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# ELEVATOR CODE SUPPLEMENT

Containing All Amendments to the 1926 Revision  
of the Elevator Code

October, 1930

Issued by  
INDUSTRIAL COMMISSION OF WISCONSIN  
Madison

# INDUSTRIAL COMMISSION OF WISCONSIN

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In the following pages are included all amendments to the Elevator Code which have become effective since August 12, 1926. The amendments supplement, and are a part of, the Elevator Code, issued by the Industrial Commission, which became effective August 12, 1926.

The following orders and portions of orders, included in this supplement, were amended, effective August 24, 1927, and were then published in an eighteen page supplement in February, 1928:

Orders 400, 404, 408, 411 (d), 415 (a) (b), 417 (a), 422 (b), 423 (a), 424 (a), 428 (a) (b), 433, 435 (a) (b) (c), 436 (a), 437, 438 (a) (b) (d), 439 (b) (d) (f) (g), 440, 441 (a), 446 (b), 456 (b), 459 (d), 463 (a) (b), 464 (i), 469 (a) (b), 470 (d) (g) (h), 471 Item 3, 473 (b) (e) (k), 474, 475 (a), 478 (a) (b), 479 (b), 480 (e) (g) (h), 486 (f), Caption of Section IV and Captions of Orders 437, 463, 474, 485, 486, 487, 488 and 489.

Orders, or portions of orders 415 (d), 416, 422 (c), 431 (e), 447 (a), 451 (b), 472 (a) and 481 (b) became effective February 6, 1928.

Order 435 (d) of the Elevator Code effective August 12, 1926, was repealed, effective August 24, 1927.

The following orders and portions of orders, included in this supplement, were amended, effective October 20, 1930:

Orders 400 (29), 400 (30), 404, 411 (d), 416, 420 (a), 421, 422 (c), 428 (a) (b), 429 (b), 430 (a), 433 (b), 435 (b) (c), 436 (a) (c), 437 (a), 438 (a), 464 (i), 466, 475, 481 (d).

Order number 400 (31) is changed to number 400 (32).

New orders 400 (31), 434 and 473 (n) are included herein.

## Order 400. Definitions.

23. A shaftway door or gate electric contact is an electrical device the purpose of which is to prevent the operation of the elevator machine in a direction to move the car away from the landing, by maintaining the interruption of the supply circuit, until the door or gate is closed.

24. A mechanical interlock for a shaftway landing door or gate is a device the purposes of which are:

(1) To prevent the normal operation of the elevator machine unless the shaftway landing door or gate opposite which the car is standing is latched within 4 inches of the fully closed position, and

(2) To prevent the opening of a shaftway landing door or gate from the landing side, except by special apparatus, unless the car is at the landing.

25. An electro-mechanical interlock for a shaftway landing door or gate is a combination of electrical and mechanical devices the purposes of which are:

(1) To prevent the operation of the elevator machine in a direction to move the car away from the landing unless all shaftway landing doors or gates are latched within 4 inches of the fully closed position; and

(2) To prevent the opening of a shaftway landing door or gate from the landing side except by means of a key or other special apparatus.

26. A door lock or a gate lock is a device that will prevent the door or gate from being opened from the landing side unless the elevator car is at, or within 3 inches of, the landing, and which is so constructed and located that it can-

not be easily put out of order, or reached from the landing floor when the door or gate is closed.

27. A telescoping gate is one in which the several parts slip together without distortion.

28. A collapsing gate is one that is distorted in opening and closing.

29. By new installation or elevator hereafter installed is meant:

(1) Every part of every elevator for which the contract was not let before the effective date of this code;

(2) The shaftway enclosure, guides and machine of an elevator which is hereafter moved to a new location;

(3) In any elevator any complete part which is materially altered or replaced with new after the effective date of this code;

(4) Every part of every elevator which is changed from freight to passenger service, or vice-versa, or from hand power to power, after the effective date of this code;

(5) Every elevator shaftway which is enlarged, or extended in height, after the effective date of this code.

30. By existing installation or elevator heretofore installed is meant an elevator, or part of an elevator, which is not considered a new installation or an elevator hereafter installed under order 400-29.

31. A secondary entrance to an elevator car is any entrance other than that at which the operator, or operating station, is placed.

