



DEPARTMENT OF LABOR AND ECONOMIC OPPORTUNITY

GENERAL INDUSTRY STANDARD

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(By authority conferred on the director of the department of licensing and regulatory affairs
by sections 16 and 21 of 1974 PA 154, MCL 408.1016 and 408.1021,
and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4,
MCL 445.2001, 445.2011, 445.2025, and 445.2030)

R 408.10501, R 408.10502, R 408.10503, R 408.10504, R 408.10505, R 408.10506, R 408.10507, R 408.10508,
R 408.10509, R 408.10561, R 408.10564, R 408.10565, R 408.10568, R 408.10571, R 408.10573, R 408.10575a,
R 408.10575b, R 408.10575c, R 408.10575e, R 408.10582, and R 408.10592
of the Michigan Administrative Code are amended,
R 408.10518 and Appendix D are added,
and R 408.10511, R 408.10512, R 408.10513, R 408.10521, R 408.10522, R 408.10523, R 408.10524,
R 408.10525, R 408.10526, R 408.10527, R 408.10528, R 408.10529, R 408.10530, R 408.10531, R 408.10532,
R 408.10533, R 408.10534, R 408.10535, R 408.10541, R 408.10542, R 408.10543, R 408.10544, R 408.10545,
R 408.10546, R 408.10548, R 408.10549, and R 408.10550 are rescinded, as follows:

PART 5. POWERED PLATFORMS FOR BUILDING MAINTENANCE

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GENERAL PROVISIONS

R 408.10501 Scope.

Rule 501. (1) This standard covers powered platform installations permanently dedicated to interior or exterior building maintenance of a specific structure or group of structures. Building maintenance includes, but is not limited to, such tasks as window cleaning, caulking, metal polishing and re-glazing.

(2) This standard does not apply to suspended scaffolds or swinging scaffolds used to service buildings on a temporary basis and covered under General Industry Safety and Health Standard Part 2 “Walking-Working Surfaces,” nor to suspended scaffolds used for construction work and covered under Construction Safety Standard Part 12 “Scaffolds and Scaffold Platforms,” and Construction Safety Standard Part 32 “Aerial Work Platforms,” as referenced in R 408.10509.

(3) Powered and manual mobile elevating platforms and self-propelled vehicle mounted elevating and rotating platforms are not included in these rules but are provided for in General Industry Safety and Health Standard Part 58 “Aerial Work Platforms,” as referenced in R 408.10509.

(4) Scaffolds are not included in these rules but are provided for in General Industry Safety and Health Standard Part 2 “Walking-Working Surfaces,” as referenced in R 408.10509.

R 408.10502 Applicability for powered platforms.

Rule 502. (1) Permanent installations in existence and or completed before July 23, 1990 shall comply with R 408.10574(2), R 408.10578 to R 408.10582, R 408.10585 to R 408.10592 and Appendix C of General Industry Safety and Health Standard Part 33 “Personal Protective Equipment,” as referenced in R 408.10509.

(2) These rules apply to all new permanent installations for powered platforms and modifications to existing buildings that affect the structural integrity of the building exterior, tie-in guides and attachments, and the supporting structure for the powered platforms.

(3) Employers shall ensure compliance with these rules for any powered platform that is powered by a source other than electricity except for those rules that govern the electrical power source. The alternative power source shall be outfitted with protective devices that are equivalent to the protection that is provided by rules pertaining to an electrical power source.

(4) Permanent installations shall be in compliance with the provisions of Appendix D “Existing Installations – Mandatory.”

(5) The following standards are referenced in Appendix D and adopted in R 408.40509.

(a) ANSI A120.1 "Safety Requirements for Powered Platforms for Exterior Building Maintenance" 1970 edition.

(b) General Industry Safety Standard Part 39 “Design Safety Standards for Electrical Systems.”

R 408.10503 Definitions; A to D.

Rule 503. (1) "Anemometer" means an instrument for measuring wind velocity.

(2) "Angulated roping" means a suspension method where the upper point of suspension is inboard from the attachments on the suspended unit, thus causing the suspended unit to bear against the face of the building.

(3) "Building face roller" means a rotating cylindrical member that is designed to ride on the face of the building wall to prevent the platform from abrading the face of the building and to assist in stabilizing the platform.

(4) "Building maintenance" means operations such as window cleaning, caulking, metal polishing, re-glazing, and general maintenance on building surfaces.

(5) "Cable" means a conductor, or group of conductors, enclosed in a weatherproof sheath, that may be used to supply electrical power or control current, or both, for equipment or to provide voice communication circuits.

(6) "Carriage" means a wheeled vehicle used for the horizontal movement and support of other equipment.

(7) "Certification" means a written, signed, and dated statement confirming the performance of a requirement of this standard.

(8) "Combination cable" means a cable having both steel structural members capable of supporting the platform, and copper or other electrical conductors insulated from each other and the structural members by nonconductive barriers.

(9) "Competent person" means a person who, because of training and experience, is capable of identifying hazardous or dangerous conditions in powered platform installations and of training employees to identify such conditions.

(10) "Continuous pressure" means the need for constant manual actuation for a control to function.

(11) "Control" means a mechanism used to regulate or guide the operation of the equipment.

(12) "Davit" means a device that is used singly or in pairs and that is for suspending a powered platform from work, storage, or rigging locations on the building being serviced. Unlike outriggers, a davit reacts its operating load into a single roof socket or carriage attachment.

R 408.10504 Definitions; E to L.

Rule 504. (1) "Equivalent" means alternative designs, materials, or methods that the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified in the standard.

(2) "Ground rigging" means a method of suspending a working platform starting from a safe surface to a point of suspension above the safe surface

(3) "Ground rigged davit" means a davit that cannot be used to raise a suspended working platform above the building face being serviced.

(4) "Guide button" means a building face anchor designed to engage a guide track mounted on a platform.

(5) "Guide roller" means a rotating cylindrical member, operating separately or as part of a guide assembly, designed to provide continuous engagement between the platform and the building guides or guideways.

(6) "Guide shoe" means a device attached to the platform designed to provide a sliding contact between the platform and the building guides.

(7) "Hoisting machine" means a device intended to raise and lower a suspended or supported unit.

(8) "Hoist rated load" means the hoist manufacturer's maximum allowable operating load.

(9) "Installation" means all the equipment and all affected parts of a building that are associated with the performance of building maintenance using powered platforms.

(10) "Interlock" means a device designed to ensure that operations or motions occur in proper sequence.

(11) "Intermittent stabilization" means a method of platform stabilization in which the angulated suspension wire rope or ropes are secured to regularly spaced building anchors.

(12) "Lanyard" means a flexible line of rope, wire rope, or strap that is used to secure the body belt or body harness to a deceleration device, lifeline, or anchorage.

(13) "Lifeline" means a component consisting of a flexible line for connection to an anchorage at 1 end to hang vertically, vertical lifeline, or for connection to anchorages at both ends to stretch horizontally, horizontal lifeline, and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

(14) "Live load" means the total static weight of workers, tools, parts, and supplies that the equipment is designed to support.

R 408.10505 Definitions; M, O.

Rule 505. (1) "Mobile elevating platform" means a type of freestanding scaffolding that can be manually moved horizontally from 1 area to another and raised or lowered manually or with power to predetermined heights.

(2) "Obstruction detector" means a control that will stop the suspended or supported unit in the direction of travel if an obstruction is encountered, and will allow the unit to move only in a direction away from the obstruction.

(3) "Operating control" means a mechanism regulating or guiding the operation of equipment that ensures a specific operating mode.

(4) "Operating device" means a device actuated manually to activate a control.

(5) "Outrigger" means a device, used singly 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 2 opposing vertical components acting into 2 or more distinct roof points and or attachments.

R 408.10506 Definitions; P, R.

Rule 506. (1) "Platform rated load" means the combined weight of workers, tools, equipment and other material which is permitted to be carried by the working platform at the installation, as stated on the load rating plate.

(2) "Poured socket" means the method of providing wire rope terminations in which the ends of the rope are held in a tapered socket by means of poured spelter or resins.

(3) "Powered platform" means scaffolding equipment that consists of a permanently installed, power-operated working platform and a roof car or other suspension means.

(4) "Primary brake" means a brake designed to be applied automatically whenever power to the prime mover is interrupted or discontinued.

(5) "Prime mover" means the source of mechanical power for a machine.

(6) "Rated load" means the manufacturer's recommended maximum load.

(7) "Rated strength" means the strength of wire rope, as designated by its manufacturer or vendor, based on standard testing procedures or acceptable engineering design practices.

(8) "Rated working load" means the combined static weight of persons, materials, and suspended or supported equipment.

(9) "Registered professional engineer" means a person who has been duly and currently registered and who is licensed by an authority within the United States or its territories to practice the profession of engineering.

(10) "Roof car" means a structure that is for suspending a working platform and that provides for the platform's horizontal movement to work positions.

(11) "Roof powered platform" means a working platform where the hoist or hoists used to raise or lower the platform is located on the roof.

(12) "Roof rigged davit" means a davit used to raise the 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.

(13) "Rope" means the equipment used to suspend a component of an equipment installation, such as wire rope.

R 408.10507 Definitions; S.

Rule 507. (1) "Safe surface" means a horizontal surface intended to be occupied by personnel, which is so protected by a fall protection system that it can be reasonably assured that said occupants will be protected against falls.

(2) "Safety factor" means a ratio of the breaking strength of a piece of material or object to the maximum designed load or stress that is applied when in use.

(3) "Scaffold" means an elevated work platform that is for supporting both employees and materials and that is temporary in nature.

(4) "Secondary brake" means a brake designed to arrest the descent of the suspended or supported equipment in the event of an overspeed condition.

(5) "Self-powered platform" means a working platform where the hoist or hoists used to raise or lower the platform is mounted on the platform.

(6) "Speed reducer" means a positive type speed reducing machine.

(7) "Stability factor" means the ratio of the stabilizing moment to the overturning moment.

(8) "Stabilizer tie" means a flexible line connecting the building anchor and the suspension wire rope supporting the platform.

(9) "Supported equipment" means building maintenance equipment that is held or moved to its working position by means of attachment directly to the building or extensions of the building being maintained.

(10) "Suspended equipment" means building maintenance equipment that is suspended and raised or lowered to its working position by means of ropes or combination cables attached to some anchorage above the equipment.

(11) "Suspended scaffold", also known as swinging scaffold, means a scaffold supported on wire or other ropes, used for work on, or for providing access to, vertical sides of structures on a temporary basis. Such scaffold is not designed for use on a specific structure or group of structures.

R 408.10508 Definitions; T to W.

Rule 508. (1) "Tail line" means the non-supporting end of the wire rope used to suspend the platform.

(2) "Tie-in guides" means the portion of a building that provides continuous positive engagement between the building and a suspended or supported unit during its vertical travel on the face of the building.

(3) "Traction hoist" means a type of hoisting machine that does not accumulate the suspension wire rope on the hoisting drum or sheave, and is designed to raise and lower a suspended load by the application of friction forces between the suspension wire rope and the drum or sheave.

(4) "Transportable outriggers" means outriggers designed to be moved from 1 work location to another.

(5) "Trolley carriage" means a carriage suspended from an overhead track structure.

(6) "Verified" means accepted by design, evaluation, or inspection by a registered professional engineer.

(7) "Weatherproof" means so constructed that exposure to adverse weather conditions will not affect or interfere with the proper use or functions of the equipment or component.

(8) "Winding drum hoist" means a type of hoisting machine that accumulates the suspension wire rope on the hoisting drum

(9) "Working platform" means suspended or supported equipment intended to provide access to the face of a building and manned by persons engaged in building maintenance.

(10) "Wrap" means 1 complete turn of the suspension wire rope around the surface of a hoist drum.

R 408.10509 Adopted and referenced standards.

Rule 509. (1) The following standard, American National Society Institute (ANSI) Standard ANSI A120.1 'Safety Requirement for Powered Platforms for Exterior Building Maintenance,' 1970 edition, also known as American Society of Mechanical Engineers (ASME)

Standard ASME A120.1 'Safety Requirements Powered Platforms and Traveling Ladders and Gantries for Building Maintenance,' 1970 edition is adopted by reference in these rules and is available from IHS Global, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at website: www.global.ihs.com, at a cost at the time of adoption of these rules of \$20.00.

(2) The standard adopted in these rules is available for inspection at the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143.

(3) The standard adopted in these rules may be obtained from the publisher or may be obtained from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143, at the cost charged in this rule, plus \$20.00 for shipping and handling.

(4) The following Michigan Occupational Safety and Health Administration (MIOSHA) standards are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Michigan Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at website: www.michigan.gov/mioshastandards. For quantities greater than 5, the cost, at the time of adoption of these rules, is 4 cents per page.

