

PART XIV. UNIFORM CONSTRUCTION CODE

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403. ADMINISTRATION
405. ELEVATORS AND OTHER LIFTING DEVICES

CHAPTER 405. ELEVATORS AND OTHER LIFTING DEVICES

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GENERALLY

§ 405.1. Scope.

- (a) *Application of chapter.* This chapter constitutes the Uniform Construction Code technical requirements for elevators and other lifting devices. This chapter applies to the construction, alteration, addition, repair, movement, equipment, removal, maintenance, use and change in use of every elevator and lifting device after April 9, 2004.
- (b) *Exceptions.* The Uniform Construction Code does not apply to:
- (1) New elevators and lifting devices or renovations to existing elevators and lifting devices for which a permit application was made to the Department before April 9, 2004.
 - (2) New elevators and lifting devices or renovations to existing elevators and lifting devices for which a contract for design or construction was signed before April 9, 2004.
 - (3) Elevators and lifting devices solely in residential buildings used by the occupants of a dwelling unit except where the lifting device is used or accessible by the occupants of more than 1 dwelling unit.
- (c) *Prior permits and construction.*
- (1) A permit issued under valid regulations before April 9, 2004, remains valid and the construction of the elevator or lifting device may be completed in accordance with the approved permit if construction commences by April 9, 2006.
 - (2) If construction of the elevator or lifting device has not commenced within the time period allowed under paragraph (1), the permit becomes rescinded. The permit holder shall acquire a new permit under section 304(c)(2) of the act (35 P. S. § 7210.304(c)(2)) before construction.
 - (3) An elevator or lifting device that was issued a certificate of operation by the Department before April 9, 2004, may remain in use if the owner maintains the elevator or lifting device in accordance with a previous Department permit or approval, the owner complied with the regulations in effect when the certificate of operation was issued and the owner complies with the applicable requirements of §§ 405.7-405.9 (relating to periodic inspections; periodic testing; and periodic dynamic testing).

§ 405.2. Standards.

(a) The following standards are adopted as part of the Uniform Construction Code and apply to the listed type of elevator or other lifting device. Other authorities referenced in the standards are adopted if the authority is not excluded in subsection (b):

- (1) "ASME A17.1-2000" with "A17.1a-2002" addenda:
 - (i) Part 1 (General).
 - (ii) Part 2 (Electric elevators).
 - (iii) Part 3 (Hydraulic elevators).
 - (iv) Part 4 (Elevators with other types of driving machines).
 - (v) Part 5 (Special application elevators).
 - (vi) Part 6 (Escalators and moving walks).
 - (vii) Part 7 (Dumbwaiters and material lifts).
 - (viii) Part 8 (General requirements).
 - (ix) Part 9 (Standard codes and specifications).
- (2) "ASME B20.1-2000" for vertical and inclined reciprocating conveyors without automatic transfer devices.
- (3) "ASME A90.1-1997" including "A90.1a-1999" and "A90.1b-2001" addenda for belt man-lifts.
- (4) "ANSI B77.1-2006" for passenger ropeways, aerial tramways, aerial lifts, surface lifts, tows and conveyors.
- (5) "ASME A18.1-1999" including "A.18.1a-2001" addenda for vertical and inclined wheelchair lifts and stairway lifts. Testing under sections 10.3.2 and 10.3.3 shall comply with § 405.8 (relating to periodic test results).
- (6) Electric wiring and apparatus shall comply with the "ICC Electrical Code."

(b) The following sections of "ASME A17.1-2000" with "A17.1b-2002" addenda are not adopted as the Uniform Construction Code:

- (1) Section 5.3 (Private residence elevators).
- (2) Section 5.4 (Private residence inclined elevators).
- (3) Section 5.8 (Shipboard elevators).
- (4) Section 5.9 (Mine elevators).
- (5) Section 7.7 (Automatic transfer devices).
- (6) Section 7.8 (Power dumbwaiter with automatic transfer devices).
- (7) Section 7.9 (Electric material lifts with automatic transfer devices).
- (8) Section 7.10 (Hydraulic material lifts with automatic transfer devices).
- (9) Section 7.11 (Material lifts with obscured transfer devices).
- (10) Section 8.6.7.3 (Private residence elevator).
- (11) Section 8.6.7.4 (Private residence inclined elevators).
- (12) Section 8.6.7.8 (Shipboard elevators).
- (13) Section 8.6.7.9 (Mine elevators).
- (14) Section 8.6.9.2 (Material lifts and dumbwaiters with automatic transfer devices).
- (15) Section 8.7.5.3 (Private residence elevators).
- (16) Section 8.7.5.4 (Private residence inclined elevators).
- (17) Section 8.7.5.8 (Shipboard elevators).
- (18) Section 8.7.5.9 (Mine elevators).
- (19) Section 8.7.7.3 (Material lifts and dumbwaiters with automatic transfer devices).
- (20) Section 8.10.5.2 (Private residence elevators and lifts).
- (21) Section 8.10.5.5 (Material lifts and dumbwaiters with automatic transfer devices).
- (22) Section 8.10.5.8 (Shipboard elevators).
- (23) Section 8.11.5.2 (Private residence elevators and lifts).
- (24) Section 8.11.5.5 (Material lifts and dumbwaiters with automatic transfer devices).
- (25) Section 8.11.5.8 (Shipboard elevators).

(c) The following portions of "ASME B20.1-2000" are not adopted as the Uniform Construction Code:

- (1) Section 3 (Intent).
- (2) Section 5.14 (Hoppers and chutes).
- (3) Section 6.1 (Belt conveyors - fixed in place).
- (4) Section 6.2 (Bucket conveyors).
- (5) Section 6.3 (Chain conveyors).
- (6) Section 6.4 (En masse conveyors).
- (7) Section 6.5 (Flight and apron conveyors - bulk material).
- (8) Section 6.7 (Live roller conveyors - belt or chain driven).
- (9) Section 6.8 (Mobile conveyors).
- (10) Section 6.9 (Portable conveyors, extendible belt conveyors and car unloaders).
- (11) Section 6.10 (Pusher bar conveyors).
- (12) Section 6.11 (Roller and wheel conveyors).
- (13) Section 6.12 (Screw conveyors).

- (14) Section 6.13 (Shuttle conveyors, belt trippers and transfer cars).
- (15) Section 6.14 (Skip hoists - bulk materials).
- (16) Section 6.15 (Slat conveyors and roller slat conveyors).
- (17) Section 6.16 (Suspended vertical tray conveyors).
- (18) Section 6.17 (Tow conveyors - in the floor).
- (19) Section 6.18 (Trolley conveyors and power and free conveyors).
- (20) Section 6.19 (Vertical articulated conveyors).
- (21) Section 6.20 (Vertical chain opposed shelf type conveyors).

(d) The following portions of "ASME A18.1-1999" with "A18.1a-2001" addenda are not adopted as the Uniform Construction Code:

- (1) Part V (Private residence vertical platform lifts).
- (2) Part VI (Private residence inclined platform lifts).
- (3) Part VII (Private residence incline stairway chairlifts).

(e) This chapter applies when there is a conflict with a code or standard related to elevators or lifting devices.

§ 405.3. Permit application.

(a) An owner of an elevator or lifting device or an authorized agent shall apply to the Department for a permit before the construction, alteration, replacement or repair of an elevator or lifting device.

(b) An owner or owner's agent shall submit four copies of a permit application and supporting documents to the Department for review. The application and supporting construction documents shall be submitted in Department-approved media and clearly detail the location, nature and extent of the proposed construction and its compliance with the Uniform Construction Code.

(c) The Department may suspend or revoke a permit when the permit was issued erroneously, on inaccurate, incorrect or incomplete information or issued in violation of the Uniform Construction Code. The Department may charge an applicant a new application and inspection fee when a previous permit was suspended or revoked based upon inaccurate, incomplete or incorrect information provided by the permit applicant.

(d) A permit becomes invalid unless construction work is commenced within 180 days after its issuance or if the work is suspended or abandoned for a period of 180 days after it is commenced. The Department may grant written extensions of time for periods of 180 days each. A permit remains valid for no more than 5 years.

(e) The Department will grant or deny a permit in whole or in part within 30 business days of the filing date of a complete application. The Department will provide written notification to the applicant for applications denied in whole or in part.

(f) The Department will place the written or stamped notation "Reviewed and Approved for Code Compliance" on the documents accompanying the permit application. The Department will keep three sets of the construction documents and send one set of construction documents to the permit applicant.

(g) An owner or owner's agent may request a variance or appeal the code administrator's decision to the Industrial Board under § 403.122 (relating to appeals, variances and extensions of time). The appeal shall be based on a claim that the true intent of the act or the Uniform Construction Code were incorrectly interpreted, the act does not fully apply or an equivalent form of construction is to be used.

