Flow Industries, Inc.

August 19, 2016

Mr. Stephen Carley, Esq.
The Commonwealth of Massachusetts
Department of Public Safety

Re: 524 CMR 32.00 VRC Regulations

Dear Attorney Carley,

Thank you for the opportunity to submit these comments and recommendations for modifying 524 CMR 32.00. This submission is made on behalf of the VRC Industry.

The VRC regulations in 524 CMR 32.00 were issued on an emergency basis in May, 2009 without input form the VRC Industry. Our industry recommendations will help promote consistent enforcement in the field, but importantly, will help simplify (i.e., reduce complexity in keeping with Governor Baker's Executive Order No. 562) the requirements for inspectors in the field, thus allowing inspectors to devote more of their time and Department resources to safety and inspections for people-moving equipment.

Note that a red-lined version of the draft regulations is included to illustrate the narrative recommendations below.

Recommendations:

1. The second sentence of 32.01(2) requires a registered design professional to indicate conformance to the following:

a. Requirements of 524 CMR 32.00
b. Any additional requirements of the Massachusetts State Building Code (780 CMR)
c. A safety factor of three for all structural components

The second sentence in this subparagraph should be revised as follows: "A registered design professional shall indicate conformance to these requirements and verify a safety factor of three for all structural components." Conformance with other requirements of the Massachusetts State Building Code is enforced by local building code inspectors and should be overlapped in these regulations.

2. The definition of VRC in section 32.02 should be revised as follows: delete "moves in guides,". Industrial scissors lifts are often used as VRCs and should include the same safety features as standard VRC designs. Industrial scissor lift manufacturers often claim that their equipment does not utilize "guides" and therefore industrial

scissor lifts are not subject to 524 CMR 32.00. This loophole should be closed in order to avoid any rogue installations of scissors lifts that are being used as VRCs.

3. Some inspectors have interpreted Section 32.03(2)(a) to require full height or floor-to-ceiling enclosure of the VRC on any open operating ends of the platform (i.e., operating ends of the platform that don't have car gates). To eliminate any uncertainty, section 32.03(2)(a) should be revised by adding the following: "Where a car gate is not used, the hoistway shall be fully enclosed on the open end(s) of the platform."

4. Add Section 32.03(3) as follows: "Lighting shall be provided at the top of the hoistway to provide minimum illumination in the hoistway at the top landing of not less than five foot candles."

5. The second sentence of Section 32.04(1) should be deleted and replaced with the follow: "Backstops are required, regardless if a car gate is provided or not." Car gates can inadvertently be opened during loading, which would create a fall hazard to personnel and a falling load hazard. The backstop acts as a redundant safety guard in this instance.

6. Section 32.04(2) is overly broad and subjective. It should be deleted and the requirements of section 32.03(2)(b) should be inserted.

7. The following sentence should be added Section 32.04(3): "The height of the backstop shall match the height of the tallest rated load." This prevents any portion of the load from falling over the backstop.

8. Section 32.06(1), the first sentence should be revised to require landing doors to guard the full width AND HEIGHT of the platform opening. The reference of 72" minimum door height in the second sentence should be deleted. Some VRCs are designed to move small parcels, and have platform openings and landing doors of only 36" high.

9. The 5" dimension in section 32.06(3) should be measured from the edge of the floor sill to the nearest part of the inside of the landing door. The purpose of this requirement is to prevent a person from standing on the landing ledge with the landing door closed. This change would also allow the use of "sweeps" on the inside of the gate panel to bring the nearest portion of the gate within 5" when site conditions might otherwise prevent the manufacturer's standard design from meeting the 5" requirement.

10. A mechanical lock and contact with stationary cam creates an unlocking zone at each floor level in which the landing door is unlocked. This does not create a hazard to personnel. We recommend that the first sentence in Section 32.06(4) be revised as follows for clarity: "... to prevent the door from opening while the material lift conveyor platform is not within the landing zone and to prevent the material lift conveyor from operating... . We also recommend that every reference to "material lift" be replaced with "conveyor".

11. For clarity, Section 32.07(1) and (2) should clearly state that the car enclosure height and the car gate height (if one is provided) shall match the height of the tallest rated load.