32. Approved means approved by the Industrial Commission.

#### Order 404. Plans. New Installations.

Before starting work on any new installation of an elevator, power dumbwaiter or escalator, three copies of the plans shall be submitted to the Industrial Commission for approval, with two copies of application, properly filled out, on blank forms furnished by the commission. This order shall not apply in cities where elevator permits are issued by the city in a manner approved by the Industrial Commission. Every elevator manufacturer who furnishes an elevator, power dumbwaiter or escalator to be installed by

the owner, or an agent of the owner, shall submit plans and file an application in compliance with this order.

**Note:** The elevator manufacturer and architect should cooperate in preparing plans to avoid discrepancy in design. See also order 464 (k).

#### Order 408. Tests. New Installations.

A full capacity test shall be made of every elevator and power dumbwaiter before being put into regular service.

For test of catching device see order 464.

For test of escalators see order 492.

#### Order 411. Freight Elevator Shaftway Enclosures. New Installations.

(d) Where a fireproof enclosure is required for the shaftway of a freight elevator, all doorway openings shall be protected with approved fire doors or approved fire shutters which shall be self-closing, or equipped to close automatically in case of fire, or furnished with electric contacts, or provided with mechanical or electro-mechanical shaftway landing door interlocks. All windows in inside enclosure walls shall be approved fire windows. Where a hand cable is operated through the shaftway enclosure, a slot not more than 5 inches wide by not more than 3 feet long with the bottom 30 inches from the floor, may be cut in the enclosure. This slot or opening shall be protected with an approved fire shutter which will be self-closing, or which will close automatically in case of fire.

#### Order 415. Guards for Projections in Shaftways.

##### 1. Existing Installations.

(a) All projections and shearing edges in elevator shaftways, such as floors, beams, sills, pipes, bolts and other stationary parts within 4 inches of the edge of the car, unless guarded against by the permanent car enclosure, shall be provided with smooth bevelled guards fitted directly under such projections so as to push any projecting object back into the car. The bevelled surface of each guard shall make an angle of not less than 60 degrees with the horizontal.

**Exception:** This requirement need not apply to the tracks of two-speed doors.

2. New Installations.

(b) On elevators hereafter installed, bevelled guards shall be made of smooth metal not less than 1-16 inch in thickness, properly braced.

**Order 416. Car Clearances—New Installations.**

1. Minimum Clearances. In every new installation, the clearance between every point of the elevator shaftway walls and the elevator car shall be not less than  $\frac{3}{4}$  inch. Every rope, cable, sheave and other similar moving part shall have a clearance of not less than  $\frac{3}{4}$  inch. The clearance between the car entrance sill and any landing sill shall be not less than  $\frac{1}{2}$  inch where steel guide posts are used in side-post construction, and not less than  $\frac{3}{4}$  inch where wood guide posts or corner post construction are used. No part of the shaftway landing door mechanism shall project beyond the landing sill.

2. Maximum Clearances. In every new installation, the clearance between the shaftway walls and the edge of any car entrance sill shall not be more than 7 inches at any point, except that in existing installations, the distance between the car entrance sill and the wall containing a secondary entrance may be increased if approved in writing by the Industrial Commission.

The distance between the shaftway side of any shaftway landing door, or landing gate, and the shaftway edge of the landing sill shall not be more than  $3\frac{1}{2}$  inches.

The clearance between the car entrance sill and any landing sill shall not be more than  $1\frac{1}{2}$  inches.

**Order 417. Depth of Pit and Overhead Clearance. New Installations.**

(a) The depth of the pit and the overhead clearance for any power elevator hereafter installed shall each be not less than the number of inches shown for a given speed and capacity in the following table; except that in no case shall the clearance between the bottom of the car platform and the bottom of the pit be less than 15 inches when the car is resting on the fully compressed buffers:

TABLE SHOWING REQUIRED MINIMUM DEPTH OF PIT AND OVERHEAD CLEARANCE, EACH IN INCHES

Elevator car speed in feet per min.	Capacity of Elevator in Pounds									
	0 to 2500	3000	4000	5000	6000	7000	8000	9000	10000 or more	
0 to 50.....	30	31	34	36	38	41	43	46	48	
100 .....	34	35	37	40	42	45	47	49	52	
200 .....	41	43	45	47	50	52	54	57	59	
300 .....	49	50	53	55	57	60	62	64	67	
400 .....	57	58	60	63	65	67	70	72	75	
500 .....	64	65	67	70	73	75	77	80	82	
600 or more.....	72	73	76	78	80	83	85	88	90	

**Order 420. Shaftways and Pits Unobstructed. New and Existing Installations.**

(a) No elevator machine or other machinery shall be located in the pit, except that this requirement need not apply to machinery used in connection with sidewalk type elevators. No ropes, wires or pipes other than those needed to serve the elevator machinery and for heating and lighting the car or the shaftway, and except branch water pipes with sprinkler heads, shall be installed in any elevator shaftway.

