Requirements for Vertical and Horizontal Columns, Walls, and Other Reinforcing Assemblies.

(1) Reinforcing steel for walls, piers, columns, prefabricated reinforcing steel assemblies, and similar vertical structures shall be guyed, braced, or supported to prevent collapse.

(2)(A) Systems for guying, bracing, or supports shall be designed by a qualified person.

(B) Guys, braces, and supports shall be installed and removed as directed by a competent person.

(3) Reinforcing steel shall not be used as an external guy or brace. Reinforcing steel used for internal bracing must be designed by a Registered Professional Engineer using the Load and Resistance Factor Design. Calculations must include wind and person-on-the-cage loads.

The Petitioner makes the following arguments for amending subsection 1711(e)(3):

- While subsection 1711(e)(2)(a) states that systems for guying and bracing shall be designed by a qualified person, the language of subsection 1711(e)(3) would make a column rebar cage that was designed by an RPE with internal bracing consisting of reinforcing steel X-braces an illegal practice in the eyes of Cal/OSHA.
- Reinforcing steel internal bracing, when designed by an RPE, is a safer practice than relying on external bracing, as made evident in the report completed by Carlos A. Banchik, PE with Innova Technologies.
- Internal bracing does not impact formwork before or after installation, thereby decreasing the need for coordination between various contractors to maintain safety.

DIVISION'S EVALUATION

In its evaluation concerning the Petition, dated February 19, 2021, the Division notes that internal bracing comprised of rebar is commonly used by the industry to construct reinforcing steel columns, walls and other structures. However, they state that rebar should not be the bracing method used to prevent collapse/falling of reinforcing steel assemblies.

The Division's review of the design and analysis provided by Mr. Banchik with Innova Technologies finds the report to be overly simplistic and lacking vital information. The analysis did not include a maximum height for which internal rebar bracing could be used and focused solely on wind loading, with no mention of accidental contact by machinery and equipment.

Further, the provided technical report from the University of Nevada, Reno – Center for Civil Engineering Earthquake Research (CCEER) does not show that internal braces are adequate to prevent collapse. The report was based on bridge columns supported not only by internal bracing, but also by two guy wires. The purpose of the study was to increase the stability of bridge columns when guy or brace supports are removed for concrete installation and was not

intend to make the case that reinforcing steel braces should act as the only means of support for reinforcing steel structures.

The Division disagrees with the Petitioner's claims that removal of external bracing poses hazards to employees. The Division maintains that the Petitioner failed to provide specific hazard data to support their claim. Furthermore, if a collapse of reinforcing steel structures does occur, the root cause of the hazard would likely be inadequate bracing or guying, not the removal of the support.

Additionally, the Division does not agree with the Petitioner's arguments that internal bracing eliminates the need for coordination at worksites. To ensure employee safety, effective communication and coordination between contractors at worksites must be maintained.

While the Division agrees that properly designed and installed reinforcing steel bracing enhances strength and stability of reinforcing steel structures, they maintain that it should not be allowed as the sole means of bracing for reinforcing steel structures. Therefore, the Division recommends the Petition be DENIED.

BOARD STAFF'S EVALUATION

The Board staff evaluation dated July 29, 2020 opines that the intent of subsection 1711(e), which was added as a result of a rulemaking made effective in January of 2018, is to prevent vertical reinforcing steel structures from collapsing/falling during construction. Board staff surmises that the addition of subsection 1711(e)(3) was to prohibit rebar from being used as an external brace due to its tendency to buckle when loaded at the tip.

Board staff argues that subsection 1711(e)(3) was not intended to make internal bracing illegal, as neither ANSI/ASSP A10.9-2013 nor the federal standard specifically prohibit the use of rebar as an internal brace.

Current California regulations state that a qualified person should design systems for guying, bracing or supports; therefore, amending the language is unnecessary. In addition, Board staff believes an RPE should not be restricted to a certain calculation rubric or method in designing load requirements for internal bracing to ensure structural stability.

Lastly, internal bracing of vertical and horizontal columns, walls and other reinforcing assemblies must not preclude the judgement of the competent person on-site in determining where additional external guying or bracing is required for structural stability.

Board staff recommends the Petition be DENIED but suggests clarification on internal bracing be made to subsection 1711(e) through an additional rulemaking addressing:

- Internal bracing is not illegal.