12. Section 32.07(6) should be revised as follows: Illumination of not less than five foot candles must be provided in the area of each landing sill. Section 32.07(7) should be

deleted in its entirety. Permanent ambient lighting is better than requiring a light on the conveyor.

13. The second sentence in Section 32.08(3) should be revised as follows for clarity: "Where machines are located in fully enclosed hoistways, a safe means of access shall be provided from outside the hoistway or from the platform when secured in position at the top landing to facilitate maintenance and repairs."

14. Section 32.08(5) should be revised as follows: "Controllers shall not be accessible from inside the hoistway, and controllers shall be located in a locked enclosure." Some VRCs ship in one piece from the manufacturer and a portion of the controller may be recessed in the full height enclosure (i.e., hoistway).

15. Section 32.08(9) should be revised to allow either an overspeed valve or a velocity fuse on hydraulic VRCs.

16. Section 32.09(2) should be revised to allow physical stops or the floor to be used as final limits as an alternative to final limit switches.

Best Regards,

PFLOW INDUSTRIES, INC.

Tom Archie
Director of Regulatory Compliance

524 CMR 32.00: VERTICAL RECIPROCATING CONVEYORS

Section

32.01: Scope and Application

(1) 524 CMR 32.00 is promulgated by the Board of Elevator Regulations pursuant to the authority granted by M.G.L. c. 143, §§ 68 and 71E.

(2) The standards in 524 CMR 32.00 shall apply to the new installation, alteration, and maintenance of power driven Vertical Reciprocating Conveyors (VRC) as defined in 524 CMR 32.02. A registered design professional shall indicate conformance to these requirements and ~~any additional requirements under the Massachusetts State Building Code (780 CMR)~~ verifying a safety factor of three for all structural components.

(3a) Vertical Reciprocating Conveyors shall be subject to inspection as provided in 524 CMR, Part 32.

(3b) Existing vertical reciprocating conveyors installed prior to April 15, 2009 shall be subject to the following requirements:

Top and bottom limits;
Backstops;
Signage;
Safeties (instantaneous or valve overspeed);
Safety operated switches required on safeties;
Suitable enclosure for machinery;
Electrical and mechanical interlocks must be provided;
Interlocks cannot be accessible from outside the hoistway;
Corridor push button w/stop switches;
Car light;
Other if deemed a safety issue.

(4) Vertical Reciprocating Conveyor wiring and electrical equipment shall be installed in

accordance with 527 CMR 12.00.

(5) No riders shall be permitted on Vertical Reciprocating Conveyors while the lift is in operation.

(6) Individuals performing work relative to the construction, maintenance, or repair of Vertical Reciprocating Conveyors within the Commonwealth shall be subject to the licensing requirements of M.G.L. c. 143, § 71B.

(7) A permit for installation, alteration, relocation, or material change of a Vertical Reciprocating Conveyor must be obtained from the Department of Public Safety in accordance with 524 CMR Part 1 prior to the commencement of any such work.

32.02: Definitions Unique to 524 CMR Part 32

The following definitions shall apply to the installation, alteration, repair and maintenance of equipment covered by 524 CMR 32.01:

ASME. American Society of Mechanical Engineers.

Controlled Access Facility. Any facility where the use of facility and access thereto is restricted only to persons leasing or otherwise using space.

Doubled-ended Platform. A lift that is capable of being loaded and unloaded from more than one side of the platform.

Electromechanical Interlock. A device that prevents the operation of the VRC unless all hoistway doors and car gates (when provided) are closed and locked when locking is possible when the lift is away from landing.

Final Limit Switch. An electromechanical switch, device or system actuated by position of the car causing the main drive power to be disconnected from the driving machine when the lift reaches floor level or if the lift travels beyond the terminal landings.

General Public. People other than employees or owner's agent of the facility where a VRC is installed and operated.

Travel Limit Switch. A device that mechanically limits the travel of the lift when the platform arrives or travels beyond the terminal landings. This device may be used in conjunction with a final limit device or system.