(a) General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," R 408.10201 to R 408.10241.

(b) General Industry Safety Standard Part 7 "Guards for Power Transmission," R 408.10701 to R 408.10765.

(c) General Industry Safety Standard Part 8 "Portable Fire Extinguishers," R 408.10801 to R 408.10839.

(d) General Industry Safety and Health Standard Part 33 "Personal Protective Equipment," R 408.13301 to R 408.13398.

(e) General Industry Safety Standard Part 39 "Design Safety Standards for Electrical Systems," R 408.13901 to R 408.13902.

(f) General Industry Safety and Health Standard Part 58 "Aerial Work Platforms," R 408.15801 to R 408.15842.

(g) Construction Safety Standard Part 12 "Scaffolds and Scaffold Platforms," R 408.41201 to R 408.41264.

(h) Construction Safety Standard Part 32 "Aerial Work Platforms," R 408.43201 to R 408.43220.

R 408.10518 Assurance.

Rule 518. Building owners of all installations, new and existing, shall inform the employer in writing that the installation has been inspected, tested, and maintained in compliance with the requirements of R 408.10574(2), R 408.10578 to R 408.10582, and R 408.10585 to R 408.10589, and that all anchorages meet the requirements of R 408.13395a(14) of General Industry Safety and Health Standard Part 33 "Personal Protective Equipment" as referenced in R 408.10509.

R 408.10511 Rescinded.

R 408.10512 Rescinded.

R 408.10513 Rescinded.

R 408.10521 Rescinded.

R 408.10522 Rescinded.

R 408.10523 Rescinded.

R 408.10524 Rescinded.

R 408.10525 Rescinded.

R 408.10526 Rescinded.

R 408.10527 Rescinded.

R 408.10528 Rescinded.

R 408.10529 Rescinded.

R 408.10530 Rescinded.

R 408.10531 Rescinded.

R 408.10532 Rescinded.

R 408.10533 Rescinded.

R 408.10534 Rescinded.

R 408.10535 Rescinded.

R 408.10541. Rescinded.

R 408.10542 Rescinded.
R 408.10543 Rescinded.
R 408.10544 Rescinded.
R 408.10545 Rescinded.
R 408.10546 Rescinded.
R 408.10548 Rescinded.
R 408.10549 Rescinded.
R 408.10550 Rescinded.

POWERED PLATFORMS

R 408.10561 Installations.

Rule 561. (1) A powered platform installed, or that part of a powered platform modified, after August 27, 1971, shall be in compliance with the design and manufacturing requirements prescribed in ANSI A120.1, "Safety Requirements for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.10509, and as further prescribed in the rules of this standard.

(2) The following requirements apply to affected parts of buildings that utilize working platforms for building maintenance:

(a) Structural supports, tie-downs, tie-in guides, anchoring devices, and any affected parts of the building that are included in the installation shall be designed by, or under the direction of, a registered professional engineer who is experienced in such design.

(b) Exterior installations shall be capable of withstanding prevailing climatic conditions.

(c) The building installation shall provide safe access to, and egress from, the equipment and shall provide sufficient space to conduct necessary maintenance of the equipment.

(d) The affected parts of the building shall have the capability of sustaining all of the loads imposed by the equipment.

(e) The affected parts of the building shall be designed to allow the equipment to be used without exposing employees to a hazardous condition.

(3) The exterior of each building shall be provided with tie-in guides unless the conditions specified in either of the following provisions are met:

(a) Tie-in guides required pursuant to this rule may be eliminated for not more than 75 feet (22.9 m) of the uppermost elevation of the building if angulated roping is employed, if the use of tie-in guides is not feasible due to the exterior building design, and if an angulation force of not less than 10 pounds (44.4 n) is maintained under all conditions of loading.

(b) Tie-in guides may be eliminated if 1 of the specified guide systems is provided as specified in R 408.10562 and R 408.10563.

R 408.10562 Intermittent stabilization systems.

Rule 562. (1) An intermittent stabilization system shall keep 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 that use tie-in guides on the same building if the requirements for each system are met.

(2) The maximum vertical interval between building anchors shall be 3 floors or 50 feet (15.3 m), whichever is less.

(3) Building anchors shall be located vertically so that attachments 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.

(4) Building anchors shall be visible to employees and shall allow a stabilizer tie attachment for each of the platform suspension ropes at each vertical interval. If more than 2 suspension ropes are used on a platform, only the 2 building-side suspension ropes at the platform ends shall require a stabilizer attachment.

(5) Building anchors that extend beyond the face of the building shall be free of sharp edges or points. Where cables, suspension wire ropes, and lifelines may be in contact with the building face, external building anchors shall not interfere with their handling or operation.

(6) The intermittent stabilization system building anchors and components shall be capable of sustaining, without failure, not less than 4 times the maximum anticipated load applied or transmitted to the components and anchors. If 2 anchors share the wind load, the minimum design wind load for each anchor shall be 300 pounds (1334 n).

(7) 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 rope or if the building requires different suspension spacings on 1 platform, 1 building anchor and stabilizer tie shall be capable of sustaining the wind loads.

(8) A powered platform shall be suspended by 2 or more cables. Where 2 cables are used, each employee on the work platform shall use a safety harness and lanyard that is attached to an individual lifeline. The lifeline shall be secured to the building structure and shall be independent of any cable and structures that support the powered platform.

(9) When normal voice communication cannot be understood, a powered platform shall be equipped with a 2-way voice communication system between the operator and persons who are stationed at a supervised location in the vicinity or within the building being serviced. The communication system shall be operative and shall be tended at all times.

(10) Where thrustouts are used in place of a roof car, they shall be anchored to the building structure with fasteners that are capable of sustaining the imposed load.

R 408.10563 Button guide stabilization systems.

Rule 563. (1) Guide buttons shall be coordinated with platform-mounted equipment.

(2) Guide buttons shall be located horizontally on the building face 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 that extend beyond the face of the building shall be free of sharp edges or points. Where cables, ropes, and lifelines 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 the guide tracks or guide track connectors shall have provisions 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 minimum design load shall be 300 pounds (1334 n) per building anchor.

**POWERED PLATFORM INSTALLATIONS -
EQUIPMENT**

R 408.10564 Design of installation; equipment.

Rule 564. (1) The requirements of this rule apply to equipment that is part of a powered platform installation, such as any of the following:

- (a) Platforms.
- (b) Stabilizing components.
- (c) Carriages.
- (d) Outriggers.
- (e) Hoisting machines.
- (f) Wire ropes.
- (g) Electrical components.

(2) Equipment installations shall be designed by, or under the direction of, a registered professional engineer who is experienced in such design.

(3) The design shall provide for a minimum live load of 250 pounds (113.6 kg) for each occupant of a suspended or supported platform.

(4) Equipment that is exposed to wind when not in service shall be designed to withstand forces generated by winds that have a velocity of at least 100 miles per hour (44.7 m/s) at 30 feet (9.2 m) above grade.

(5) Equipment that is exposed to wind when in service shall be designed to withstand forces generated by winds that have a velocity of at least 50 miles per hour (22.4 m/s) for all elevations.

(6) Bolted connections shall be self-locking or shall otherwise be secured to prevent the loss of the connections by vibration.

R 408.10565 Roof cars; carriages; suspension methods.

Rule 565. (1) A roof car shall be used when it is necessary to move a working platform horizontally to a work or storage position.

(2) Movements of a roof car shall be restricted to a designated path of travel. Mechanical stops shall be provided and shall prevent the roof car from traversing outside the intended path of travel. The stops shall be capable of withstanding a force equal to 100% of the inertial effect of the roof car under power and shall be designed to prevent a crushing or shearing hazard.

(3) Elevated building maintenance equipment shall be suspended by a roof car, carriage, outrigger, davits, or an equivalent method.

(4) Carriages or roof cars shall be in compliance with all of the following provisions:

(a) The horizontal movement of a carriage shall be controlled to ensure its safe movement and allow accurate positioning of the platform for vertical travel or storage.

(b) Powered carriages shall not exceed a traversing speed of 50 feet per minute (0.3 ms).

(c) The initiation of a traversing movement for a manually propelled carriage on a smooth level surface shall not require a person to exert a horizontal force of more than 40 pounds (444.8 n).

(d) Structural stops and curbs shall be provided to prevent the traversing of the carriage beyond its designed limits of travel.

(e) Traversing controls for a powered carriage shall be of a continuous pressure weatherproof type. Multiple controls, when provided, shall be arranged to permit operation from only 1 control station at a time. An emergency stop device shall be provided on each end of a powered carriage for interrupting power to the carriage drive motors.

(f) The operating control or controls shall be connected so that, in the case of suspended equipment, traversing of a carriage is not possible until the suspended portion of the equipment is located at its uppermost designed position for traversing and is free of contact with the face of the building or building guides. All protective devices and interlocks shall be in the proper position to allow traversing of the carriage.

(g) Stability for underfoot supported carriages shall be obtained by gravity, by an attachment to a structural support, or by a combination of gravity and a structural support. The use of flowing counterweights to achieve stability is prohibited.

(h) The stability factor against overturning shall not be less than 5 for horizontal traversing of the carriage, including the effects of impact and wind.

(i) The carriages and their anchorages shall be capable of resisting accidental over-tensioning of the wire ropes that suspend the working platform, and this calculated value shall include the effect of 1-1/2 times the stall capacity of the hoist motor. The forces that result from the stall load of the hoist and 1/2 of the wind load shall not cause damage to any part of the installation.

(j) Roof carriages that rely on having tie-down devices secured to the building to develop the required stability against overturning shall be provided with an interlock that will prevent vertical platform movement unless the tie-down is engaged.

(k) An automatically applied braking or locking system, or an equivalent, shall be provided that will prevent the unintentional traversing of power-traversed or power-assisted carriages.

(l) A manual or automatic braking or locking system, or an equivalent, shall be provided that will prevent the unintentional traversing of manually propelled carriages.

(m) A means to lock out the power supply for the carriage shall be provided.

(n) Safe access to, and egress from, the carriage shall be provided from a safe surface. If the carriage traverses an elevated area, any operating area on the carriage shall be protected by a guardrail system in compliance with General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509. Any access gate shall be self-closing and self-latching or shall be provided with an interlock.

(o) Each carriage work station position shall be identified by location markings or position indicators, or both.

(p) A motor shall stall if the load on the hoist motor is at any time more than 3 times that necessary for lifting the working platform with its rated load.

R 408.10566 Outriggers.

Rule 566. (1) Outriggers may be used as a method of suspension for ground-rigged working platforms where the point of suspension is not more than 300 feet (91.5 m) above a safe surface. A tie-in guide system or systems shall be provided and shall be in compliance with the requirements of R 408.10561 and R 408.10562.

(2) Outriggers shall be used only with self-powered, ground-rigged working platforms.

(3) Each 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 4 against overturning or upsetting the outrigger.

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

(5) Each portable outrigger shall be designed for lateral stability to prevent rollover if lateral load is accidentally applied to the outrigger. The accidental lateral load to be considered in this design system shall be not less than 70% of the rated load of the hoist.

(6) Each portable outrigger shall be designed to support a load of not less than 4 times the rated load of the hoist.

(7) Each portable outrigger shall be located so that the suspension wire ropes for 2-point suspended working platforms are hung parallel.

(8) A portable outrigger shall be tied back to a verified anchor on the building with a rope that is equivalent in strength to the suspension rope.

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

R 408.10567 Davits.

Rule 567. (1) Every davit installation, whether fixed or portable or rotatable or non-rotatable, shall be designed and installed to ensure that it has a stability factor against overturning of not less than 4.

(2) Both of the following requirements apply to roof-rigged davit systems:

(a) Access to and egress from the working platform shall be from a safe surface. Access or egress shall not require a person to climb over a building's parapet or guard railing.

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

(3) Both of the following requirements apply to ground-rigged davit systems:

(a) The point of suspension shall not be more than 300 feet (91.5 m) above a safe surface. A guide system or systems shall be provided and shall be in compliance with the requirements of R 408.10561 and R 408.10562.

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

(4) A rotating davit shall not require a horizontal force of more than 40 pounds (177.9 n) per person to initiate a rotating movement.

(5) All of the following requirements apply to portable davits:

(a) A davit or part of a davit that weighs more than 80 pounds (36 kg) shall be provided with a means for its transport, which shall keep the center of gravity of the davit at or below 36 inches (914 mm) above the safe surface during transport.

(b) A davit shall be provided with a pivoting socket or with a base that will allow the insertion or removal of a davit at a position of not more than 35 degrees above the horizontal, with the complete davit inboard of the building face being serviced.

(c) Means shall be provided to lock the davit to its socket or base before it is used to suspend the platform.

R 408.10568 Roof guarding.