(h) A permit is not valid until the Department collects the required fees under § 401.2 (relating to Department fees).

§ 405.4. Approved designs, equipment and devices.

A platform, car, cabin or chair safety device may be installed after it receives a Department-issued certificate of acceptance. An applicant for a certificate of acceptance shall meet the following requirements:

- (1) The manufacturer, designer or engineer of the platform, car, cabin or chair safety device shall submit the design to the Department.
- (2) The Department will observe the operation of the device for compliance with the Uniform Construction Code before use of the device in this Commonwealth.
- (3) The Department will issue a certificate of acceptance after it observes successful testing of the device.

§ 405.5. Acceptance inspection.

The Department will conduct an acceptance inspection to confirm compliance with the Uniform Construction Code before a new elevator or lifting device or an elevator or lifting device under repair is put into service.

§ 405.6. Certificate of operation.

- (a) An elevator or lifting device may not be operated unless the Department issues a certificate of operation for the elevator or other lifting device. The Department will issue a certificate of operation for the elevator or other lifting device if it passes inspection.
- (b) A certificate of operation is valid for 24 months from the issue date for equipment that requires a 6-month periodic inspection under § 405.7 (relating to periodic inspections). A certificate of operation is valid for 48 months from the issue date for equipment requiring a 12-month periodic inspection cycle under § 405.7.
- (c) A certificate of operation may remain valid for an additional 30 days after its expiration date if a periodic inspection is conducted within 30 days of the certificate's expiration date. A certificate of operation is not valid until the Department collects the required fee under § 401.2 (relating to Department fees).
- (d) The certificate of operation or a copy of the certificate of operation for equipment with a machine room shall be posted in the elevator car or other lifting device enclosure, or attached to the controller in the machine room. The certificate of operation for escalators, moving walks and other equipment without a machine room shall be made available to a construction code official during a periodic inspection.

§ 405.7. Periodic inspections.

- (a) A construction code official of the Department or a third-party agency shall conduct periodic inspections and document compliance with the Uniform Construction Code at intervals that do not exceed 6 months for the following equipment:
- (1) Electric elevator.
 - (2) Hydraulic elevator.
 - (3) Escalator.
 - (4) Belt man-lift.
 - (5) Lumber elevator.
 - (6) Moving walk.
 - (7) Orchestra elevator.
 - (8) Organ elevator.
 - (9) Limited use/limited application elevator.
 - (10) Special purpose personnel elevator.
 - (11) Stage elevator.
 - (12) Power sidewalk elevator.
 - (13) Elevators used for construction.
 - (14) Inclined elevator.
 - (15) Rooftop elevator.
- (b) A construction code official shall perform periodic inspections of all other lifting devices at intervals that do not exceed 12 months. A construction code official shall inspect a lifting device that is used on a seasonal basis before the beginning of the season of operation.
- (c) A construction code official who performed a periodic inspection shall complete an inspection report containing all of the following information:
- (1) The inspection results.
 - (2) The day, month and year of the inspection.
 - (3) The beginning and conclusion times of the inspection.
 - (4) The construction code official's certification number.
 - (5) The construction code official's signature. An electronic signature may be used.
- (d) A construction code official who performed a periodic inspection shall insure that the following information is completed on the certificate of operation:
- (1) The day, month and year of inspection.
 - (2) The construction code official's certification number.
 - (3) The construction code official's signature.
- (e) A construction code official shall submit the results of routine inspections to the Department within 15 days of the inspection in a format acceptable to the Department.
- (f) A construction code official shall notify the Department if a lifting device failed a periodic inspection within 1 business day from the inspection.

§ 405.8. Periodic testing.

