SKYCURRENT

To: Cal OSHA

From: Hudson Worthington Harr and Luis Garcia on behalf of SkyCurrent, LLC

Date: Jan 13th 2023

Re: Temporary Experimental Variance

Item 1: Send the letter to: Jeff Killip jkillip@dir.ca.gov (Chief of Cal/OSHA), and Eric Berg eberg@dir.ca.gov (Deputy Chief of Health for Cal/OSHA).

Item 2: State the Title 8 safety orders that are the subject of the proposed temporary experimental variance. List all sections of California Code of Regulations, Title 8, that apply, plus applicable ANSI, ASME, NFPA, API or other national consensus standards that are included in the applicable Title 8 sections.

1 - According to Cal/OSHA - Title 8 regulations, Chapter 4. Division of Industrial Safety, Subchapter 7. General Industry Safety Orders, Group 1. General Physical Conditions and Structures, Article 5. Window Cleaning, §3281. Definitions,

> *Outrigger Beam. A device, used singularly or in pairs, for suspending a working platform from work, storage, and rigging locations on the building being serviced. Unlike davits, an outrigger reacts its operating moment load as at least two opposing vertical components acting into two or more distinct roof points and/or attachments.*
>
> *Outrigger Beam, Fixed. An outrigger beam designed to remain at a fixed location.*

Outrigger Beam, Mobile. An outrigger beam designed to be used in association with a roof car.

Outrigger Beam, Portable. An outrigger beam designed and dedicated to a specific building or roof area, which is capable of being moved from work location to work location within the dedicated area.

Outrigger Beam, Transportable. An outrigger beam designed to be moved manually from building to building or worksite (geographical area) to worksite.

SkyCurrent's system utilizes a "transportable outrigger beam" as its primary method of suspension. The outrigger beam is not designed to be dedicated to a specific building, used in association with a roof car, or remain at a fixed location. SkyCurrent is requesting approval from the Division to use a transportable outrigger as the primary method of suspension.

2 - According to Cal/OSHA - Title 8 regulations, Chapter 4. Division of Industrial Safety, Subchapter 7. General Industry Safety Orders, Group 1. General Physical Conditions and Structures, Article 5. Window Cleaning, §3291. Special Design Considerations -- Permanent Roof Top Installations,

(d) Outrigger Beams.

(1) Outrigger beams shall not be employed on buildings exceeding 130 feet in height unless acceptable to the Division. All outrigger beams shall be designed to support the rated load imparted by the suspended scaffold or boatswain's chair with a safety factor of at least 4. Outrigger beams shall not extend more than 6 feet beyond the face of the building. Only steel or high strength alloy beams shall be used. The inboard end of outrigger beams, measured from the fulcrum point to the anchorage point, shall be not less than 1 1/2 times the outboard end in length. The fulcrum point of the beam shall rest on leg(s) or equivalent supports securely attached to the beam and so arranged as to prevent lateral overturning of the beam. Bearing pads shall be securely affixed to each support and shall be of sufficient area to safely distribute imposed loads to the roof structure. The inboard ends of outrigger beams shall be securely anchored by means of tension members (tie-down) affixed to the structural frame of the roof in such a manner that applied forces are resisted within allowable limits affording a safety factor of at least 4. All tie-down fittings at the inboard end of the beam shall be of a type that vibration effects shall not produce accidental disengagement. Safety hooks for beam tie-down purposes shall not be used. The use of counterweights at the inboard end of mobile and fixed outrigger beams are prohibited.

(2) The use of counterweights on the inboard end of portable or transportable outrigger beams shall be permitted only when the following conditions have been met:

(A) The building on which the counterweight beam is to be used, was constructed prior to July 23, 1990.

(B) The building was not designed for other suspension systems.

(C) An Operating Procedures Outline Sheet (OPOS) shall be developed in accordance with Section 3282(p) of these orders.

(D) The counterweights shall be secured to the inboard ends of beams and shall consist of non-flowable solid materials (e.g., concrete, steel, etc.).

(E) The outrigger shall be secured with a tie-back to a verified anchorage on the building during the entire time of use. The anchorage shall be designed to have a safety factor of not less than four based on the rated capacity of the outrigger.

(F) The counterweight shall provide a stability factor of at least 4 against overturning or upsetting of the outrigger.