Rule 568. (1) Employees who work on roofs while performing building maintenance shall be protected by a perimeter guarding system that meets the requirements of General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509.

(2) The perimeter guard shall not be more than 6 inches (152 mm) inboard of the inside face of a barrier, for example, the parapet wall, or roof edge curb of the building being serviced; however, the perimeter guard location shall not be set back more than 18 inches (457 mm) from the exterior building face.

R 408.10568a Equipment stops.

Rule 568a. Operational areas for trackless type equipment shall be provided with structural stops, such as curbs, to prevent equipment from traveling outside its intended travel areas and to prevent a crushing or shearing hazard.

R 408.10568b Maintenance access.

Rule 568b. Means shall be provided to traverse all carriages and their suspended equipment to a safe area for maintenance and storage. Maintenance shall be performed on equipment in a stored position when possible.

R 408.10568c Elevated track.

Rule 568c. Either of the following must be provided:

(a) An elevated track system that is located 4 feet (1.2 m) or more above a safe surface and that is traversed by carriage supported equipment shall be provided with a walkway and guardrail system.

(b) The working platform that is capable of being lowered, as part of its normal operation, to the lower safe surface for access and egress of the personnel and provided with a safe means of access and egress to the lower safe surface.

R 408.10568d Tie-down anchors.

Rule 568d. Imbedded tie-down anchors, fasteners, and affected structures shall be resistant to corrosion.

R 408.10568e Cable stabilization.

Rule 568e. (1) Hanging lifelines and all cables that are not in tension shall be stabilized at 200-foot (61 m) intervals of vertical travel of the working platform beyond an initial 200-foot (61 m) distance.

(2) Hanging cables, other than suspended wire ropes, that are in constant tension shall be stabilized when the vertical travel is more than an initial 600-foot (183 m) distance. Beyond the initial 600 feet, cables shall be stabilized at intervals of 600 feet (183 m) or less.

R 408.10568f Emergency planning.

Rule 568f. An employer shall develop and implement a written emergency action plan for each kind of working platform operation. This plan shall explain the emergency procedures that are to be followed in the event of a power failure, equipment failure, or other emergencies which may be encountered. The plan shall include building emergency escape routes, procedures, and alarm systems to be used by each employee before operating a platform. Upon initial assignment and when the plan is changed, the employer shall review, with each employee, those parts of the plan that the employee is required to know in the event of an emergency.

R 408.10568g Building maintenance.

Rule 568g. Repairs or major maintenance of those building portions that provide primary support for the suspended equipment shall not affect the capability of the building to be in compliance with the requirements of these rules.

R 408.10569 Electrical requirements.

Rule 569. The following electrical requirements apply to buildings that utilize working platforms for building maintenance:

(a) General building electrical installations shall be in compliance with the provisions of General Industry Safety Standard Part 39 "Design Safety Standards for Electrical Systems," as referenced in R 408.10509.

(b) Building electrical wiring shall be of such capacity that when a full load is applied to the equipment power circuit not more than a 5% drop from building service-vault voltage will occur at any power circuit outlet that is used by equipment regulated by these rules.

(c) The equipment power circuit shall be an independent electrical circuit that remains separate from all other equipment within or on the building, other than power circuits that are used for hand tools which will be used in conjunction with the equipment. If the building has an emergency power system, the equipment power circuit may also be connected to this system.

(d) The power circuit shall be provided with a disconnect switch that can be locked in the "off" or "on" position. The switch shall be located to allow the operators of the equipment access to the switch.

(e) The disconnect switch for the power circuit shall be locked in the "on" position when the equipment is in use.

R 408.10570 Controls and interlocks.

Rule 570. Where a roof car is used, safety interlocks shall be provided to ensure that the working platform will not leave the stored position until the required positive position anchor is engaged and to ensure that the roof car cannot move when the working platform is not in the stored position.

WIRE, FIBER AND SYNTHETIC ROPE

R 408.10571 Safety factors.

Rule 571. All of the parts of a powered platform that are subject to stress, except for the wire rope, shall have a design safety factor of not less than 5. Wire rope shall have a design safety factor of not less than 10.

R 408.10572 Working platforms.

Rule 572. A working platform that is used on the exterior of a building shall be equipped with rollers which will be in contact with the building face. Where the vertical working travel of a working platform is more than 130 feet, the platform shall be equipped with guide rollers or guide shoes which shall positively engage guides, such as "t" rails or indented mullions. The guide rollers or guide shoes shall enter the guides at the lowest possible speed and shall not require any manual assistance from an employee while the work platform is in motion. A working platform that is installed before the effective date of this standard and that has a rise of more than 130 feet may use an equivalent means to tie the platform to the building instead of guide rollers or guide shoes.

R 408.10573 Inspections and tests.

Rule 573. (1) An employer that has a powered platform under the employer's control shall do all of the following:

(a) Provide operating instructions and a checklist for a visual inspection which shall be used by the operator before each daily use of the platform. The visual inspection shall include a check of the platform controls and safety interlocks.

(b) Provide for a physical inspection, and service and repair when required, of the platform by a trained and authorized employee or an outside service every 30 days or before each use cycle if the equipment is used less often than every 30 days. The inspection, service, or repair shall be logged to show the date and the signature of the authorized employee or outside service and the work done.

(c) Provide for inspections and operating tests not less than annually or after major alterations to determine that all components of the platform, including safety and operating equipment, are in compliance with the provisions of these rules. Such inspections and operating tests shall be made by a trained and authorized employee or outside service.

(2) A special inspection of platform governors and secondary brakes shall be made not less than annually by an authorized and trained employee or outside service to verify that the initiating device for the secondary brake operates at the proper overspeed. If a test cannot be made in the field, the initiating device or hoisting machine, or both, shall be removed from the building and sent to a shop that is equipped to make such a test.

(3) When the tested parts are reinstalled, the powered platform shall be reinspected before returning it to service.

R 408.10574 Maintenance.

Rule 574. (1) The following maintenance shall be performed, when required, during the 30-day inspection:

(a) Replacement of any worn or defective parts noted during the inspections prescribed in R 408.10572.

(b) Electrical connections shall be tightened and controller contacts and relays shall be cleaned.

(c) Gears, shafts, bearings, brakes, and hoisting drums shall be aligned.

(2) Hoisting ropes shall be reshackled at the non-drum ends at least once every 2 years. In reshackling a rope, enough shall be cut from the end to remove damaged or fatigued portions. The rope shall be retagged and the limit switches reset, if necessary.

(3) Hoisting rope shall be replaced when there are 6 or more broken wires in any 1 lay or when the wire rope becomes damaged or is in a deteriorated condition.

R 408.10575 Hoisting machines.

Rule 575. (1) The raising and lowering of suspended or supported equipment shall be performed only by a hoisting machine.

(2) Each hoisting machine shall be capable of arresting any overspeed descent of the load.

(3) Each hoisting machine shall be powered only by air, electric, or hydraulic sources.

(4) Each hoisting machine shall be capable of raising or lowering 125% of the rated load of the hoist.

(5) Moving parts of a hoisting machine shall be enclosed or guarded in compliance with the provisions of General Industry Safety Standard Part 7 "Guards for Power Transmission," as referenced in R 408.10509.

(6) Flammable liquids shall not be carried on the working platform.

(7) Winding drums, traction drums, and sheaves and directional sheaves that are used in conjunction with hoisting machines shall be sized for the wire rope that is used.

(8) Each winding drum shall be provided with a positive means of attaching the wire rope to the drum. The attachment shall be capable of developing not less than 4 times the rated load of the hoist.

(9) Each hoisting machine shall be provided with a primary brake and at least 1 independent secondary brake, each of which shall be capable of stopping and holding not less than 125% of the lifting capacity of the hoist.

(10) The primary brake shall be directly connected to the drivetrain of the hoisting machine and shall not be connected through belts, chains, clutches, or set screw-type devices. The brake shall automatically set when power to the prime mover is interrupted.

(11) The secondary brake shall be an automatic emergency type of brake that, if actuated during each stopping cycle, shall not engage before the hoist is stopped by the primary brake and shall stop and hold the platform within a vertical distance of 24 inches (609.6 mm).

(12) Any component of a hoisting machine that requires lubrication for its protection and proper functioning shall be provided with a means for that lubrication to be applied.

R 408.10575a Suspended equipment.

Rule 575a. (1) Each suspended unit component, except for suspension ropes and guardrail systems, shall be capable of supporting not less than 4 times the maximum intended live load applied or transmitted to that component.

(2) Each suspended unit component shall be constructed of materials that will withstand anticipated weather conditions.

(3) Each suspended unit shall be provided with a load rating plate that is conspicuously located and that states the unit weight and rated load of the suspended unit.

(4) When the suspension points on a suspended unit are not at the unit ends, the unit shall be capable of remaining continuously stable under all conditions of use and position of the live load and shall maintain not less than a 1.5 to 1 stability factor against unit upset.

(5) Guide rollers, guide shoes, or building face rollers shall be provided and shall compensate for variations in building dimensions and for minor horizontal out-of-level variations of each suspended unit.

(6) Each working platform of a suspended unit shall be secured to the building facade by 1 or more of the following methods or by an equivalent method that is in compliance with the provisions of R 408.10561 and R 408.10562:

- (a) Continuous.
- (b) Intermittent.
- (c) Button guide engagement.
- (d) Angulated roping.
- (e) Building face rollers.

(7) Each working platform of a suspended unit shall be provided with a guardrail system on all sides, which shall meet the requirements of General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509. All of the following provisions apply to the guardrail system:

(a) The system shall consist of a top guardrail, midrail, and toeboard.

(b) The top guardrail shall be not less than 42 inches high and shall be able to withstand not less than a 200-pound force in any downward or outward direction.

(c) The midrail shall be able to withstand not less than a 75-pound (333 n) force in any direction.

(d) The areas between the guardrail and toeboard on the ends and outboard side, and the area between the midrail and toeboard on the inboard side, shall be closed with a material that is capable of withstanding a load of 100 pounds (45.4 kg.) applied horizontally over any area of 1 square foot (.09 m²). All openings in the material shall be small enough to prevent the passage of lifelines and potential falling objects that may be hazardous to persons below.

(e) Toeboards shall be capable of withstanding a force of not less than 50 pounds (222 n) applied in any direction at any point along the toeboard.

(f) Toeboards shall be not less than 4 inches in height from the top edge to the level of the platform floor.

(g) Toeboards shall be securely fastened in place at the outermost edge of the platform and have not more than 1/4 of an inch (1.3 cm) clearance above the platform.

(h) Toeboards shall be solid or have an opening that is not more than 1 inch (2.5 cm) in the greatest dimension.

R 408.10575b Two- and 4-point suspended working platforms.

Rule 575b. (1) The 2- and 4-point suspended working platform shall be not less than 24 inches (610 mm) wide and shall be provided with a minimum of a 12-inch (305 mm) wide passage at or past any obstruction on the platform.

(2) The flooring of the 2- and 4-point suspended working platform shall be of a slip-resistant type and shall not have an opening that would allow the passage of lifelines, cables, and other potential falling objects.

(3) The 2- and 4-point suspended working platform shall be provided with a means of suspension that will restrict the platform from tilting more than 15 degrees in any direction.

(4) Any cable that is suspended from above the 2- and 4-point suspended working platform shall be provided with a means for storage to prevent accumulation of the cable on the floor of the platform.

(5) All operating controls for the vertical travel of the 2- and 4-point suspended working platform shall be of the continuous-pressure type and shall be located on the platform.

(6) Each operating station of every 2- and 4-point suspended working platform shall be provided with a means of interrupting the power supply to all hoist motors to stop any further powered ascent or descent of the platform.

(7) The maximum rated speed of the 2- and 4-point suspended working platform shall not be more than 50 feet per minute (0.3 ms) for single-speed hoists and not more than 75 feet per minute (0.4 ms) for multispeed hoists.

(8) All tools, water tanks, and other accessories shall be secured to prevent their movement or accumulation on the floor of the 2- and 4-point suspended working platform.

(9) Portable fire extinguishers that are in compliance with the provisions of General Industry Safety Standard Part 8 "Portable Fire Extinguishers," as referenced in R 408.10509, shall be provided and securely attached on all 2- and 4-point suspended working platforms.

(10) Access to and egress from a 2- and 4-point suspended working platform, except for those that land directly on a safe surface, shall be provided by stairs, ladders, platforms, and runways that are in compliance with the provisions of General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509. Access gates shall be self-closing and self-latching.

(11) Means of access to or egress from a working platform that is 48 inches (1.2 m) or more above a safe surface shall be provided with a guardrail system or ladder-handrails that are in compliance with the provisions of General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509.