- (a) The following periodic testing under “ASME A17.1-2000” with “A17.1a-2002” addenda is required. A construction code official shall witness all of the testing:
- (1) Category One under section 8.11.2.2 at 5-year intervals.
 - (2) Category Five under section 8.11.2.3 at 5-year intervals.
 - (3) Category One under section 8.11.3.2 at 3-year intervals. Periodic inspection and testing shall be phased in over a 3-year period as follows:
 - (i) Elevators installed before 1973 shall receive periodic inspection and testing on or before April 9, 2005.
 - (ii) Elevators installed between 1973 and 1992 shall receive periodic inspection by April 9, 2006.
 - (iii) Elevators installed after 1992 shall receive periodic inspection and testing by April 9, 2007.
 - (4) Category Three under section 8.11.3.3 at 5-year intervals.
 - (5) Category Five under section 8.11.3.4 at 5-year intervals.
 - (6) Category One under section 8.11.4.2 at 3-year intervals.
 - (7) Other equipment under section 8.11.5 at 5-year intervals as follows:
 - (i) Sidewalk elevators under section 8.11.5.1.
 - (ii) Hand elevators under section 8.11.5.3.
 - (iii) Dumbwaiters under section 8.11.5.4.
 - (iv) Special purpose personnel elevators under section 8.11.5.6.
 - (v) Inclined elevators under section 8.11.5.7.
 - (vi) Screw column elevators under section 8.11.5.9.
 - (vii) Rooftop elevators under section 8.11.5.10.
 - (viii) Rack and pinion elevators under section 8.11.5.11.
 - (ix) Limited use and limited application elevators under section 8.11.5.12.
 - (x) Elevators used for construction under section 8.11.5.13.
- (b) A construction code official shall witness each test enumerated in this section.
- (c) Inspection and testing under “ASME A.18.1-1999” with “A18.1a-2001” addenda are required at the following intervals:
- (1) Testing under section 10.3.1 shall be conducted at 5-year intervals.
 - (2) Testing under section 10.3.2 shall be conducted at 5-year intervals.
 - (3) Testing under section 10.3.3 shall be conducted at 5-year intervals.
- (d) A lumber elevator equipped with platform safety devices shall be tested with rated load at intervals that may not exceed 5 years.
- (e) Stage, orchestra and organ lifts equipped with a platform safety device shall be tested with rated loads at intervals that may not exceed 5 years.
- (f) Vertical reciprocating conveyers with a platform safety device shall be tested at intervals that do not exceed 5 years.
- (g) A construction code official shall complete a test report after the official witnesses a periodic test in a format acceptable to the Department. The construction code official shall submit the report to the Department within 15 days of witnessing the tests. All of the following information is required in the report:
- (1) The test results.
 - (2) The day, month and year of the test.
 - (3) The beginning and concluding times of the test.
 - (4) The construction code official’s signature. The construction code official may use an electronic signature.
- (h) A metal tag shall be permanently attached on an elevator that successfully passes the test under this section in accordance with all of the following:
- (1) The metal tag shall be furnished by the company that performed the testing.
 - (2) The metal tag shall be attached to the elevator safety-releasing carrier for safety tests or to the controller for all other tests.
 - (3) The tag shall contain all of the following:
 - (i) The day, month and year of the test.
 - (ii) The name of the company that performed the test.
 - (iii) The type of test performed.

§ 405.9. Periodic dynamic testing.

- (a) The following periodic dynamic testing shall be conducted under “ANSI B77.1-1999”:

- (1) Aerial tramways dynamic testing under section 2.3.3.1.2.
- (2) Detachable grip aerial lifts dynamic testing under section 3.3.3.1.2.
- (3) Fixed grip aerial lifts dynamic testing under section 4.3.3.1.2.

(b) A construction code official shall witness all periodic dynamic testing under this section.

(c) A construction code official shall complete and submit a test report to the Department within 15 days of witnessing a periodic dynamic test. The report shall be in a format acceptable to the Department and contain all of the following information:

- (1) The test results.
- (2) The day, month and year of test.
- (3) The beginning and concluding times of test.
- (4) The construction code official's signature. The construction code official may use an electronic signature.

§ 405.10. Major repairs, replacements and alterations.

(a) Repairs, replacement and alterations of elevators or other lifting devices shall comply with the following sections of "ASME A17.1-2000" with "A17.1a-2002" addenda:

- (1) Section 8.6.2 (Repairs).
- (2) Section 8.6.3 (Replacements)
- (3) Section 8.7 (Alterations).

(b) The requirements of subsection (a) apply to major repairs, replacements and alterations performed on other types of lifting devices that are not referenced in "ASME A17.1-2000" with "A17.1a-2002" addenda.

(c) An elevator or lifting device shall be taken out of service when a major repair, replacement or alteration is performed upon it. The owner or owner's agent shall provide written notification to the Department when the major repair, replacement or alteration is completed. The elevator or lifting device may be returned to service when it passes a Department inspection.

§ 405.11. Accident report.

