

**OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD**

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**PROPOSED PETITION DECISION OF THE
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD
(PETITION FILE NO. 498)****INTRODUCTION**

The Occupational Safety and Health Standards Board (Board) received a petition on September 4, 2007, from Mr. Howard Hill, Gary Searer, Richard Dethlefs and Terrence Paret (Petitioners), all of whom are with Wiss, Janney, Elstner Associates, Inc. (WJE). The Petitioners request the Board to amend Title 8, California Code of Regulations, Section 3296 regarding the inspection and testing of building maintenance equipment and installations.

Labor Code section 142.2 permits interested persons to propose new or revised standards concerning occupational safety and health, and requires the Board to consider such proposals, and render a decision no later than six months following receipt. 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 must be referred to the Division for evaluation, and the Division has 60 days after receipt to submit a report on the proposal.

SUMMARY

The Petitioners concerns are related to the provisions that prescribe requirements for testing load suspension devices such as portable davits¹, davit bases, outriggers and roof tie-back anchors, and associated load sustaining devices used in window cleaning and/or building maintenance operations.

The Petitioners concerns are focused on the provisions in Section 3296(b)(4)(A) and (B) which state:

Section 3296(b). Periodic Inspection and Tests.

Section 3296(b)(4)

(A) Load suspension devices shall not be tested to more than 2 times the rated working load which the device is designed to lift and/or support.

(B) Roof tie-back anchors shall be tested to no more than 50 percent of their rated capacity. For example, an anchor with a rated capacity of 5000 pounds shall not be tested in excess of 2500 pounds.

The Petitioners dispute the rationale provided in the rulemaking file and the advice provided by the professional engineers who served on the advisory committee that assisted with the development of

¹ A roof davit is used to raise a suspended working platform above the building face being serviced. This type of davit can also be used to raise a suspended working platform that has been ground-rigged.

the above standards. The Petitioners assert that the testing prescribed in the subject standards does not verify or ensure the structural integrity of load suspension devices.

DIVISION'S EVALUATION

The Division submitted its recommendations to the Board by memorandum dated November 13, 2007. The Division supports proof load testing to verify the design of anchors or suspension equipment prior to installation. The testing of an anchor to 5000 pounds or destruction to verify the design is recommended, but not when it is in service on a building. The Division stated that it is its experience that testing existing anchors with a load of 5000 pounds causes damage to the roof and weatherproofing materials allowing subsequent damage to the anchor connections and structure. There is often deflection in the building's structural components that does not compromise the anchorage performance. Modifications to the building design to eliminate the temporary deflection from a 5000-pound test load applied in various directions would be costly and unnecessary for the safety of workers.

The Division stated that testing davits or other suspension devices to four times the rated load or hoist capacity is fine for the verification of design when done in a shop. Many professional engineers experienced in the design and testing of this equipment do not recommend repeated loading at the design capacity of the suspension equipment. Performing such tests on a rooftop presents the same problems as testing anchors on a roof. Temporary deflection in the building's frame structure allows enough movement to damage roofing and weatherproofing. Testing at two times rated capacity has detected problem installations and defective equipment while minimizing the damage to buildings.

The Division stated that mobile cranes are tested in a similar manner. Mobile cranes are designed to meet the ANSI/ASME B30.5 standard and are not to be subjected to test loads exceeding 110 percent of the rated chart capacity. The crane's chart capacity is reduced by a margin of safety from the tipping loads, structural capacity and wire rope design factors. In most cases if mobile cranes were tested to the hoist stall capacity there would be structural or wire rope failure. In another example, the ANSI/ASME B30.2 standard specifies that Overhead and Gantry Cranes not be tested at more than 125 percent of their rated capacity.

The Division further indicated that the ANSI/TWCA I-14.1 "Window Cleaning Safety" committee will meet in March 2008, and the ASME/ANSI A120.1 "Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance" committee will meet on April 10-11, 2008. An invitation will be sent to the Petitioners or other representatives of WJE Engineers to attend the meetings and discuss the issues on a national level.

The Division concluded its report stating that it is important for California to have standards for the design and testing of exterior building maintenance equipment that are consistent with national standards. The California standards should not be based on one organization's opinion. The advisory committee that considered the revisions to Section 3296 included professional engineers, equipment manufacturers, scaffold inspection and testing agencies, and building owners having many years of experience in the design, installation, use and testing of exterior building maintenance

equipment. The advisory committee reached a consensus on the language in the revised standard. The Division's evaluation states that it "recommends that the design and load testing issues be resolved in the ANSI committees before California departs in another direction." Therefore, the Division recommends that Petition No. 498 be denied.

STAFF'S EVALUATION

Post-installation load testing of all building safety devices and equipment is not mandated. However, when post-installation load testing of suspension equipment, devices and roof tie-back anchorages used in window cleaning and building maintenance operations are necessary, the Petitioners are strong proponents of load testing such equipment and devices to their full design capacity. Section 3291 requires that roof tie-back anchorages be designed to sustain a load of 5000 pounds applied in any direction without deformation. Section 3291 also requires load suspension equipment and devices such as roof davits and outrigger beams to be designed with a safety factor of 4 times the rated load (manufacturer's recommended maximum working load) of such equipment.

The Board's advisory committee that assisted in the development of the amendments to Section 3296 included professional engineers, load suspension equipment manufacturers, scaffold inspection and testing agencies, and building owners having many years of experience in the design, installation, use and testing of exterior building maintenance equipment. The advisory committee discussions included consideration of appropriate load/proof testing procedures and limits for exterior building maintenance equipment and a consensus was reached for the standards now in Section 3296 that included the provisions in Section 3296(b)(4)(A) and (B).