- Internal bracing must be designed by an RPE.
- Internal bracing does not automatically exempt vertical and horizontal columns, walls, and other reinforcing assemblies from external bracing.
- The clarification of safe practices listed under Prohibited Use of Reinforcing Steel in ANSI/ASSE A10.9-2013, Safety Requirements for Concrete and Masonry Work.

DISCUSSION

Petitioner argues that the existing language lacks clarity, that a requirement for a RPE should be proscribed, and a specific calculation rubric to be employed by said RPE when determining requirements for internal bracing. Petitioner's proposal would delineate "external" vs. "internal" bracing, and create new standards for each, ultimately providing a pathway for the exclusive use of internal bracing. In support of this proposal, the Petitioner provided supporting documents drafted by Innova Technologies, which argues internal bracing is sufficient to prevent collapse of reinforcing steel structures, and CCEER, which provides comprehensive analysis of internal reinforcing bracing.

The Board is convinced by the Division's conclusion that, while the CCEER report proves internal reinforcing steel bracing adds significant stability to structures also supported by external bracing, internal steel bracing alone has not been shown to provide equivalent safety to the existing standard. The Division's determination that the analysis by Innova Technologies is incomplete, as it does not establish a maximum height for internal reinforcing steel bracing and considers only wind loading force, is well-founded. The Board agrees with the Division that the CCEER report notably analyzes internal reinforcing braces used *in conjunction with* guy wires. Additionally, the Board finds it material that the CCEER report considers not only tension and compression, as Innova Technologies does, but also forces exerted by bending and torsion. Bending and torsion forces are undeniably present during cases where accidental contact by machinery and equipment causes reinforcing steel assembly failure.

Neither the Division nor Board staff evaluation support the Petitioner's determination that internal bracing consisting of rebar X-braces is illegal under the existing regulation. Rather, the Division argues that *exclusive* use of internal bracing, absent supporting external bracing, is prohibited. The Division also notes correctly that effective communication and coordination between contractors at a worksite must always be maintained, and that this responsibility cannot be eliminated.

The staff evaluation points out that neither the ANSI/ASSP A10.9-2013 nor the federal standard, both of which informed the Board's 2016 rulemaking, specifically prohibit reinforcing steel from being used as an internal brace.

Similar to the Division's recommendation, the evaluation by Board staff recommends denial of the Petitioner's proposal. However, in focusing on the plain language of the existing regulation and the rulemaking history which informed it, Board staff acknowledges Petitioner's concerns

regarding clarity in the existing regulation. Staff finds that the Petitioner's proposed language flawed and unnecessarily proscriptive, with the potential to preclude the judgement of the competent person on-site in determining whether additional external guy or brace is needed for structural stability. In the alternative, the staff evaluation recommends consideration of a narrowly focused rulemaking to improve clarity on the use of internal bracing, qualifications for a "competent person", and to clarify safe practices listed in ANSI/ASSP A10.9-2013.

The Board finds it material that while the Board staff evaluation allows for the possibility that internal bracing alone may be sufficient in some cases, it does not point to supporting evidence for this conclusion. Instead, the staff evaluation defers to the (future) determination of an on-site engineer. The Division's evaluation does not agree, and implies that such a determination would be in error, as evidenced by the CCEER report. As such, this discrepancy in the evaluations argues strongly in favor of providing additional clarity to the requirements of subsection 1711(e)(3).

CONCLUSION AND ORDER

Having considered Petition 585 and the evaluations of the Division and Board staff, for the reasons outlined in the preceding DISCUSSION, the Board hereby GRANTS, IN PART the Petition to the extent that the Board directs its staff to consider a limited and narrowly constructed amendment to subsection 1711(e) to clarify the following:

- Internal bracing is not illegal.
- A Registered Professional Engineer must design any internal bracing.
- Safe practices listed under Prohibited Use of Reinforcing Steel in ANSI/ASSE A10.9-2013, Safety Requirements for Concrete and Masonry Work.

Furthermore, the Board directs staff to work with the Division to determine if sufficient data exists to support exclusive use of internal reinforcing bracing in some installations of vertical and horizontal columns, walls and other reinforcing assemblies. Subsequent to a determination, Board staff is directed to consider a further amendment to clarify subsection 1711(e).

Given the narrow focus of the amendment to be considered, an advisory committee meeting is not required.