(a) An owner of an elevator or lifting device or an authorized agent shall submit an accident report to the Department if the elevator or lifting device is involved in an accident resulting in any of the following:

- (1) Fatal injury or hospitalization to a person.
- (2) Damage to the elevator or lifting device rendering it unsafe under § 403.84 (relating to unsafe building, structure or equipment).

(b) The owner or authorized representative shall submit the accident report on a Department-prescribed form, which must be received by the Department within 24 hours of the accident.

(c) The Department may order an investigation of the accident.

(d) An elevator or lifting device that was involved in a fatal accident may not return to operation until the Department provides approval.

(e) An elevator or lifting device involved in a nonfatal accident resulting from mechanical or electrical failure may not return to operation until the Department provides approval. This requirement does not apply to ski lifts.

§ 405.12. Lumber elevators.

(a) A lumber elevator is a platform that is used to raise or lower stacked lumber under the requirements of this section. An individual may not ride a lumber elevator.

(b) The shaftway is enclosed on all sides that are not used for loading or unloading with flush partitions that are at least 6 feet high. Movable bars or railings are required to protect all points of loading and unloading, unless gates are provided. Flaring is at an angle of at least 75° from the horizontal and shall protect all shearing points in the shaftway excluding each loading and unloading landing.

(c) Gates are required to protect all points of loading and unloading when the platform's vertical travel exceeds 6 feet or when there are two or more landings. The following types of automatic and semiautomatic gates may be used:

- (1) Semiautomatic vertical-rising gates.
- (2) Fully automatic vertical-rising gates only at terminal landings.

- (3) Manually operated swinging or horizontal gates with locking devices and electric brakes.
 - (4) Department-approved, power-operated horizontal gates.
- (d) A locking device shall comply with the following requirements:
- (1) An automatic locking device shall be placed on, or attached to a manually operated gate. The locking device shall prevent the normal operation of the platform when the gate is open and unsecured. The locking device shall prevent the opening of the gate when the car is away from the landing.
 - (2) A shield shall be installed on openwork gates and shall be of sufficient size to prevent access to the lock from the outside of the shaftway.
- (e) The shaftway shall have a pit with a depth of at least 2 feet from the lowest point of the underside of the platform framing to the pit floor or highest projection when the platform is at its lowest limit of travel. Toe guards, guide shoes or rollers attached to the platform and buffers or bumpers may extend into this space.
- (f) Substantial guides of either wood or steel are required for installation on lumber elevators.
- (g) Lifting capacity shall equal a live load of at least 50 pounds per square foot of platform floor area. The gross weight of the movable platform shall include railings, aprons, wirings, conduits, outlets and every item that is permanently attached to the platform and its rated lifting capacity.
- (h) The lifting speed of a lumber elevator may not exceed 15 feet per minute.
- (i) A lumber elevator shall be equipped with operating switches that meet the following requirements:
- (1) An operating switch shall be located where the entire shaftway is visible when gates are not installed.
 - (2) An operating switch shall be a continuous pressure switch.
 - (3) A manually operated emergency stop switch shall be placed adjacent to the elevator's operating switches, driving machines, pit entrances, machine controller and landings. An emergency stop switch shall be a manually reset switch and cannot be dependent upon springs for proper operation.
 - (4) An emergency stop switch shall be red. No other switch may be red.
 - (5) Operating switches shall be labeled by function.
- (j) Reverse phase protection is required when alternating current is used.
- (k) Elevator screws shall be directly connecting with worm or beveled gears. Gears shall be enclosed in a housing.
- (l) A lumber elevator that is not supported or operated by screws, plungers or similar means shall have approved platform safeties capable of stopping and holding the platform at any point of its travel and its rated lifting capacity.
- (m) The motor, controller and brake shall be located in a lighted room outside of the shaftway, unless the devices are located in the pit. The lumber elevator shall be equipped with stone or masonry piers or columns capable of absorbing the impact of a full-loaded platform when the motor and controller are located in the pit.
- (n) A lumber elevator shall be equipped with normal terminal limit switches located in the shaftway or stop motion devices on the operating machine and arranged to automatically bring the platform to rest at either terminal landing.
- (o) Final terminal limit switches shall be installed and connected so the switch will function if a lumber elevator runs by the normal terminal limit switch. Final terminal limit switches will automatically shut off the power, apply the brake and prevent the operation of the lumber elevator in either direction until adjustments are made to return the lumber elevator to normal operation. Final terminal limit switches shall be located in the shaftway.
- (p) A slack cable or slack chain device shall be installed on all winding drum or sprocket power-driven lumber elevator machinery. The device shall automatically shut off the power, apply the brake and stop the machinery when the platform is obstructed in its descent.
- (q) A lumber elevator shall be equipped with an approved and enclosed fused main line switch or an approved and enclosed circuit breaker switch. The switch shall be located adjacent to the entrance door in the machine room when the motor and controller are located in a machine room. The switch shall be located outside of the shaftway and adjacent to the pit access door when the motor and controller are located in the pit.
- (r) A motor or controller shall be equipped with a second device for disconnection when the motor or controller is not visible from the disconnection equipment required in subsection (q). The second disconnection device shall be equipped to accept a padlock that can lock the device in an "open" and "off" position.