Board staff contacted several professional engineers experienced in the design and testing of this equipment, and they do not recommend repeated load testing at the full design capacity of the suspension equipment. These engineers concurred with the Division's opinion that such load tests on a roof top present the same problems as testing anchors on a roof. Temporary deflection in the building's frame structure creates enough movement to damage roofing and weatherproofing. Additionally, repeated testing to the full design capacity can cause deflection in some suspension equipment that can result in permanent deformation requiring replacement.

Board staff also contacted manufacturers of anchorage systems and load suspension equipment and devices used in window cleaning and building maintenance operations. Manufacturers contacted indicated that they support proof load testing to verify calculations and the full design capacity of suspension equipment prior to installation. However, they did not support this type of load testing for post-installation for the same concerns expressed by the Division and professional engineers as stated in the preceding paragraph.

The test loads needed to verify the suitability of anchorages and the design and testing of load suspension devices on existing buildings has been an ongoing debate among engineers that has resulted in some controversy as noted by some of the opinions expressed by the Petitioners. For example, the Petitioners state that the provisions in the ANSI/IWCA I-14.1 standard and in Section 3296(b)(4)(A) and (B) (i.e. testing at twice the rated load or 50 percent of the rated full design capacity) would not identify all deterioration levels of davit system equipment/devices, especially

those deterioration levels of a lesser degree in relation to the full design capacity of equipment and devices.

However, there are no statistics, means or methods to know how many installations may be compromised to the various deterioration levels described by the Petitioners that would adversely affect the suitability of suspension equipment or devices. For the reasons described above, the load testing of all suspension devices that require such testing to the full design capacity is not recommended.

Another area of concern by the Petitioners is that hoists that are covered by the provisions pertaining to exterior building maintenance are permitted by various standards to generate forces of up to three times their rated load before stalling/stopping of the hoist motor forces. Three times the rated load is the maximum stall capacity permitted for a hoist. It does not represent the actual stall capacity of individual hoists. Hoist manufacturers generally do not publish the hoist stall factors, and the hoist stall factor is subject to variation depending on the manufacturer, the hoist model, age of the hoist and its required duty cycle.

The Petitioners' concern is that load testing of suspension devices at two times the rated load would not be adequate testing when the hoist stall factor could be as high as three times the rated load. The hoist's stall load is an unusual event that is normally controlled by overload limiting devices on the hoist, upper travel limit switches or obstruction bars to shut off the hoist motor. Most manufacturers do not consider this type of unusual load event to fall within design criteria that includes a four to one safety factor.

Additionally, the ASME A120.1-2001 consensus standard for powered platform safety, Section 3.6.8(c) requires that overload protection be provided in the hoisting and suspension system to protect against the equipment operating in the up direction with a load in excess of the capacity of the hoist's braking system. Section 3.6.8 of this standard requires that the primary brake shall be rated to stop and hold not less than 125 percent of the rated load of the hoist but in no case less than the maximum lifting capacity of the hoist. Consequently, overload protection devices may be set as low as 1.25 percent of the rated load in order to stop the hoist motor in the event of an overloading or stalling situation.

The Petitioners assert that roof tie-back anchorages designed to sustain a 5000 pound load do not include a safety factor of four to one and that the prescribed load testing in the ANSI/IWCA I-14.1 standard and Section 3296(b)(4)(B) are not adequate to provide reasonable assurance the anchorage is adequate to sustain real world conditions. As rationale, the Petitioners refer to standards that limit maximum fall arresting forces on an employee to 1800 pounds when using a body harness and an arresting test force prescribed in Article 6, Appendix C of 2,520 pounds. However, these are maximum fall arrest forces permitted. Information from companies that manufacture and provide personal fall protection equipment indicate that actual fall arrest forces when one person is attached to an anchor with an appropriate shock absorbing lanyard are well below 900 pounds of fall arrest force.

Title 8 standards in the General Industry Safety Orders [e.g. Section 3328(b)] are consistent in requiring that machinery and equipment in service be inspected and maintained in accordance with the manufacturer's recommendations. The Petitioners recommendations would not be recommended by the manufacturers contacted by staff, some of which also attended the Board's advisory committee.

The load testing standards in the ANSI/IWCA I-14.1 national consensus standard and in Section 3296(b)(4)(A) and (B) were not arbitrarily proposed but were given careful consideration. The majority of stakeholders concur that load testing as prescribed in the ANSI/IWCA I-14.1 standard and in Section 3296(b)(4)(A) and (B) has been successful in detecting problem installations and defective equipment while minimizing the damage to buildings and suspension equipment and devices.

For reasons discussed in this evaluation, staff recommends that the petition be denied. Additionally, the Division has indicated that an invitation will be extended to the Petitioners and/or the Petitioners' representatives to participate in the forthcoming national consensus standard committee meetings that cover window cleaning safety and safety requirements for powered platform installations related to building maintenance. Board staff notes that revisions recommended by the Petitioners for Section 3296(b)(4)(A) and (B) are included with a number of other revisions recommended by the Petitioners in its letter to the ANSI/IWCA I-14.1 consensus standard committee. Board staff concurs with the Division that the Petitioners issues should be resolved at the national consensus committee meetings before California considers amendments that are inconsistent with the national consensus standards.

CONCLUSION AND ORDER

The Occupational Safety and Health Standards Board has considered the subject Petition to make recommended changes to Section 3296 regarding the inspection and testing of building maintenance equipment and installations. The Board has also considered the recommendations of the Division and Board staff. For reasons stated in the preceding discussion, the Petition is hereby denied.