(12) The 2- and 4-point suspended working platform shall be provided with a secondary wire rope suspension system if the platform has overhead structures that restrict the emergency egress of employees. A horizontal lifeline or a direct connection anchorage shall be provided as part of a personal fall arrest system. The system shall be in compliance for each employee on such a platform with the requirements of General Industry Safety and Health Standard Part 33 "Personal Protective Equipment" as referenced in R 408.10509.

(13) A vertical lifeline shall be provided as part of a personal fall arrest system. The system shall be in compliance with the requirements of General Industry Safety and Health Standard Part 33 "Personal Protective Equipment," as referenced in R 408.10509, for each employee on a working platform that is suspended by 2 or more wire ropes, if the failure of 1 wire rope or suspension attachment will cause the platform to upset. If a secondary wire rope suspension is used, vertical lifelines are not required for the personal fall arrest system, provided that each employee is attached to a horizontal lifeline anchored to the platform.

R 408.10575c Single-point suspended working platforms.

Rule 575c. (1) The requirements of R 408.10575b(1) to (11) apply to a single-point working platform.

(2) Each single-point suspended working platform shall be provided with a secondary wire rope suspension system that will prevent the working platform from falling if there is a failure of the primary means of support, or if the platform contains overhead structures that restrict the egress of the employees. A horizontal lifeline or a direct connection anchorage shall be provided, as part of a personal fall arrest system that is in compliance with the requirements of General Industry Safety and Health Standard Part 33 "Personal Protective Equipment," as referenced in R 408.10509, for each employee on the platform.

R 408.10575d Ground-rigged working platforms.

Rule 575d. (1) The ground-rigged working platform shall be in compliance with all of the requirements of R 408.10575b(1) to (11).

(2) After each day's use, the power supply within the building shall be disconnected from a ground-rigged working platform, and the platform shall be either disengaged from its suspension points or secured and stored at grade.

R 408.10575e Intermittently stabilized platforms.

Rule 575e. (1) The intermittently stabilized platform shall be in compliance with the requirements of R 408.10575b (1) to (13).

(2) Each stabilizer tie shall be equipped with a quick-connect and quick-disconnect device that cannot be accidentally disengaged, that is for attachment to the building anchor, and that is resistant to adverse environmental conditions.

(3) The platform shall be provided with a stopping device that will interrupt the hoist power supply if the platform contacts a stabilizer tie during its ascent.

(4) Building face rollers shall not be placed at the anchor setting if exterior anchors are used on the building face.

(5) Stabilizer ties that are used on intermittently stabilized platforms shall allow for the specific attachment length that is needed to effect the predetermined angulation of the suspended wire rope. The specific attachment length shall be maintained at all building anchor locations.

(6) The intermittently stabilized platform shall be in continuous contact with the face of the building during ascent and descent.

(7) The attachment and removal of stabilizer ties shall not require the horizontal movement of the platform.

(8) The platform-mounted equipment and its suspension wire ropes shall not be physically damaged by the loads from the stabilizer tie or its building anchor. The platform, platform-mounted equipment, and wire ropes shall be able to withstand a load that is not less than twice the ultimate strength of the stabilizer tie.

R 408.10575f Button-guide stabilized platforms.

Rule 575f. (1) The button-guide stabilized platform shall be in compliance with the requirements of R 408.10575b(1) to (13).

(2) Each guide track on the button-guide stabilized platform shall engage a minimum of 2 guide buttons during any vertical travel of the platform after the initial button engagement.

(3) Each guide track on a button-guide stabilized platform that is part of a roof-rigged system shall be provided with a storage position on the platform.

(4) Each guide track on the button-guide stabilized platform shall be sufficiently maneuverable by platform occupants to permit easy engagement of the guide buttons and easy movement into and out of the guide track's storage position on the platform.

(5) Two guide tracks shall be mounted on the button-guide stabilized platform and shall provide continuous contact with the building face.

(6) The load-carrying components of the button guide stabilization system that transmit the load into the platform shall be capable of supporting the weight of the platform or provision shall be made in the guide track connectors or platform attachments to prevent the weight of the platform from being transmitted to the platform attachments.

R 408.10575g Supported equipment.

Rule 575g. (1) Supported equipment shall maintain a vertical position in respect to the face of the building by means other than friction.

(2) Cog wheels or equivalent means shall be incorporated to provide climbing traction between the supported equipment and the building guides.

(3) Additional guide wheels or shoes shall be incorporated as may be necessary to ensure that the drive wheels are continuously held in positive engagement with the building guides.

(4) Launch guide mullions that are indexed to the building guides and that are retained in alignment with the building guides shall be used to align drive wheels that enter the building guides.

(5) Manned platforms that are used on supported equipment shall be in compliance with the requirements of R 408.10575b (1), (2), and (4) to (11) with respect to suspended equipment.

R 408.10575h Suspension wire ropes and rope connections.

Rule 575h. (1) Each specific installation shall use suspension wire ropes or combination cable and connections that are in compliance with the specifications recommended by the manufacturer of the hoisting machine that is used. Connections shall be capable of developing not less than 80% of the rated breaking strength of the wire rope.

(2) Each suspension rope shall have a design factor of not less than 10. The design factor is the ratio of the rated strength of the suspension wire rope to the rated working load and shall be calculated using the following formula:

(3) Suspension wire rope grade shall be at least improved plow steel or equivalent.

(4) Suspension wire ropes shall be sized to be in compliance with the required design factor, but shall not be less than 5/16 of an inch (7.94 mm) in diameter.

(5) A reverse bend in wire rope shall not be permitted.

(6) A bend radius in wire rope shall not be less than 20 times the wire rope diameter.

(7) Wire rope shall be inspected and maintained as specified in the provisions of R 408.10582.

$F = \frac{S(N)}{W}$	
Where:	
F	Design factor
S	Manufacturer's rated strength of 1 suspension rope.
N	Number of suspension ropes under 1 load
W	Rated working load on all ropes at any point of travel.

R 408.10576 Tags.

Rule 576. (1) A corrosion-resistant tag shall be securely attached to 1 of the wire rope fastenings when a suspension wire rope is to be used at a specific location and will remain in that location. This tag shall bear all of the following wire rope data:

- (a) The diameter in inches or millimeters, or both.
- (b) Construction classification.
- (c) Whether non-preformed or preformed.
- (d) The grade of materials.
- (e) The manufacturer's rated strength.
- (f) The manufacturer's name.
- (g) The month and year the ropes were installed.
- (h) The name of the person or company that installed the ropes.

(2) A new tag shall be installed at each rope renewal.

(3) The original tag shall be stamped with the date of the resocketing or the original tag shall be retained and a supplemental tag shall be provided when ropes are resocketed. The supplemental tag shall show the date of resocketing and the name of the person or company that resocketed the rope.

(4) Winding drum-type hoists shall contain not less than 3 wraps of the suspension wire rope on the drum when the suspended unit has reached the lowest possible point of its vertical travel.

(5) Traction drum and sheave-type hoists shall be provided with a wire rope that is of a sufficient length to reach the lowest possible point of vertical travel of the suspended unit and with an additional length of the wire rope that is not less than 4 feet (1.2 m). The lengthening or repairing of suspension wire rope is prohibited. Babbitted fastenings for suspension wire rope are prohibited.

R 408.10577 Control circuits; power circuits; components.

Rule 577. (1) Electrical wiring and equipment shall be in compliance with the requirements specified in General Industry Safety Standard Part 39 "Design Safety Standards for Electrical Systems," as referenced in R 408.10509, except as otherwise required by these rules.

(2) An electrical runway conductor system shall be of a type that is designed for use in exterior locations and shall be located so that the system does not come into contact with accumulated snow or water.

(3) Cables shall be protected against damage that results from over-tensioning or from other causes.

(4) Devices shall be included in the control system for the equipment which will provide protection against electrical overloads, 3-phase reversal, and phase failure. The control system shall have a separate method, which shall be independent of the direction control circuit, for breaking the power circuit if there is an emergency or malfunction.

(5) Suspended or supported equipment shall have a control system that will require the operator of the equipment to follow predetermined procedures.

(6) All of the following requirements apply to electrical protection devices:

(a) On installations where the carriage does not have a stability factor of at least 4 against overturning, an electrical contact or contacts shall be provided and connected so that the operating devices for the suspended or supported equipment shall be operative only when the carriage is located and mechanically retained at an established operating point.

(b) Overload protection shall be provided in the hoisting or suspension system to protect against the equipment operating in the "up" direction with a load of more than 125% of the rated load of the platform.

(c) An automatic detector shall be provided for each suspension point which will interrupt power to all hoisting motors for travel in the "down" direction and which will apply the primary brakes if any suspension wire rope becomes slack. A continuous-pressure rigging-bypass switch that is designed for use during rigging is permitted. This switch shall only be used by authorized personnel during rigging.

(d) Upper and lower directional switches that are designed to prevent the travel of suspended units beyond safe upward and downward levels shall be provided.

(e) Emergency stop switches shall be provided on remote controlled, roof-powered platforms that are adjacent to each control station on the platform.

(f) Cables that are in constant tension shall have overload devices which will prevent the tension in the cable from interfering with the load-limiting device or with the platform roll-limiting device. The setting of these devices shall be coordinated with other overload settings at the time the system is designed and shall be clearly indicated on or near the device. The device shall interrupt the equipment travel in the "down" direction.

R 408.10578 Inspection and tests.

Rule 578. (1) All completed building maintenance equipment installations shall be inspected and tested in the field before being placed in initial service to determine that all parts of the installation are in compliance with applicable requirements of these rules, and that all safety and operating equipment is functioning as required.

(2) A similar inspection and test shall be made after any major alteration to an existing installation.

(3) A hoist in an installation shall not be subjected to a load that is more than 125% of its rated load.

R 408.10579 Periodic inspections and tests.

Rule 579. (1) Related building supporting structures shall undergo periodic inspection by a competent person at intervals of not more than 12 months.

(2) All parts of the equipment, including control systems, shall be inspected and, where necessary, tested by a competent person at intervals specified by the manufacturer and supplier, but not more than 12-month intervals, to determine that equipment parts are in safe operating condition. Parts that are subject to wear, such as wire ropes, bearings, gears, and governors, shall be inspected or tested to determine that they have not worn to such an extent as to affect the safe operation of the installation.

(3) The owner shall keep a certification record of each inspection and test required. The record shall include all of the following information:

(a) The date of the inspection.

(b) The signature of the person who performed the inspection.

(c) The number, or other identifier, of the building support structure and equipment that was inspected. This certification record shall be kept readily available for review by the director of the Michigan Department of Licensing and Regulatory Affairs or his or her representative and by the employer.

(4) Working platforms and their components shall be inspected by the employer for visible defects before every use and after each occurrence that could affect the platform's structural integrity.

R 408.10580 Maintenance inspections and tests.

Rule 580. (1) A maintenance inspection and, where necessary, a test shall be made of each platform installation every 30 days. If the work cycle is less than 30 days, such inspection and test shall be made before each work cycle. This inspection and test shall follow the procedures recommended by the manufacturer and shall be made by a competent person.

(2) The building owner shall keep a certification record of each inspection and test performed. The record shall contain all of the following information:

- (a) The date of the inspection and test.
- (b) The signature of the person who performed the inspection or test.
- (c) An identifier for the platform installation that was inspected. The certification record shall be kept readily available for review by the director of the Michigan Department of Licensing and Regulatory Affairs or his or her designated representative and by the employer.

R 408.10581 Special inspection of governors and secondary brakes.

Rule 581. (1) Governors and secondary brakes shall be inspected and tested at intervals specified by the manufacturer and supplier, but the interval shall not be more than every 12 months.

(2) The results of the inspection and test shall confirm that the initiating device for the secondary braking system operates at the proper overspeed.

(3) The results of the inspection and test shall confirm that the secondary brake is functioning properly.

(4) If any hoisting machine or initiating device for the secondary brake system is removed from the equipment for testing, all reinstalled and directly related components shall be reinspected before returning the equipment installation to service.

(5) Inspection of governors and secondary brakes shall be performed by a competent person.

(6) The secondary brake governor and actuation device shall be tested before each daily use. Where testing is not feasible, a visual inspection of the brake shall be made to ensure that it is free to operate.

MAINTENANCE

R 408.10582 Suspension wire rope maintenance; inspection and replacement.

Rule 582. (1) Any of the following conditions or combination of conditions are be cause for removal of the wire rope:

- (a) In any length of 8 diameters, the total number of visible broken wires is more than 6 in 1 rope lay or 3 wires in 1 strand.
- (b) The wire rope has been kinked, crushed, or bird-caged or has sustained any other damage that distorts the wire rope structure.
- (c) The wire rope shows heat or corrosive damage.
- (d) The wire rope contains a broken wire within 18 inches (460.8 mm) of the end attachment.

(2) Wire rope that is bent to form an eye over a bolt or rod that has a diameter that is less than 4 times the rope diameter shall be equipped with a metal thimble.