Vertical Reciprocating Conveyor (VRC). A power driven stationary conveyance permanently installed, and comprised of a car or platform that ~~moves in guides~~, serves two or more floors or landings, and travels in a vertical or inclined direction. It is an isolated self-contained lift, and is not part of a mechanized conveyor system. VRCs are normally installed in a commercial or industrial area not accessible to the *General Public* or intended to be operated by the *General*

Public.

32.03: Hoistway Enclosure

(1) The hoistways of all VRCs that penetrate any fully enclosed solid floor above the bottom landing shall be enclosed throughout their height and constructed in accordance with 780 CMR (Massachusetts State Building Code) in effect at that time of installation.

(2) Where 524 CMR 32.03(1) does not apply, hoistway enclosures shall be constructed at each landing according to the following standards:

(a) Enclosure Height of the hoistway shall be not less than 96 inches (2440-mm) ~~and shall terminate as determined by the highest part of the lift, machinery or relating support structure.~~ insert: where a car gate is not used, the hoistway shall be fully enclosed on the open end(s) of the car.

(b) Enclosures shall be constructed with material having the ability to withstand a 100 pound lateral force without deflection and reject a ball two inches (50-mm) in diameter.

(c) Where the VRC is adjacent to a stairway, the enclosure shall be of solid or perforated construction and shall not be less than 96 inches (2440-mm) above any step. Perforated construction shall reject a ball one inch (25-mm) in diameter.

insert: 32.03(3) Lighting shall be provided at the top of the hoistway to provide minimum illumination in the hoistway at the top landing of not less than five foot candles.

32.04: Backstops

(1) Where a double-ended platform is not accessible from both sides at a landing, the enclosure shall be provided with a backstop located on the hoistway enclosure opposite the landing opening. ~~When car doors or gates are provided, backstops are not required.~~ insert: Backstops are required regardless if a car gate is provided or not.

(2) ~~The strength of the material used for the backstop shall be sufficient to withstand normal load impacts.~~ insert: same requirements as 32.03(2)(b)

(3) The backstop shall extend ~~a minimum of 43 inches (1100-mm) high~~ and not less than two inches (50-mm) below the platform or to floor level, as measured with the lift at floor level. The width of the backstop shall be not less than the clear opening. insert: to the height of the tallest rated load

(4) The distance measured horizontally from the platform to the backstop shall not exceed 1½ inches (38-mm).

32.05: Machine Rooms

Machine rooms or suitable enclosures around machinery and control equipment shall be required and shall meet the requirements of A.17.1-2013 Section 2.7 except as modified by 524 CMR 35.00.

32.06: Hoistway Doors and Gates insert: and height

(1) The openings at each landing shall be provided with gates or doors that guard the full width of the opening and prevent entry to any hoistway area during material lift operation. Hoistway gates or doors shall extend vertically not more than two inches (50-mm) from the landing threshold ~~and to a minimum height of 72 inches (1830-mm) above the landing~~

~~threshold~~.

(2) The horizontal running clearance between the platform and landing threshold shall not be less than ½ inch (13 mm) nor greater than 1½ inches (40-mm). insert: landing edge

(3) The horizontal clearance between the ~~platform edge~~ and the ~~inside surface~~ of the hoistway door shall not exceed five inches (130-mm). insert: nearest portion insert: VRC platform is not within the landing zone

(4) Each hoistway gate or door shall have an *Electromechanical Interlock* or combination mechanical door lock and contact to prevent the door from opening while the ~~material lift is in operation~~ and to prevent the ~~material lift~~ from operating if a door or gate is open at any landing. The interlock shall be located so it is not accessible from the landing side when the hoistway doors are closed. Access to the interlock through use of special tool is permitted provided the interlock is located not more than 84 inches (2130-mm) from floor level. insert: VRC

(5) There shall be a sign on each landing door or gate reading "NO RIDERS." Letters on the sign shall be a minimum of two inches (50-mm) high and be a contrasting color to the surrounding background.

(6) Power doors, when provided, shall conform to the following:
(a) Swing door closing force shall not exceed 10-lbf (45-N).
(b) Horizontal sliding or vertical operating doors closing force shall not exceed 30-lbf (133-N).
(c) The maximum closing speed for doors shall not exceed 1-ft/sec (0.305-m/s).
(d) The control device to open and close the door shall be within sight of the hoistway door it controls. Door control shall be of the constant pressure type and shall not be controlled automatically.