(G) Each outrigger shall be designed by a registered engineer to support a load of 4 times the rated hoist capacity or the total load whichever is greater. Outrigger beams shall have a minimum rated capacity of 1000 pounds.

(H) The outrigger beam shall be secured against horizontal movement when in use.

(I) Portable outriggers weighing more than 80 pounds shall be provided with a stable means for its transport (wheels or cart).

(J) Each outrigger shall be so located that the suspension wire ropes, for two point suspended working platforms, are hung parallel.

(K) The parts of sectional outrigger beam(s) (i.e. an outrigger beam(s) consisting of more than one piece) shall be identified (e.g. numbered, color-coded). Parts shall not be interchanged or substituted except with the approval of the manufacturer.

(3) Each outrigger beam shall be provided with a securely affixed, durable and readily visible metal plate bearing the following information in letters at least 1/4-inch in height:

(A) The beam's rated load.

(B) Manufacturer's name.

(C) Precautionary warning message prohibiting use of the beam within 10 feet of high-voltage lines. (Title 24, Part 2, Section 3105A.4.2.)

(e) Portable Outrigger Beams. The use of portable outrigger beams shall comply with the applicable provisions of Article 6. (Title 24, Part 2, Section 2-8505(d).)

SkyCurrent is requesting approval from the Division to use a transportable outrigger beam on buildings exceeding 130 feet in height. Additionally, the use of counterweights on buildings constructed subsequent to July 23, 1990, and buildings designed for other suspension systems.

3 - According to Cal/OSHA - Title 8 regulations, Chapter 4. Division of Industrial Safety, Subchapter 7. General Industry Safety Orders, Group 1. General Physical Conditions and Structures, Article 6. Powered Platforms and Equipment for Building Maintenance, §3294. Powered Platform Installations -- Affected Parts of Buildings,

(3) Tie-in guides required in subsection(b)(1) of this section may be eliminated if one of the guide systems in subsection (b)(3)(A), (b)(3)(B) or (b)(3)(C) of this section is provided, or an equivalent.

(A) Intermittent Stabilization System. The system shall keep the equipment in continuous contact with the building facade, and shall prevent sudden horizontal movement of the platform. The system may be used together with continuous positive building guide systems using tie-in guides on the same building, provided the requirements for each system are met.

1. The maximum vertical interval between building anchors shall be three floors or 50 feet, whichever is less.

2. Building anchors shall be located vertically so that attachment of the stabilizer ties will not cause the platform suspension ropes to angulate the platform horizontally across the face of the building. The anchors shall be positioned horizontally on the building face so as to be symmetrical about the platform suspension ropes.

3. Building anchors shall be easily visible to employees and shall allow a stabilizer tie attachment for each of the platform suspension ropes at each vertical interval. If more than two suspension ropes are used on a platform, only the two building-side suspension ropes at the platform ends shall require a stabilizer attachment.

4. Building anchors which extend beyond the face of the building shall be free of sharp edges or points. Where cables, suspension wire ropes and safety lines may be in contact with the building face, external building anchors shall not interfere with their handling or operation.

5. The intermittent stabilization system building anchors and components shall be capable of sustaining without failure at least four times the maximum anticipated load applied or transmitted to the components and anchors. The design wind load for each anchor shall be 600 pounds.

6. The building anchors and stabilizer ties shall be capable of sustaining anticipated horizontal and vertical loads from winds specified for roof storage design which may act on the platform and wire ropes if the platform is stranded on a building face. If the building anchors have different spacing than the suspension wire ropes or if the building requires different suspension spacings on one platform, each building anchor and stabilizer tie shall be capable of sustaining the wind loads.

Note: See Figure 2 in Appendix B of this article for a description of a typical intermittent stabilization system.

(B) Button Guide Stabilization System.

1. Guide buttons shall be coordinated with platform mounted equipment as specified in Section 3295(e)(6).

2. Guide buttons shall be located horizontally on the building face so as to allow engagement of each of the guide tracks mounted on the platform.

3. Guide buttons shall be located in vertical rows on the building face for proper engagement of the guide tracks mounted on the platform.

4. Two guide buttons shall engage each guide track at all times except for the initial engagement.

5. Guide buttons which extend beyond the face of the building shall be free of sharp edges or points. Where cables, ropes and safety lines may be in contact with the building face, guide buttons shall not interfere with their handling or operation.