(3) End fittings should be swagged or zinc-poured sockets.

(4) Where wire clips are used, the provisions of table 8 shall be followed and the u-bolts shall be installed on the dead end or short end of the wire rope.

(5) Wire rope shall be stored in a manner to prevent damage or deterioration.

(6) Before cutting wire rope, a seizing shall be placed on each side of the cut on preformed wire rope, 2 seizings shall be placed on each side of 7/8 inch size or smaller non-preformed wire rope, and 3 seizings shall be placed on each side of 1 inch or larger size non-preformed wire rope.

(7) Wire rope shall be maintained in a lubricated condition over its entire length with the same type of lubricant that is used by the manufacturer.

(8) Suspension wire ropes shall be maintained and used in accordance with the procedures recommended by the wire rope manufacturer.

(9) Suspension wire rope shall be inspected by a competent person for visible defects and gross damage to the rope before every use and after each occurrence that might affect the wire rope's integrity.

(10) A thorough inspection of suspension wire ropes in service shall be made once a month. Suspension wire ropes that have been inactive for 30 days or more shall have a thorough inspection before they are placed into service. These thorough inspections of suspension wire ropes shall be performed by a competent person.

(11) The need for replacement of suspension wire rope shall be based on its condition. A wire rope shall be removed for any of the following conditions:

- (a) Evidence of core failure. A lengthening of rope lay, protrusion of the rope core, and a reduction in rope diameter suggests core failure.
- (b) Outer wire wear is more than 1/3 of the original outer wire diameter.
- (c) Any other condition that the competent person determines has significantly affected the integrity of the rope.

(12) The owner shall keep a certification record of each monthly inspection of a suspension wire rope which shall be verified by the employer. The record shall include the date of the inspection and a number or other identifier of the wire rope that was inspected. The record of inspection shall be made available for review by the Director of the Michigan Department of Licensing and Regulatory Affairs or his or her designated representative and by the employer.

R 408.10583 Fiber rope maintenance; inspection and replacement.

Rule 583. (1) An employer shall ensure that fiber rope shall be inspected visually before the start of each daily use as follows:

- (a) Externally for any of the following conditions:
 - (i) Abrasions.
 - (ii) Cut or broken fibers.
 - (iii) Decay.
 - (iv) Burns.
 - (v) Lack of strength.
 - (vi) Softness.
 - (vii) Variation in size or roundness of the strands.
 - (b) Internally, by separating the strands at 3-foot intervals, for any of the following conditions:
 - (i) Broken fibers.
 - (ii) Presence of grit.
 - (iii) Mildew or mold.
 - (iv) Color change of the fibers.
 - (v) Powdering.
 - (vi) Short loose fibers. A rope that has any of the conditions specified in this rule shall be replaced or returned to the manufacturer for repair.
- (2) A fiber rope shall be stored in a dry room in coils or on a reel.
- (3) A wet fiber rope shall be dried by placing it in the sunshine or a warm room hanging loosely over a rounded peg or hook.
- (4) A fiber rope shall not be kinked or run over sharp corners, shall not be used when frozen, and shall not be left in freezing temperatures when wet.
- (5) A fiber rope that is subjected to an impact load that is equal to or more than its rated capacity shall be replaced.
- (6) A thimble shall be used with fiber rope pursuant to the provisions of R 408.10581(2).

R 408.10584 Synthetic rope maintenance; inspection and replacement.

Rule 584. (1) An employer shall ensure that synthetic rope shall be inspected visually before the start of each job for all of the following conditions:

- (a) Abrasions.
 - (b) Cut or broken fibers.
 - (c) Burns.
 - (d) Melted fibers.
 - (e) Variation in size or roundness of the strands.
- A rope that has any of these conditions shall be replaced or returned to the manufacturer for repair.
- (2) Because of the variance in manufacturing methods, the manufacturer's recommendations shall be followed.
- (3) A synthetic rope shall not be kinked, run over sharp corners, used when frozen, or left in freezing temperatures when wet.
- (4) A synthetic rope that is subjected to an impact load that is equal to or more than its rated capacity shall be replaced.
- (5) A thimble shall be used with synthetic rope pursuant to the provisions of R 408.10581(2).

R 408.10585 Hoist inspection; maintenance and cleaning.

Rule 585. (1) Before lowering personnel below the top elevation of the building, a hoist shall be tested each day in the lifting direction with the intended load to make certain it has sufficient capacity to raise the personnel back to the boarding level.

(2) All parts of the equipment that affect the safe operation of a hoist shall be maintained in proper working order so that the parts perform the functions for which they were intended. The equipment shall be taken out of service when it is not in proper working order.

(3) Control or power contacts and relays shall be kept clean.

(4) All other equipment parts shall be kept clean if their proper functioning would be affected by the presence of dirt or other contaminants.

R 408.10586 Periodic resocking of wire rope fastenings.

Rule 586. (1) Hoisting ropes that utilize poured socket fastenings shall be resocketed at the nondrum ends at intervals of not more than 24 months. In resocketing the ropes, a sufficient length shall be cut from the end of the rope to remove damaged or fatigued portions.

(2) Resocketed ropes shall be in compliance with the requirements of R 408.10581.

(3) Limit switches that are affected by the resocked ropes shall be reset, if necessary.

R 408.10587 Roof systems; maintenance.

Rule 587. Roof track systems, tie downs, and similar equipment shall be maintained in proper working order so that they perform the functions for which they were intended.

R 408.10588 Building face guiding members; maintenance.

Rule 588. T-rails, indented mullions, and equivalent guides that are located in the face of a building shall be maintained in proper working order so that they perform the functions for which they were intended. Brackets for cable stabilizers shall similarly be maintained in proper working order.

R 408.10589 Inoperative safety devices.

Rule 589. A person shall not render a required safety device or electrical protective device inoperative, except as necessary for tests, inspections, and maintenance. Immediately upon completion of such tests, inspections, and maintenance, the device shall be restored to its normal operating condition.

R 408.10590 Platform operator training.

Rule 590. (1) Working platforms shall be operated only by persons who are proficient in the operation, safe use, and inspection of the particular working platform to be operated.

(2) All employees who operate working platforms shall be trained in all of the following areas:

(a) Recognition of, and preventative measures for, the safety hazards that are associated with the employee's individual work tasks.

(b) General recognition and prevention of safety hazards that are associated with the use of working platforms.

(c) Emergency action plan procedures.

(d) Work procedures.

(e) Personal fall arrest system inspection, care, use, and system performance.

(3) The training of employees in the operation and inspection of working platforms shall be done by a competent person.

(4) Written work procedures for the operation, safe use, and inspection of working platforms shall be provided for employee training. Pictorial methods of instruction may be used in place of written work procedures if employee communication is improved through the use of this method. The operating manuals that are supplied by the manufacturers for platform system components can serve as the basis for these procedures.

(5) An employer shall certify that employees have been trained in the operation and inspection of a working platform by preparing a certification record that includes all of the following information:

(a) The identity of the person trained.

(b) The signature of the employer or the person who conducted the training.

(c) The date that training was completed.

The certification record shall be prepared at the completion of the training and shall be maintained in a file for the duration of the employee's employment. The certification record shall be kept readily available for review by the director of The Michigan Department of Licensing and Regulatory Affairs or his or her designated representative.

R 408.10591 Operations use.

Rule 591. (1) Working platforms shall not be loaded in excess of the rated load as stated on the platform load rating plate.

(2) Employees shall be prohibited from working on snow, ice, or other slippery material that covers a platform, except to remove such materials.

(3) Adequate precautions shall be taken to protect the platform, wire ropes, and lifelines from damage due to acids or other corrosive substances. The precautions taken shall be in accordance with the recommendations of the corrosive substance producer, supplier, platform manufacturer, or other equivalent information sources. Platform members that have been exposed to acids or other corrosive substances shall be washed down after each use with a neutralizing solution at a frequency recommended by the corrosive substance producer or supplier.

(4) Platform members, wire ropes, and lifelines shall be protected when using a heat-producing process. Wire ropes and lifelines that have been contacted by the heat-producing process shall be considered to be permanently damaged and shall not be used.

(5) A platform shall not be operated in winds of more than 25 miles per hour (40.2 km/hr), except to move the platform from an operating to a storage position. Wind speed shall be determined based on the best available information, which includes on-site anemometer readings and local weather forecasts that predict wind velocities for the area.

(6) On exterior installations, an anemometer shall be mounted on the platform to determine on-site wind velocities before and during use of the platform. The anemometer may be a portable (hand-held) unit that is temporarily mounted during platform use.

(7) Tools, materials, and debris that are not related to the work in progress shall not be allowed to accumulate on platforms. Stabilizer ties shall be located so as to allow unencumbered passage along the full length of the platform and shall be of such length so as not to become entangled in rollers, hoists, or other machinery.

R 408.10592 Personal fall protection.

Rule 592. Employees on working platforms shall be protected by a personal fall arrest system that is in compliance with the requirements of General Industry Safety and Health Standard Part 33 "Personal Protective Equipment," as referenced in R 408.10509.

APPENDIX A – GUIDELINES
Advisory

1. "Use of the Appendix." Appendix A provides examples of equipment and methods to assist the employer in meeting the requirements of the indicated provision of the standard. Employers may use other equipment or procedures which conform to the requirements of the standard. This appendix neither adds to nor detracts from the mandatory requirements set forth in this standard.

2. "Assurance." Paragraph 1910.66(c) requires the building owner to inform the employer in writing that the powered platform installation complies with certain requirements of the standard since the employer may not have the necessary information to make these determinations. The employer however remains responsible for meeting these requirements which have not been set off in 1910.66(c)(1).

3. "Design Requirements." The design requirements for each installation should be based on the limitations, such as stresses, and deflections, established by nationally recognized standards as promulgated by the following organizations, or to equivalent standards:

AA - The Aluminum Association, 818 Connecticut Avenue, NW., Washington, DC 20008

Aluminum Construction Manual "Specifications For Aluminum Structures Aluminum Standards and Data"

AGMA - American Gear Manufacturers Association, 101 North Fort Meyer Dr., Suite 1000, Arlington, VA 22209

AISC - American Institute of Steel Construction, 400 North Michigan Avenue, Chicago, IL 60611

ANSI - American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018

ASCE - American Society of Civil Engineers, 345 East 47th Street, New York, NY 10017

ASME - American Society of Mechanical Engineers, 345 East 47th Street, New York, 10017

ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103

AWS - American Welding Society, Inc.; Box 351040, 550 NW. LeJeune Road, Miami, FL 33126

JIC - Joint Industrial Council, 2139 Wisconsin Avenue NW., Washington, DC 20007

NEMA - National Electric Manufacturers Association, 2101 L Street, NW., Washington, DC 20037

4. "Tie-in-guides." Indented mullions, T-rails or other equivalent guides are acceptable as tie-in guides in a building face for a continuous stabilization system. Internal guides are embedded in other building members with only the opening exposed, see Figure 1 of Appendix B. External guides, however, are installed external to the other building members and so are fully exposed. The minimum opening for tie-in guides is three quarters of an inch (19 mm), and the minimum inside dimensions are one-inch (25 mm) deep and two inches (50 mm) wide.

Employers should be aware of the hazards associated with tie-in guides in a continuous stabilization system which was not designed properly. For example, joints in these track systems may become extended or discontinuous due to installation or building settlement. If this alignment problem is not corrected, the system could jam when a guide roller or guide shoe strikes a joint and this would cause a hazardous situation for employees. In another instance, faulty design will result in guide rollers being mounted in line so they will jam in the track at the slightest misalignment.

5. "Building anchors, intermittent stabilization system." In the selection of the vertical distance between building anchors, certain factors should be given consideration. These factors include building height and architectural design, platform length and weight, wire rope angulation, and the wind velocities in the building area. Another factor to consider is the material of the building face, since this material may be adversely affected by the building rollers.

External or indented type building anchors are acceptable. Receptacles in the building facade used for the indented type should be kept clear of extraneous materials which will hinder their use. During the inspection of the platform installation, evidence of a failure or abuse of the anchors should be brought to the attention of the employer.

6. "Stabilizer tie length." A stabilizer tie should be long enough to provide for the planned angulation of the suspension cables. However, the length of the tie should not be excessive and become a problem by possibly becoming entangled in the building face rollers or parts of the platform machinery.

The attachment length may vary due to material elongation and this should be considered when selecting the material to be used. Consideration should also be given to the use of ties which are easily installed by employees, since this will encourage their use.