- (s) Lighting shall be provided in all machine spaces and pits within the shaftway and landings. The light switch shall be mounted at the entryway to a machine space and pit.
- (t) A lumber elevator shall be equipped with a door that allows access to the pit when the motor or controller is located in the pit. A pit access door is to meet all of the following requirements:
- (1) A pit access door shall be located below the bottom of the platform when the platform is at its lowest limit of travel.
 - (2) A pit access door shall be at least 30 inches by 30 inches in size, self-closing and self-locking.
 - (3) A pit access door shall have a switch to prevent operation of the elevator while the pit access door is open.
 - (4) An emergency stop switch shall be installed on the strike side of each pit access door.
 - (5) A switch for operating the pit lights shall be installed on the strike side of all pit access doors.
 - (6) A sign shall be located on the exterior strike side of each pit access door with the notation, "CAUTION—Elevator Pit Access Door—Authorized Personnel Only." The sign lettering shall be a minimum of ¼ inch in width and 1½ inches in height. The color of the lettering shall contrast with the color of the access door.
 - (7) An owner or owner's agent shall have sole possession of keys to each pit access door.
- (u) A lumber elevator platform shall have a steel frame designed with a minimum safety factor of six based on the highest rating of either the rated lifting load or the rated static load, uniformly distributed.
- (v) A platform shall be equipped with an apron on all its sides. When the travel distance of a lumber elevator extends above the top of the surrounding floor level, the apron shall have sufficient depth to enclose the space between the floor level and the under side of the platform when the platform is at its travel limit.
- (w) As part of the initial inspection, the elevator shall be loaded to rated lifting capacity and operated throughout its entire travel. Platform safeties are to be tested with the maximum rated lifting capacity.

STAGE, ORCHESTRA AND ORGAN CONSOLE ELEVATORS

§ 405.31. Applicability.

The following types of elevators shall meet the requirements of this section and §§ 405.32-405.41:

- (1) A stage elevator consisting of a section of the stage arranged to be raised and lowered above and below the stage in a vertical direction.
- (2) An orchestra elevator consisting of a platform arranged to be raised and lowered in a vertical direction.
- (3) An organ console elevator used for raising and lowering an organ console, including the organist in a vertical direction.

§ 405.32. Platforms.

- (a) A stage, orchestra or organ console elevator platform shall be comprised of steel frame construction and designed with a safety factor of at least six based on the highest rating of either the rated lifting load or the rated static load uniformly distributed.
- (b) When the travel of a stage, orchestra or organ console elevator extends above the top of the shaftway enclosure, the platform shall be equipped with an apron at least as deep as the space between the top of the shaftway enclosure and the underside of the platform when the platform is at its limit of travel.

§ 405.33. Shaftway requirements.

- (a) The inside surface of a shaftway shall have a smooth finish within the limits of travel without any projections or recesses except for landing entrances, guides and guide brackets, vertical slots required for concealed guides, junction boxes and conduits for wiring, seating cart storage areas, orchestra areas and piano storage areas.
- (b) Shaftway guide rails shall be made of steel.
- (c) Adjacent lift sides shall be equipped with aprons, railings and toeboards and pressure-sensing strips that are necessary to avoid shearing and fall hazards when elevators or other lifts under this section are installed in the same shaftway.

§ 405.34. Projections and recesses.

Projections or recesses for landing entrances, junction boxes and conduits for wiring, seating cart storage areas, orchestra areas and piano storage areas shall have the following protection:

(1) Metal bevel plates shall protect the underside and topside of projections and the underside of all recesses. The plates shall extend from the edge of the projection or recess to the wall. The beveled angle may not be less than 75° relative to a horizontal position. Instead of plates, the bevel surfaces may be made of concrete and troweled to a smooth finish. Pressure sensing strips meeting the requirements in paragraph (2) may be used instead of beveled plates.