6. Guide buttons, connections and seals shall be capable of sustaining without damage at least the weight of the platform, or provision shall be made in the guide tracks or guide track connectors to prevent the platform and its attachments from transmitting the weight of the platform to the guide buttons, connections and seals. In either case, the design load shall be 600 pounds per building anchor.

Note: 1. See Section 3295(e)(6) for relevant equipment provisions.

2. See Figure 3 in Appendix B of this article for a description of a typical button guide stabilization system.

(C) System utilizing angulated roping and building face rollers. The system shall keep the equipment in continuous contact with the building facade, and shall prevent sudden horizontal movement of the platform. This system is acceptable only where the suspended portion of the equipment in use does not exceed 130 feet above a safe

surface or ground level, and where the platform maintains no less than 10 pounds angulation force on the building facade.

The SkyCurrent facade maintenance vehicle achieves stabilization via force produced from ducted fans, ensuring continuous contact with the building façade throughout cleaning operations. SkyCurrent is requesting approval for the electric ducted fans to be used as a means of interim stabilization.

High wind field testing demonstrated this method of stabilization to be effective with zero loss of facade adhesion and minimal lateral movement. Wind speeds during the testing exceeded 25 mph with drops taking place from all facade orientations and elevations. This high wind testing took place from ground level to the roof deck at the 240 feet tall Morgan Stanley Tower in St. Petersburg, FL

Before conducting our extensive field operations, SkyCurrent's facade access vehicle was tested in a wind tunnel at numerous wind orientations, corner case conditions, and velocities. Results showed positive adhesion forces up to a 35 MPH wind speed. This wind threshold test simulated the worst orientation to the wind and a corner condition of a building.

In the event of a power outage condition, SkyCurrent's equipment provides continuous force to the building façade via an uninterrupted power supply. This power outage would automatically start a return sequence to bring equipment to the roof or ground level, whichever is closest during ascent/descent. The SkyCurrent system utilizes an onboard anemometer to measure wind speed. This information is sent to a PLC that also enables an automatic return home sequence to prevent the operator from using equipment in high wind speed conditions. All of this data including, telemetry, component temperatures, power settings, performance data, etc is displayed on an operator touch screen for real-time response.

4 - According to Cal/OSHA - Title 8 regulations, Chapter 4. Division of Industrial Safety, Subchapter 7. General Industry Safety Orders, Group 1. General Physical Conditions and Structures, Article 6. Powered Platforms and Equipment for Building Maintenance, §3295. Powered Platform Installations -- Equipment,

(c) Suspension Methods. Elevated building maintenance equipment shall be suspended by a carriage, outriggers, davits or an equivalent method.

(2) Portable Outriggers.

(A) Portable outriggers may be used as a method of suspension for ground rigged working platforms where the point of suspension does not exceed 130 feet above a safe surface unless acceptable to the Division.

(B) Platform stabilization system(s) shall be provided which meet the requirements of Section 3294(b).

(C) Portable outriggers shall be used only with self-powered, ground rigged working platforms.

(D) Each portable outrigger shall be secured with a tie-down to a verified anchorage on the building during the entire period of its use. The anchorage shall be designed to have a stability factor of not less than four against overturning or upsetting of the outrigger.

(E) Access to and egress from the working platform shall be from and to a safe surface below the point of suspension.

(F) The working platform shall be provided with wheels, casters or a carriage for traversing horizontally.

(G) Each portable outrigger shall be designed for lateral stability to prevent rollover in the event an accidental lateral load is applied to the outrigger. The accidental lateral load to be considered in this design shall be not less than 70 percent of the rated load of the hoist.

(H) Each portable outrigger shall be designed to support an ultimate load of not less than four times the rated load of the hoist.

(I) Each portable outrigger shall be so located that the suspension wire ropes for two point suspended working platforms are hung parallel.

(J) A portable outrigger shall be tied-down to a verified anchorage on the building with a rope equivalent in strength to the suspension rope.

(K) The tie-back rope shall be installed parallel to the centerline of the outrigger.

(L) Where applicable, the forces or weights referenced in Section 3295(c)(3)(D), (E) and (F) shall apply to outriggers.