7. "Intermittent stabilization system." Intermittent stabilization systems may use different equipment, tie-in devices and methods to restrict the horizontal movement of a powered platform with respect to the face of the building. One acceptable method employs corrosion-resistant building anchors secured in the face of the building in vertical rows every third floor or 50 feet (15.3 m), whichever is less. The anchors are spaced horizontally to allow a stabilization attachment, also known as stabilizer tie, for each of the two platform suspension wire ropes. The stabilizer tie consists of two parts. One part is a quick connect-quick disconnect device which utilizes a corrosion-resistant yoke and retainer spring that is designed to fit over the building anchors. The second part of the stabilizer tie is a lanyard which is used to maintain a fixed distance between the suspension wire rope and the face of the building.

In this method, as the suspended powered platform descends past the elevation of each anchor, the descent is halted and each of the platform occupants secures a stabilizer tie between a suspension wire rope and a building anchor. The procedure is repeated as each elevation of a building anchor is reached during the descent of the powered platform.

As the platform ascends, the procedure is reversed; that is, the stabilizer ties are removed as each elevation of a building anchor is reached. The removal of each stabilizer tie is assured since the platform is provided with stopping devices which will interrupt power to its hoists in the event either stopping device contacts a stabilizer during the ascent of the platform.

Figure 2 of Appendix B illustrates another type of acceptable intermittent stabilization system which utilizes retaining pins as the quick connect-quick disconnect device in the stabilizer tie.

8. "Wire Rope Inspection." The inspection of the suspension wire rope is important since the rope gradually loses strength during its useful life. The purpose of the inspection is to determine whether the wire rope has sufficient integrity to support a platform with the required design factor.

If there is any doubt concerning the condition of a wire rope or its ability to perform the required work, the rope should be replaced. The cost of wire rope replacement is quite small if compared to the cost in terms of human injuries, equipment down time and replacement.

No listing of critical inspection factors, which serve as a basis for wire rope replacement in the standard, can be a substitute for an experienced inspector of wire rope. The listing serves as a user's guide to the accepted standards by which ropes must be judged.

Rope life can be prolonged if preventive maintenance is performed regularly. Cutting off an appropriate length of rope at the end termination before the core degrades and valley breaks appear minimizes degradation at these sections.

9. "General Maintenance." In meeting the general maintenance requirement in R 408.10585(2) of this rule, the employer should undertake the prompt replacement of broken; worn and damaged parts, switch contacts, brushes, and short flexible conductors of electrical devices. The components of the electrical service system and traveling cables should be replaced when damaged or significantly abraded. In addition; gears, shafts, bearings, brakes and hoisting drums should be kept in proper alignment.

10. "Training." In meeting the training requirement of R 408.10590 of this rule, employers should use both on the job training and formal classroom training. The written work procedures used for this training should be obtained from the manufacturer, if possible, or prepared as necessary for the employee's information and use.

Employees who will operate powered platforms with intermittent stabilization systems should receive instruction in the specific ascent and descent procedures involving the assembly and disassembly of the stabilizer ties.

An acceptable training program should also include employee instruction in basic inspection procedures for the purpose of determining the need for repair and replacement of platform equipment. In addition, the program should cover the inspection, care and use of the personal fall protection equipment required in R 408.10592 of this rule.

In addition the training program should also include emergency action plan elements. OSHA brochure #3088 (Rev.) 1985 "How to Prepare for Workplace Emergencies" details the basic steps needed to prepare to handle emergencies in the workplace.

Following the completion of a training program, the employee should be required to demonstrate competency in operating the equipment safely. Supplemental training of the employee should be provided by the employer, as necessary, if the equipment used or other working conditions should change.

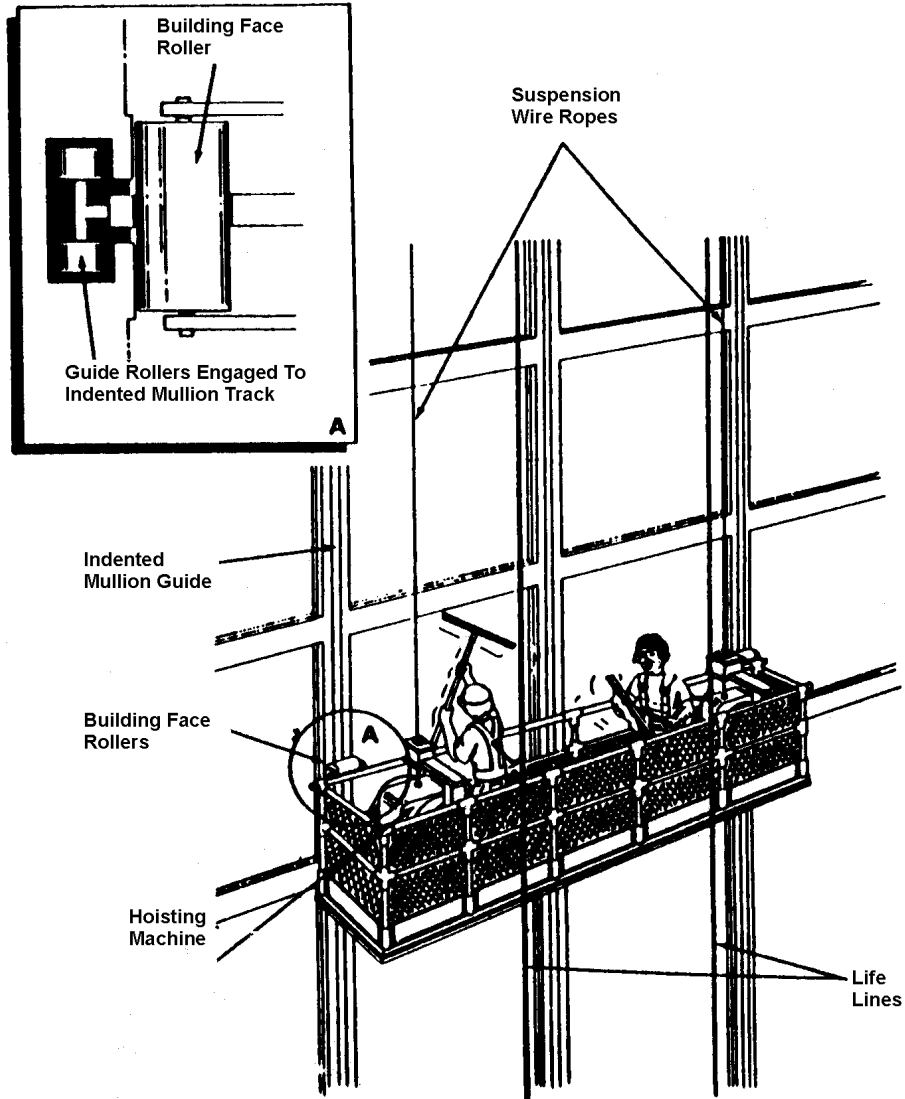
An employee who is required to work with chemical products on a platform should receive training in proper cleaning procedures, and in the hazards, care and handling of these products. In addition, the employee should be supplied with the appropriate personal protective equipment, such as gloves and eye and face protection.

11. "Suspension and Securing of Powered Platforms, Equivalency." One acceptable method of demonstrating the equivalency of a method of suspending or securing a powered platform, as required in R 408.10561(3)(b), R 408.10565, R 408.40566, R 408.10567, and R 408.10575a of this rule, is to provide an engineering analysis by a registered professional engineer. The analysis should demonstrate that the proposed method will provide an equal or greater degree of safety for employees than any one of the methods specified in the standard.

APPENDIX B – EXHIBITS
Advisory

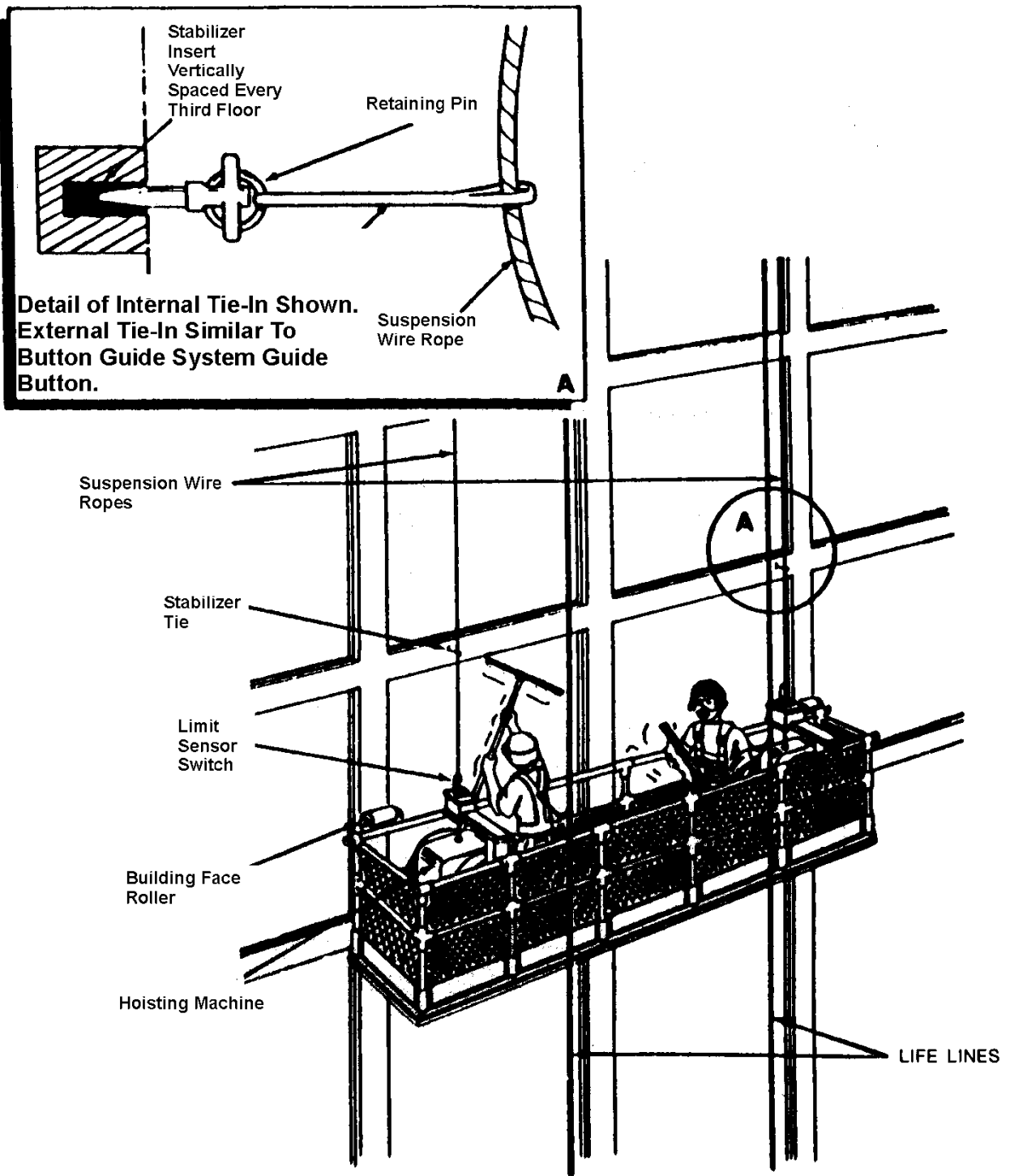
The three drawings in Appendix B illustrate typical platform stabilization systems which are addressed in the standard. The drawings are to be used for reference purposes only, and do not illustrate all the mandatory requirements for each system.