(2) Pressure sensing strips shall be placed on the underside of the platform on sides where there is a projection or recessed opening and on an apron attached to the platform. Pressure sensing strips shall meet the following requirements:

(i) A strip shall be interconnected to the operating and controlling circuit of the elevator.

(ii) A strip shall detect an obstruction that exerts a force of 5 pounds or greater per square inch.

(iii) The elevator shall immediately stop and automatically reverse direction for travel of 2-4 inches when a strip detects an obstruction. The pressure strips may automatically reset once the elevator has stopped its reverse travel.

§ 405.35. Landing doors.

(a) Swinging doors installed at the bottom landing of the shaftway shall open outward.

(b) Shaftway landing doors shall be equipped with a Department-approved interlock. The interlock shall:

(1) Secure the platform in the stop position or place the power of controlling the elevator beyond the operator's control while any landing door is open.

(2) Operate in conjunction with a normally closed electrical valve operating system when used for maintained pressure hydraulic elevators.

(c) A landing door may unlock only when the platform is stopped at the level where the landing doors are located.

(d) Landing doors shall open manually from inside the shaftway regardless of the platform's position.

§ 405.36. Lifting capacity.

(a) The lifting capacity of an orchestra or organ console elevator shall equal a live load of at least 25 pounds per square foot of floor area of the platform.

(b) The lifting capacity of a stage elevator shall equal a live load of at least 75 pounds per square foot of floor area of the platform.

§ 405.37. Operating speed.

Operating speed of an orchestra or organ console elevator may not exceed 30 feet per minute.

§ 405.38. Operating controls.

Operating controls shall be located so that the operator may view the platform and load throughout their entire travel. Operating controls are governed by the following:

(1) Operating controls shall be continuous pressure switches.

(2) Detachable pendant switches that plug into the platform or at an area other than the platform may be installed as operating controls if the operator can view the platform and load throughout their entire travel.

(3) Emergency stop switches that comply with all of the following:

(i) Manually operated emergency stop switches shall be located adjacent to the operating controls, driving machines, pit entrances, machine controller, orchestra areas and recessed storage areas located within the shaft-way.

(ii) Emergency stop switches shall be manually reset and not depend upon springs for proper operation.

(iii) Emergency stop switches shall be red. No other switch may be red.

(iv) An emergency stop switch shall be installed on an organ console elevator in a location accessible to the organist.

(4) Operating controls shall be labeled by function.

(5) A key is required for use of the operating controls other than emergency stop switches.

(6) A stage, orchestra or organ console elevator that intersects with other stage, orchestra, organ console elevators, storage areas or orchestra areas below the stage level shall be equipped with a constant pressure pushbutton switch which meets the following requirements:

(i) The additional switch shall be located to permit an unobstructed view of the intersecting area.

(ii) The switch shall be held in the closed or "run" position to complete the operating circuit and permit the operator's controls to function.

(iii) Release of the switch will stop the elevator immediately.

(iv) An additional switch is not required for elevators that are completely enclosed in an operating shaftway.

§ 405.39. Switches.

- (a) An elevator shall be equipped with normal terminal limit switches located in the shaftway or a stop motion device on the operating machine. The switches or device shall automatically bring the platform to rest at either terminal landing.
- (b) Final terminal limit switches shall be installed in the shaftway and meet the following requirements:
 - (1) The switches shall be connected so that the functioning of the switch will occur if the elevator runs by the normal terminal limit switch.
 - (2) A final terminal limit switch is to automatically shut off power, apply the brake and prevent the operation of the elevator in either direction until adjustments are made to return the elevator to normal operation.
- (c) An approved and enclosed fused main line switch or an approved circuit breaker switch shall be installed to disconnect the elevator and meet the following requirements:
 - (1) The switch shall be located adjacent to the entrance door in a machine room containing the motor and controller.
 - (2) The switch shall be located outside the shaftway and adjacent to the pit access door when the motor and controller are located in the pit.

§ 405.40. Pit and pit access.