SkyCurrent equipment is not permanently dedicated to the interior or exterior building maintenance of a specific structure or group of structures. Moreover, SkyCurrent uses a transportable outrigger beam as its primary suspension method. The outrigger beam is not designed to be dedicated to a specific building, used in association with a roof car, or remain at a fixed location. SkyCurrent is requesting approval to be recognized as its primary suspension method, a transportable outrigger for ground-rigged and roof-rigged working platforms where points of suspension exceed 130 feet.

Item 3: State all addresses and locations where the proposed temporary variance will be in effect (not applicable for construction, service, and other industries where future site locations are unknown.)

The proposed temporary variance operations will take place at the following addresses,

555 Market St.
San Francisco, CA 94105

480 Mission Bay Boulevard North
San Francisco, CA 94158

50 W San Fernando St
San Jose, CA 95113

Item 4: State if the applicant has been cited by the Division, filed an appeal, or has an appeal pending before the Occupational Safety and Health Appeals Board (OSHAB) regarding the safety orders for which the employer is applying for a temporary variance.

SkyCurrent has not been cited by the Division, filed an appeal, or has an appeal pending before the Occupational Safety and Health Appeals Board regarding the safety orders mentioned above.

Item 5: Describe in detail the conditions, practices, means, methods, operations, or processes that will provide new and improved techniques to safeguard the health and safety of employees. Include how the employer will protect employees against the hazards covered by the regulation for which an experimental variance is requested.

SkyCurrent's system takes workers out of elevated environments by allowing operators to control all aspects of facade cleaning from the relative safety of the building's roof. Risk to the roof based technicians and the general public below has been the core focus of our 4 year technology development process and extensive validation through field testing. The following images depict various safety features integral to the SkyCurrent system that provide safety to the general public and equipment operators alike. Many of these design elements derived from window cleaner interviews, consulting work with numerous engineering firms, SIT holder feedback, and reviewing the following codes; OSHA 1910, Cal/OSHA Article 5, Cal/OSHSA Article 6, ASME A120.1, and ANSI IWCA 14.1-2001.