Figure 1. Typical Self-Powered Platform-Continuous External or Indented Mullion Guide System



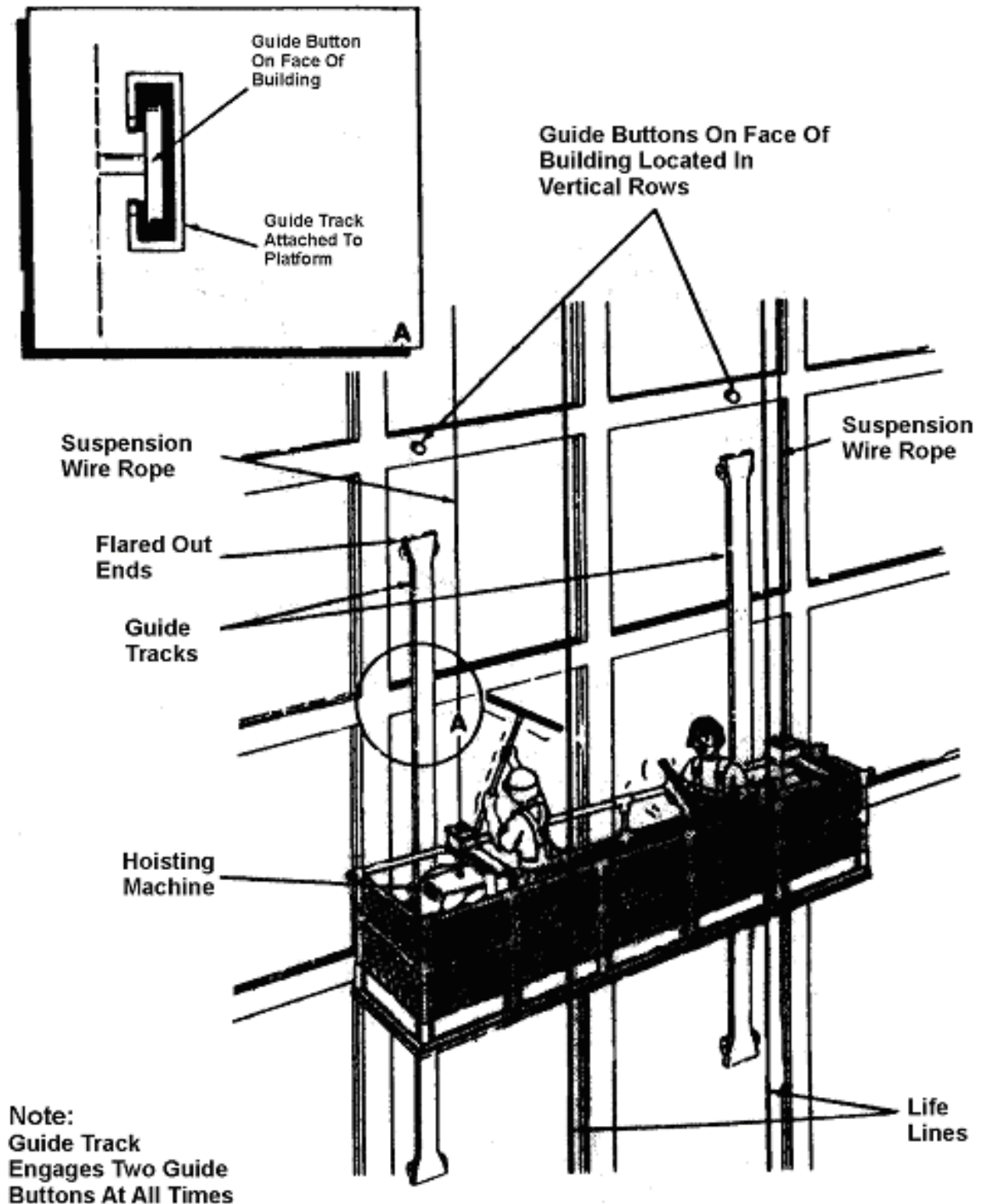
**Typical Self-Powered Platform-Continuous
External or Indented Mullion Guide System**

Figure 2. Typical Self-Powered Platform – Intermittent Tie-In System



Typical Self-Powered Platform-Intermittent Tie-in System

Figure 3. Typical Self-Powered Platform - Button Guide System



Typical Self-Powered
Platform-Button Guide System

APPENDIX D – EXISTING INSTALLATIONS MANDATORY

Use of the Appendix

Appendix D sets out the mandatory building and equipment requirements for applicable permanent installations completed after August 27, 1971, and no later than July 23, 1990, which are exempt from R 408.10501, R 408.10502, R 408.10503 to R 408.10508, R 408.10518, R 408.10561 to R 408.10567, R 408.10568 to R 408.10569, and R 408.10575 to R 408.10577 of this standard.

The requirements in Appendix D are essentially the same as unrevised building and equipment provisions which previously were designated as R 408.10501, R 408.10502, R 408.10518, and R 408.10503 to R 408.10508, and which were effective on November 1, 1974.

Note: All existing installations subject to this appendix shall also comply with R 408.10574(2), R 408.10578 to R 408.10582, and R 408.10585 to R 408.10592 of this standard.

(A) "DEFINITIONS APPLICABLE TO THIS APPENDIX"

(1) "Angulated roping." A system of platform suspension in which the upper wire rope sheaves or suspension points are closer to the plane of the building face than the corresponding attachment points on the platform, thus causing the platform to press against the face of the building during its vertical travel.

(2) "ANSI" American National Standards Institute.

(3) "Babbitted fastenings." The method of providing wire rope attachments in which the ends of the wire strands are bent back and are held in a tapered socket by means of poured molten babbitt metal.

(4) "Brake" - "disc type." A brake in which the holding effect is obtained by frictional resistance between 1 or more faces of discs keyed to the rotating member to be held and fixed discs keyed to the stationary or housing member (pressure between the discs being applied axially).

(5) "Brake - self-energizing band type." An essentially unidirectional brake in which the holding effect is obtained by the snubbing action of a flexible band wrapped about a cylindrical wheel or drum affixed to the rotating member to be held, the connections and linkages being so arranged that the motion of the brake wheel or drum will act to increase the tension or holding force of the band.

(6) "Brake - shoe type." A brake in which the holding effect is obtained by applying the direct pressure of 2 or more segmental friction elements held to a stationary member against a cylindrical wheel or drum affixed to the rotating member to be held.

(7) "Building face rollers." A specialized form of guide roller designed to contact a portion of the outer face or wall structure of the building, and to assist in stabilizing the operators' platform during vertical travel.

(8) "Continuous pressure." Operation by means of buttons or switches, any 1 of which may be used to control the movement of the working platform or roof car, only as long as the button or switch is manually maintained in the actuating position.

(9) "Control." A system governing starting, stopping, direction, acceleration, speed, and retardation of moving members.

(10) "Controller." A device or group of devices, usually contained in a single enclosure, that serves to control in some predetermined manner the apparatus to which it is connected.

(11) "Electrical ground." A conducting connection between an electrical circuit or equipment and the earth, or some conducting body which serves in place of the earth.

(12) "Guide roller." A rotating, bearing-mounted, generally cylindrical member, operating separately or as part of a guide shoe assembly, attached to the platform, and providing rolling contact with building guideways, or other building contact members.

(13) "Guide shoe." An assembly of rollers, slide members, or the equivalent, attached as a unit to the operators' platform, and designed to engage with the building members provided for the vertical guidance of the operators' platform.

(14) "Interlock." A device actuated by the operation of some other device with which it is directly associated, to govern succeeding operations of the same or allied devices.

(15) "Operating device." A pushbutton, lever, or other manual device used to actuate a control.

(16) "Powered platform." Equipment to provide access to the exterior of a building for maintenance, consisting of a suspended power-operated working platform, a roof car, or other suspension means, and the requisite operating and control devices.

(17) "Rated load." The combined weight of employees, tools, equipment, and other material which the working platform is designed and installed to lift.

(18) "Relay, direction." An electrically energized contactor responsive to an initiating control circuit, which in turn causes a moving member to travel in a particular direction.

- (19) "Relay, potential for vertical travel." An electrically energized contactor responsive to initiating control circuit, which in turn controls the operation of a moving member in both directions. This relay usually operates in conjunction with direction relays, as covered under the definition, "relay, direction."
- (20) "Roof car." A structure for the suspension of a working platform, providing for its horizontal movement to working positions.
- (21) "Roof-powered platform." A powered platform having the raising and lowering mechanism located on a roof car.
- (22) "Self-powered platform." A powered platform having the raising and lowering mechanism located on the working platform.
- (23) "Traveling cable." A cable made up of electrical or communication conductors or both, and providing electrical connection between the working platform and the roof car or other fixed point.
- (24) "Weatherproof." Equipment so constructed or protected that exposure to the weather will not interfere with its proper operation.
- (25) "Working platform." The suspended structure arranged for vertical travel that provides access to the exterior of the building or structure.
- (26) "Yield point." The stress at which the material exhibits a permanent set of 0.2 percent.
- (27) "Zinc fastenings." The method of providing wire rope attachments in which the splayed or fanned wire ends are held in a tapered socket by means of poured molten zinc.

(B) "GENERAL REQUIREMENTS"

(1) **"Design requirements."** All powered platform installations for exterior building maintenance completed as of August 27, 1971, but not later than 180 days after November 1, 1974, shall meet all of the design, construction, and installation requirements of Part II and III of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509, and of this appendix. References shall be made to appropriate parts of ANSI A120.1 1970 edition for detail specifications for equipment and special installations.

(2) **"Limitation."** The requirements of this appendix apply only to electric powered platforms. It is not the intent of this appendix to prohibit the use of other types of power. Installation of powered platforms using other types of power is permitted, provided such platforms have adequate protective devices for the type of power used, and otherwise provide for reasonable safety of life and limb to users of equipment and to others who may be exposed.

(3) "Types of powered platforms."

(i) For the purpose of applying this appendix, powered platforms are divided into 2 basic types, Type F and Type T.

(ii) Powered platforms designated as Type F shall meet all the requirements in Part II of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509. A basic requirement of Type F equipment is that the work platform is suspended by at least 4 wire ropes and designed so that failure of any 1 wire rope will not substantially alter the normal position of the working platform. Another basic requirement of Type F equipment is that only 1 layer of hoisting rope is permitted on winding drums. Type F powered platforms may be either roof-powered or self-powered.

(iii) Powered platforms designated as Type T shall meet all the requirements in Part III of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," except for section 28, "Safety Belts and Life Lines," 1970 edition, as adopted in R 408.40509. A basic requirement of Type T equipment is that the working platform is suspended by at least 2 wire ropes. Failure of 1 wire rope would not permit the working platform to fall to the ground, but would upset its normal position. Type T powered platforms may be either roof-powered or self-powered.

(iv) The requirements of this section apply to powered platforms with winding drum type hoisting machines. It is not the intent of this section to prohibit powered platforms using other types of hoisting machines such as, but not limited to, traction-drum-hoisting machines, air-powered machines, hydraulic-powered machines, and internal-combustion machines. Installation of powered platforms with other types of hoisting machines is permitted, provided adequate protective devices are used, and provided reasonable safety of life and limb to users of the equipment and to others who may be exposed is assured.

(v) Both Type F and Type T powered platforms shall comply with the requirements of Appendix C of this rule.

(C) "TYPE F POWERED PLATFORMS"

(1) "Roof car, general."

(i) A roof car shall be provided whenever it is necessary to move the working platform horizontally to working or storage positions.

(ii) The maximum rated speed at which a power traversed roof car may be moved in a horizontal direction shall be 50 feet per minute.

(2) "Movement and positioning of roof car."

(i) Provision shall be made to protect against having the roof car leave the roof or enter roof areas not designed for travel.

(ii) The horizontal motion of the roof cars shall be positively controlled so as to ensure proper movement and positioning of the roof car.

(iii) Roof car positioning devices shall be provided to ensure that the working platform is placed and retained in proper position for vertical travel and during storage.

(iv) Mechanical stops shall be provided to prevent the traversing of the roof car beyond its normal limits of travel. Such stops shall be capable of withstanding a force equal to 100 percent of the inertial effect of the roof car in motion with traversing power applied.

(v)

(a) The operating device of a power-operated roof car for traversing shall be located on the roof car, the working platform, or both, and shall be of the continuous pressure weatherproof electric type. If more than 1 operating device is provided, the operating device shall be so arranged that traversing is possible only from 1 operating device at a time.

(b) The operating device shall be so connected that it is not operable until both of the following:

(1) The working platform is located at its uppermost position of travel and is not in contact with the building face or fixed vertical guides in the face of the building; and

(2) All protective devices and interlocks are in a position for traversing.

(3) "Roof car stability." Roof car stability shall be determined by either paragraph (c)(3)(i) or (ii) of this appendix, whichever is greater.

(i) The roof car shall be continuously stable, considering overturning moment as determined by 125 percent rated load, plus maximum dead load and the prescribed wind loading.

(ii) The roof car and its anchorages shall be capable of resisting accidental over-tensioning of the wire ropes suspending the working platform and this calculated value shall include the effect of 1 1/2 times the value. For this calculation, the simultaneous effect of 1/2 wind load shall be included, and the design stresses shall not exceed those referred to in paragraph (b)(1) of this appendix.

(iii) If the load on the motors is at any time in excess of 3 times that required for lifting the working platform with its rated load, the motor shall stall.

(4) "Access to the roof car." Safe access to the roof car and from the roof car to the working platform shall be provided. If the access to the roof car at any point of its travel is not over the roof area or where otherwise necessary for safety, then self-closing, self-locking gates shall be provided. Access to and from roof cars shall comply with the requirements of General Industry Safety and Health Standard Part 2 "Walking-Working Surfaces," as referenced in R 408.10509.

(5) "Means for maintenance, repair, and storage." Means shall be provided to run the roof car away from the roof perimeter, where necessary, and to provide a safe area for maintenance, repairs, and storage. Provisions shall be made to secure the machine in the stored position. For stored machines subject to wind forces, see special design and anchorage requirements for "wind forces" in Part II, section 10.5.1.1 of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509.