- (a) The pit shall be equipped with stone or masonry piers or columns or buffers capable of absorbing the impact of a fully loaded platform while maintaining a minimum refuge space of 2 feet throughout the pit area.
- (b) A pit access door has to meet all of the following requirements:
 - (1) A pit access door shall be a minimum of 30 inches by 30 inches in size, self-closing and self-locking.
 - (2) Have a switch to prevent the operation of the elevator while the pit access door is open.
 - (3) An emergency stop switch shall be installed on the strike side of each pit access door.
 - (4) A switch for operating the pit lights shall be installed on the strike side of each pit access door.
 - (5) Contain a sign located on the exterior strike side of all pit access doors with the notation, "CAUTION—Elevator Pit Access Door—Authorized Personnel Only." The sign lettering is to be a minimum of ¼ inch in width and 1½ inches in height. The color of the lettering shall contrast with the color of the access door.
 - (6) An owner or owner's agent shall have sole possession of keys to each access door.
- (c) A shaftway shall have a pit that meets all of the following requirements:
 - (1) Pit depth shall be at least 2 feet from the lowest point of the underside of the platform framing to the pit floor or highest floor projection when the platform is at its lowest limit of travel. Toe guards, guide shoes or rollers attached to the platform and buffers or bumpers may extend into this space.
 - (2) Clearance between the lowest point of an apron, guide shoe or rollers on the underside of the platform and any portion of the pit floor shall be at least 6 inches when the platform has reached its lowest limit of travel.
 - (3) Pit floor area directly beneath any apron area of the platform shall be marked with paint of at least two contrasting colors to a minimum width of 12 inches past the inside edge of the apron, guide shoe or rollers.
- (d) A door shall be installed to provide access to a pit when the motor or controller for a stage, orchestra or organ console elevator is located in the pit by one of the following means:
 - (1) A door below the bottom of the platform when the platform is at its lowest limit of travel.
 - (2) A door that opens outward in the platform.
 - (3) The pit shall be equipped with a ladder for gaining access to the pit through this access door.
 - (4) The ladder and access door shall be arranged to secure the ladder to the platform during access to the pit.
 - (5) The ladder shall extend from the platform to the pit floor regardless of the location of the platform in the shaftway.

§ 405.41. Single operator requirement.

A single operator is required to control operation of a stage, orchestra or organ console elevator under all of the following conditions:

- (1) The operator and designated material handlers are the only persons that may ride on a stage or orchestra elevator.
- (2) The operator and organist are the only persons that may ride on an organ console elevator. An organist may be the operator of the elevator if he receives adequate training on the operation of the elevator and all its controls.
- (3) An operator is required to work with an assistant when using a stage, orchestra or organ console elevator that intersects with another stage, orchestra, organ console elevator, storage areas or orchestra areas below the stage level. The assistant shall insure that there are no obstructions in the path of the elevator being operated. The assistant shall always use a two-way communication device with the operator.

§ 405.42. Additional requirements.

- (a) Railings and toeboards shall be provided at floor levels when the elevator is not at floor level. The railing and toeboard are to be interconnected to the operating circuit so that if any portion of the rail and toeboard is not in its proper placement, the elevator cannot operate.
- (b) A key shall be located at the lowest floor in a container with a glass surface. This key shall open a landing door regardless of the location of the platform.
- (c) A plate attached to the equipment controller shall contain the manufacturer's listed rated lifting capacity and maximum static load.
- (d) The gross weight of the movable platform shall be posted on the controller and will include railings, aprons, wiring, conduits, outlets or an item that is permanently attached to the platform and related lifting capacity.
- (e) Reverse phase protection shall be provided when alternating current is used.
- (f) Elevator screws are to be directly connecting with worm or beveled gears. Gears shall be enclosed in a housing.
- (g) A stage, orchestra or organ console elevator that is not supported or operated by screws, plungers or similar means shall have platform safeties capable of stopping and holding the platform with a full-rated load at any point of its travel.
- (h) The motor controller and brake shall be located in a lighted room outside the shaftway, unless the devices are located in the pit.
- (i) A slack cable or slack chain device shall be installed on all winding drum or sprocket power-driven stage, orchestra or organ console elevator machinery. The device shall automatically shut off the power, apply the brake and stop the machinery when the platform is obstructed in its descent.
- (j) A motor or controller shall be equipped with a second device for disconnection when the motor or controller is not visible from the mainline disconnect switch.
- (k) Lighting shall be provided in all machine spaces, pits, storage areas, orchestra areas and landings within the shaftway. A light switch shall be mounted at the entryway to each area.