Image 1 - Roof Vehicle Safety Features

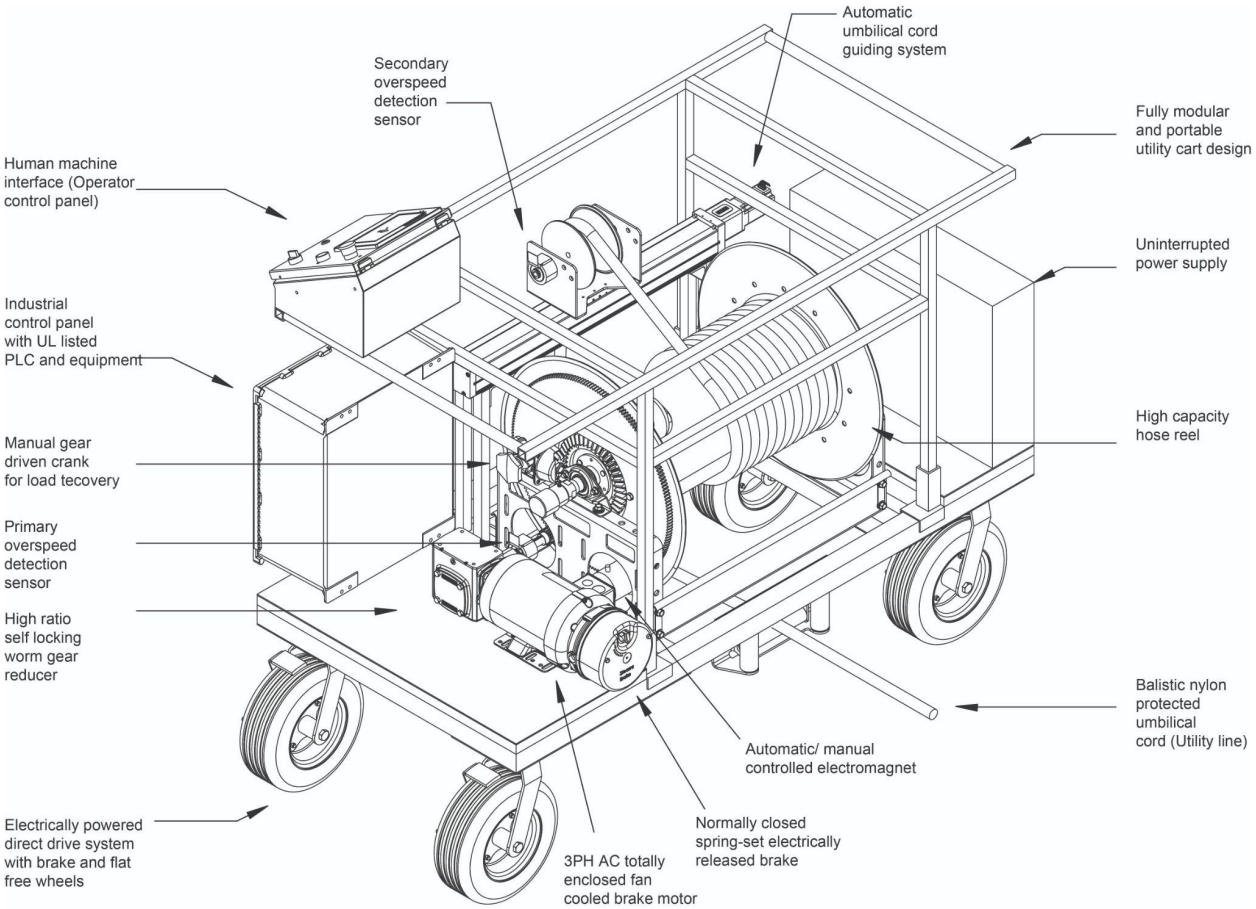


Image 2 - Transportable Outrigger Beam Safety Features

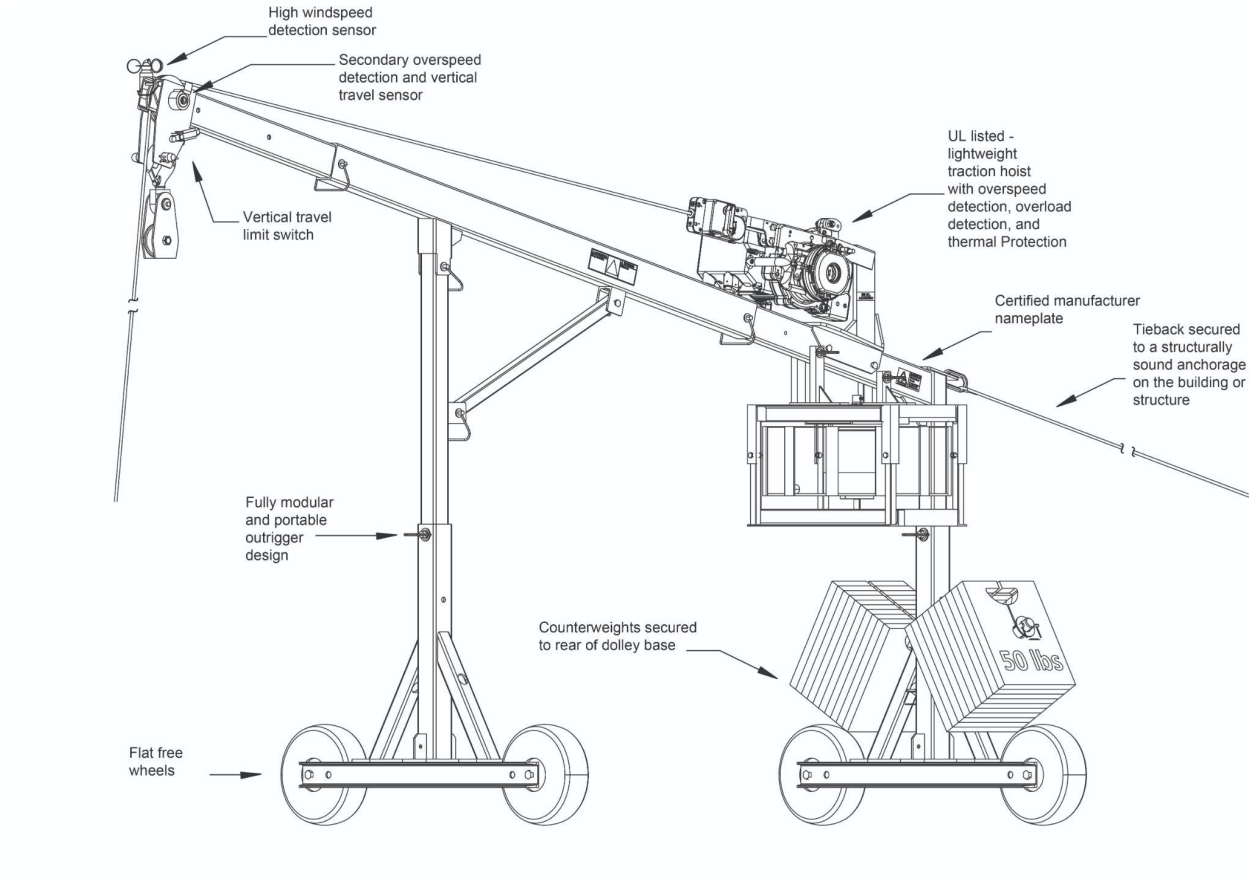
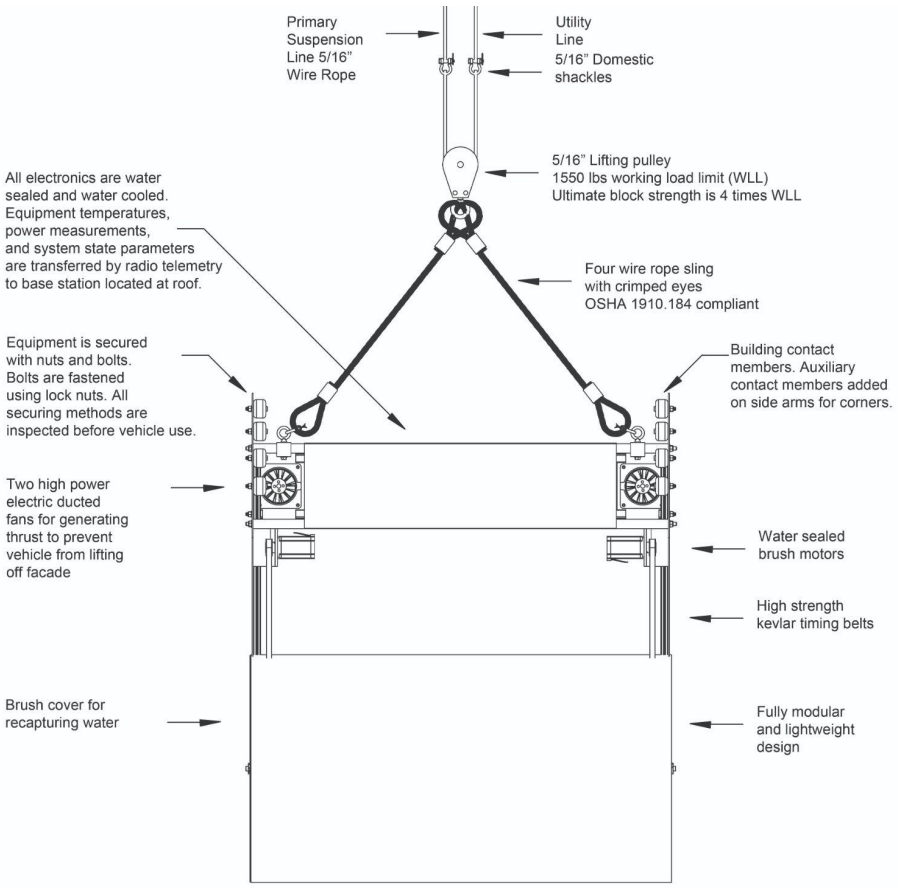


Image 3 - Facade Access Vehicle Safety Features



Item 6: Certify that all employees who may be affected by the temporary experimental variance and their representatives have been notified of the temporary variance application by providing a copy of the application letter to employee representatives, posting a copy of the application letter at places where employees notices are normally posted, and by other appropriate means such as providing an electronic copy of the application letter to employees. Ensure that the application letter has been translated into the language(s) spoken by employees for those employees who do not speak English. Include in the application, a description of how employees have been informed of the temporary variance application.

Sincerely,

Hudson Worthington Harr

Founder/CEO

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