(6) "General requirements for working platforms." The working platform shall be of girder or truss construction and shall be adequate to support its rated load under any position of loading, and comply with the provisions set forth in section 10 of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509,

(7) "Load rating plate." Each working platform shall bear a manufacturer's load rating plate, conspicuously posted; stating the maximum permissible rated load. Load rating plates shall be made of noncorrosive material and shall have letters and figures stamped, etched, or cast on the surface. The minimum height of the letters and figures shall be 1/4 inch.

(8) "Minimum size." The working platform shall have a minimum net width of 24 inches.

(9) "Guardrails." Working platforms shall be furnished with permanent guard rails not less than 36 inches high, and not more than 42 inches high at the front of building side. At the rear, and on the sides, the rail shall not be less than 42 inches high. An intermediate guardrail shall be provided around the entire platform between the top guardrail and the toeboard.

(10) "Toeboards." A 4-inch toeboard shall be provided along all sides of the working platform.

(11) "Open spaces between guardrails and toeboards." The spaces between the intermediate guardrail and platform toeboard on the building side of the working platform, and between the top guardrail and the toeboard on other sides of the platform, shall be filled with metallic mesh or similar material that will reject a ball 1 inch in diameter. The installed mesh shall be capable of withstanding a load of 100 pounds applied horizontally over any area of 144 square inches. If the space between the platform and the building face does not exceed 8 inches, and the platform is restrained by guides, the mesh may be omitted on the front side.

(12) "Flooring." The platform flooring shall be of the nonskid type, and if of open construction, shall reject a 9/16 - inch diameter ball, or be provided with a screen below the floor to reject a 9/16 - inch diameter ball.

(13) "Access gates." Where access gates are provided, access gates shall be self-closing and self-locking.

(14) "Operating device for vertical movement of the working platform."

(i) The normal operating device for the working platform shall be located on the working platform and shall be of the continuous pressure weatherproof electric type.

(ii) The operating device shall be operable only when all electrical protective devices and interlocks on the working platform are in position for normal service, and the roof car, if provided, is at an established operating point.

(15) "Emergency electric operative device."

(i) In addition, on roof-powered platforms, an emergency electric operating device shall be provided near the hoisting machine for use in the event of failure of the normal operating device for the working platform, or failure of the traveling cable system. The emergency operating device shall be mounted in a locked compartment and shall have a legend mounted thereon reading:

"For Emergency Operation Only. Establish Communication
With Personnel on Working Platform Before Use."

(ii) A key for unlocking the compartment housing the emergency operating device shall be mounted in a break-glass receptacle located near the emergency operating device.

(16) "Manual cranking for emergency operation." Emergency operation of the main drive machine may be provided to allow manual cranking. This provision for manual operation shall be designed so that not more than 2 persons will be required to perform this operation. The access to this provision shall include a means to automatically make the machine inoperative electrically while under the emergency manual operation. The design shall be such that the emergency brake is operative at or below governor tripping speed during manual operation.

(17) "Arrangement and guarding of hoisting equipment."

(i) Hoisting equipment shall consist of a power-driven drum or drum contained in the roof car, also known as roof-powered platforms, or contained on the working platform, also known as self-powered platform.

(ii) The hoisting equipment shall be power-operated in both up and down directions.

(iii) Guard or other protective devices shall be installed wherever rotating shafts or other mechanisms or gears may expose personnel to a hazard.

(iv) Friction devices or clutches shall not be used for connecting the main driving mechanism to the drum or drums. Belt or chain-driven machines are prohibited.

(18) "Hoisting motors."

(i) Hoisting motors shall be electric and of weather-proof construction.

(ii) Hoisting motors shall be in conformance with applicable provisions of paragraph (c)(22) of this appendix, Electrical Wiring and Equipment.

(iii) Hoisting motors shall be directly connected to the hoisting machinery. Motor couplings, if used, shall be of steel construction.

(19) "Brakes." The hoisting machine or machines shall have 2 independent braking means, each designed to stop and hold the working platform with 125 percent of rated load.

(20) "Hoisting ropes and rope connections."

- (i) Working platforms shall be suspended by wire ropes of either 6 x 19 or 6 x 37 classification, preformed or non-preformed.
- (ii) [Reserved]
- (iii) The minimum factor of safety is 10, and shall be calculated by the following formula:

$F = S \times N / W$	
Where:	
S	Manufacturer's rated breaking strength of 1 rope.
N	Number of ropes under load.
W	Maximum static load on all ropes with the platform and its rated load at any point of its travel.

- (iv) Hoisting ropes shall be sized to conform with the required factor of safety, but in no case shall the size be less than 5/16 inch diameter.
- (v) Winding drums shall have at least 3 turns of rope remaining when the platform has landed at the lowest possible point of its travel.
- (vi) The lengthening or repairing of wire rope by the joining of 2 or more lengths is prohibited.
- (vii) The non-drum ends of the hoisting ropes shall be provided with individual shackle rods which will permit individual adjustment of rope lengths, if required.
- (viii) More than 2 reverse bends in each rope is prohibited.

(21) "Rope tag data."

- (i) A metal data tag shall be securely attached to 1 of the wire rope fastenings. This data tag shall bear the following wire rope data:
 - (a) The diameter in inches.
 - (b) Construction classification.
 - (c) Whether non-preformed or preformed.
 - (d) The grade of material used.
 - (e) The manufacturer's rated breaking strength.
 - (f) Name of the manufacturer of the rope.
 - (g) The month and year the ropes were installed.

(22) "Electrical wiring and equipment."

- (i) All electrical equipment and wiring shall conform to the requirements of General Industry Safety Standard Part 39 "Design Safety Standards for Electrical Systems," except as modified by ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509. For detail design specifications for electrical equipment, see Part 2 of ANSI A120.1, 1970 edition.
- (ii) All motors and operation and control equipment shall be supplied from a single power source.
- (iii) The power supply for the powered platform shall be an independent circuit supplied through a fused disconnect switch.
- (iv) Electrical conductor parts of the power supply system shall be protected against accidental contact.
- (v) Electrical grounding shall be provided.
 - (a) Provision for electrical grounding shall be included with the power-supply system.
 - (b) Controller cabinets, motor frames, hoisting machines, the working platform, roof car and roof car track system, and noncurrent carrying parts of electrical equipment, where provided, shall be grounded.
 - (c) The controller, where used, shall be so designed and installed that a single ground or short circuit will not prevent both the normal and final stopping device from stopping the working platform.
 - (d) Means shall be provided on the roof car and working platform for grounding portable electric tools.
 - (e) The working platform shall be grounded through a grounding connection in a traveling cable. Electrically powered tools utilized on the working platform shall be grounded.

(vi) Electrical receptacles located on the roof or other exterior location shall be of a weatherproof type and shall be located so as not to be subject to contact with water or accumulated snow. The receptacles shall be grounded and the electric cable shall include a grounding conductor. The receptacle and plug shall be a type designed to avoid hazard to persons inserting or withdrawing the plug. Provision shall be made to prevent application of cable strain directly to the plug and receptacle.

(vii) Electric runway conductor systems shall be of the type designed for use in exterior locations and shall be located so as not to be subject to contact with water or accumulated snow. The conductors, collectors, and disconnecting means shall conform to the same requirements as those for cranes and hoists in General Industry Safety Standard Part 39 "Design Safety Standards for Electrical Systems," as referenced in R 408.40509. A grounded conductor shall parallel the power conductors and be so connected that it cannot be opened by the disconnecting means. The system shall be designed to avoid hazard to persons in the area.

(viii) Electrical protective devices and interlocks of the weatherproof type shall be provided.

(ix) Where the installation includes a roof car, electric contact or contacts shall be provided and so connected that the operating devices for the working platform shall be operative only when the roof car is located and mechanically retained at an established operating point.

(x) Where the powered platform includes a power-operated roof car, the operating device for the roof car shall be inoperative when the roof car is mechanically retained at an established operating point.

(xi) An electric contact shall be provided and so connected that it will cause the down direction relay for vertical travel to open if the tension in the traveling cable exceeds safe limits.

(xii) An automatic overload device shall be provided to cut off the electrical power to the circuit in all hoisting motors for travel in the up direction, should the load applied to the hoisting ropes at either end of the working platform exceed 125 percent of its normal tension with rated load, as shown on the manufacturer's data plate on the working platform.

(xiii) An automatic device shall be provided for each hoisting rope which will cut off the electrical power to the hoisting motor or motors in the down direction and apply the brakes if any hoisting rope becomes slack.

(xiv) Upper and lower directional limit devices shall be provided to prevent the travel of the working platform beyond the normal upper and lower limits of travel.

(xv) Operation of a directional limit device shall prevent further motion in the appropriate direction, if the normal limit of travel has been reached.

(xvi) Directional limit devices, if driven from the hoisting machine by chains, tapes, or cables, shall incorporate a device to disconnect the electric power from the hoisting machine and apply both the primary and secondary brakes in the event of failure of the driving means.

(xvii) Final terminal stopping devices of the working platform:

(a) Final terminal stopping devices for the working platform shall be provided as a secondary means of preventing the working platform from over-traveling at the terminals.

(b) The device shall be set to function as close to each terminal landing as practical, but in such a way that under normal operating conditions it will not function when the working platform is stopped by the normal terminal stopping device.

(c) Operation of the final terminal stopping device shall open the potential relay for vertical travel, thereby disconnecting the electric power from the hoisting machine, and applying both the primary and secondary brakes.

(d) The final terminal stopping device for the upper limit of travel shall be mounted so that it is operated directly by the motion of the working platform itself.

(xviii) Emergency stop switches shall be provided in or adjacent to each operating device.

(xix) Emergency stop switches shall comply with the following:

(a) Have red operating buttons or handles.

(b) Be conspicuously and permanently marked "Stop."

(c) Be the manually opened and manually closed type.

(d) Be positively opened with the opening not solely dependent on springs.

(xx) The manual operation of an emergency stop switch associated with an operating device for the working platform shall open the potential relay for vertical travel, thereby disconnecting the electric power from the hoisting machine and applying both the primary and secondary brakes.

(xxi) The manual operation of the emergency stop switch associated with the operating device for a power-driven roof car shall cause the electrical power to the traverse machine to be interrupted, and the traverse machine brake to apply.

(23) "Requirements for emergency communications."

- (i) Communication equipment shall be provided for each powered platform for use in an emergency.
- (ii) Two-way communication shall be established between personnel on the roof and personnel on the stalled working platform before any emergency operation of the working platform is undertaken by personnel on the roof.
- (iii) The equipment shall permit 2-way voice communication between the working platform and include the following:
 - (a) Designated personnel continuously available while the powered platform is in use; and
 - (b) Designated personnel on roof-powered platforms, undertaking emergency operation of the working platform by means of the emergency operating device located near the hoisting machine.
- (iv) The emergency communication equipment shall be either of the following types:
 - (a) Telephone connected to the central telephone exchange system.
 - (b) Telephones on a limited system or an approved 2-way radio system, provided designated personnel are available to receive a message during the time the powered platform is in use.

(D) "TYPE T POWERED PLATFORMS"

(1) "Roof car." The requirements of paragraphs (c)(1) to (5) of this appendix apply to Type T powered platforms.

(2) "Working platform." The requirements of paragraphs (c)(6) to (16) of this appendix apply to Type T powered platforms.

- (i) The working platform shall be suspended by at least 2 wire ropes.
- (ii) The maximum rated speed at which the working platform of self-powered platforms may be moved in a vertical direction shall not exceed 35 feet per minute.

(3) "Hoisting equipment." The requirements of paragraphs (c)(17) and (18) of this appendix shall apply to Type T powered platforms.

(4) "Brakes." Brakes requirements of paragraph (c)(19) of this appendix shall apply.

(5) "Hoisting ropes and rope connections."

- (i) Paragraph (c)(20)(i) to (vi) and (viii) of this appendix shall apply to type T powered platforms.
- (ii) Adjustable shackle rods in subparagraph (c)(20)(vii) of this appendix shall apply to Type T powered platforms if the working platform is suspended by more than 2 wire ropes.

(6) "Electrical wiring and equipment."

(i) The requirements of paragraph (c)(22)(i) to (vi) of this appendix apply to Type T powered platforms. "Circuit protection limitation," "powered platform electrical service system," all operating services and control equipment shall comply with the specifications contained in Part 2, section 26, of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509.

(ii) For electrical protective devices the requirements of paragraph (c)(22)(i) to (viii) of this appendix apply to Type T powered platforms. Requirements for the "circuit potential limitation" shall be in accordance with the specifications contained in Part 2, section 26, of ANSI A120.1 "Safety Requirement for Powered Platforms for Exterior Building Maintenance," 1970 edition, as adopted in R 408.40509.

(7) "Emergency communications." All the requirements of paragraph (c)(23) of this appendix shall apply to Type T powered platforms.



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