32.07: Car Enclosures

(1) The enclosure on the sides not used for loading and unloading shall be constructed to prevent material from falling into or against the hoistway enclosure during operation and will be constructed to reject a two inches (50 mm) ball. ~~In no case shall~~ The enclosure ~~be less than 43 inches (1100 mm) high~~. insert: shall match the height of the tallest rated load.

(2) Car Gates are not Required. Where provided, car gates shall ~~be a minimum of 43 inches (1100 mm) high~~ and provided with a gate switch contact to prevent operation of the lift unless the car gate is in the closed position. insert: match the height of the tallest rated load.

(3) A snap chain, drop bar or similar device may be installed across all loading sides of the lift platform.

(4) A capacity sign shall be installed on conveyor and clearly visible showing the maximum rated capacity. The capacity sign lettering shall not be less that ¾ inch high.

(5) A "NO RIDERS" sign shall be installed on the conveyor. The lettering shall not be less than ¾ inch high.

insert: Ambient light shall provide

(6) ~~Conveyors shall be equipped with an electric light or lights; not less than two lamps shall be provided. The~~ minimum illumination at the landing edge of the conveyor platform when the landing doors are open shall not be less than five foot candles.

~~(7) A car light switch is not required on the conveyor, but it shall be required in the machine room.~~

32.08: Driving Machines and Control Equipment

(1) Driving machines, pump units and other equipment shall be permanently secured in place and shall not be supported by hooks, cables, chains, similar devices or configurations. Chain hoists, rope falls or similar hoisting devices are prohibited from use as the main driving machine.

(2) The diameter of drive sheaves for traction machines and drums shall not be less than 30 times the diameter of the hoisting cables. The diameter of all other sheaves shall not be less than 21 times the diameter of the hoisting cables.

insert: a fully enclosed

(3) The controller, driving machine and other equipment requiring periodic service and repair shall be readily accessible. Where machines are located in ~~the~~ hoistway, a safe means of access shall be provided from outside the hoistway to facilitate maintenance and repairs. Where equipment access panels are located more than 72 inches (1830-mm) above floor level, stairs or fixed ladders shall be provided. Stairs and fixed ladders shall comply with *ASME* A17.1.2.7.3.3.1.

insert: or from the car when secured in position at the top landing

(4) Illumination of work areas containing machines and controls shall be provided with an electric light or lights; not less than two lamps shall be provided. The minimum illumination of not less than ten foot candles as measured at a point in front of the equipment. An electrical outlet conforming to 527 CMR shall be provided within 72 inches of the control equipment.

insert: accessible from

(5) Controllers shall not be ~~located in~~ the hoistway and shall be located in a ~~control room~~. insert: locked enclosure

(6) Machine rooms and/or control rooms shall meet the requirements of 524 CMR 35.00: Section 2.26.

(7) Machines located in a hoistway shall meet the minimum guidelines for a Machine Roomless (MRL) installation.

(8) By-pass pressure on hydraulic units shall be set not to exceed 150% of working pressure and shall be sealed.

insert: or velocity fuse

(9) An overspeed valve (rupture valve) shall be installed in the oil line of hydraulic units between the overspeed valve and the jack. Only threaded or welded pipe may be used between the overspeed valve and the jack.

32.09: Operating Protective Devices

(1) Each conveyor suspended by wire ropes, chains or similar means shall be equipped with car safeties. The car safety shall be capable of stopping the car and sustaining the car with 125% of its rated load. Upon activation of the car safeties, an electric safety switch shall be provided that will cause the power to be disconnected from the main driving means.

(2) Each lift shall be provided with top and bottom travel limits and *Final Limit Switches*,

(3) Control stations shall be permanently installed on the outside of each landing. The control stations shall be in view of the hoistway and shall have an emergency mechanical set-reset type stop switch. The control stations shall be located at a point outside the hoistway so it is not possible for the same person to operate the control and ride the lift.

insert: or physical stops, including the floor at the bottom landing