**Exception:** In existing installations, pipes in a shaftway may remain unless carrying steam with pressure exceeding 15 pounds, and wires may remain if placed in conduit.

**Order 421. Penthouses—Where Required. New Installations.**

Above every power elevator hereafter installed, there shall be a penthouse or working space with at least six feet average headroom above the screen or floor required by orders 423 and 424. Where a new elevator is installed in an existing building, or in a new building where the elevator terminates below an occupied floor, or below a roof, or where the penthouse cannot readily be provided, the headroom may be decreased to a height which will permit access to the machinery for oiling and inspection if approved in writing by the Industrial Commission.

**Exception:** This requirement does not apply to sidewalk type elevators, without counterweights, which are located within buildings.

**Order 422. Construction of Penthouses.**

(b) Properly weatherproofed openings shall be provided for the lighting and ventilation of penthouses.

(c) In every elevator installation, access to the penthouses shall be made safe and easy from outside the shaft-

way by means of a stairway (with handrail), or stairway type ladder (with handrail), inclined not more than 75 degrees with the horizontal, except that where there is insufficient room fixed ladders may be installed when approved in writing by the Industrial Commission. One such stairway or ladder may serve a group of adjoining penthouses on the same roof.

In every building, the stairway, or ladder, to the roof of the building shall be protected from the weather. In new or remodeled buildings, the stairway, or stairway type ladder, which has a rise of more than 6 feet, shall be protected from the weather. In existing buildings, all stairways and stairway type ladders which are not protected from the weather shall be standard fire escape construction (Building Code, order 5120).

**Order 423. Overhead Floors and Machinery Supports. New and Existing Installations.**

(a) There shall be a floor not less than 2 inches thick immediately under the machinery and sheaves at the top of the shaftway of every elevator. If the elevator machine is placed at the top of the shaftway, the floor shall cover the entire shaftway, shall be of fireproof or mill construction (where required by the Building Code issued by the Industrial Commission), and shall be built and supported for a safe load of not less than 300 pounds at the center in addition to the machinery load.

**Order 424. Floors or Screens Under Sheaves. New and Existing Installations.**

(a) If the overhead machinery consists only of sheaves and governor, the floor below, if of wood, shall be solid and not less than 2 inches thick, or not less than  $\frac{7}{8}$  inch thick if supported by joists spaced not more than 16 inches center to center. If such floor is a metal grating, there shall be no opening greater than 1 inch in width. It shall be built and supported to carry a safe load of not less than 300 pounds at the center. The floor shall cover the shaftway if the area of the shaftway does not exceed 50 square feet and if the average headroom above such floor is not less than 5 feet; if the area is larger than 50 square feet, or the head-

room is less than 5 feet, such floor need extend only two feet outside of all sheaves and machinery which must be reached for oiling and inspection. In such cases, there shall be a toeboard not less than 6 inches in height at the edge of the floor, and where the space between the floor and the wall of the shaftway exceeds 12 inches, a handrail shall be provided 30 inches above the floor. This order shall also apply to the secondary sheaves of full wrap traction elevators, and to hand power elevators having no screens or other approved covers over the cars, excepting existing installations where there is not room for such floors.

**Order 428. Enclosures for Passenger Elevator Cars.**

(a) Every existing passenger elevator car shall be enclosed on all sides, excepting the entrance opening. This enclosure shall be solid from floor to car ceiling in front of the counterweight runway, and openings in other sections shall not be larger than  $1\frac{3}{4}$  inches square; or if longer than  $1\frac{3}{4}$  inches, not wider than 1 inch. If wire mesh is used, the wire shall be not less than No. 10 U. S. Standard Gauge, with mesh not greater than  $1\frac{3}{4}$  inches, measured along the wire from center to center of wires at points where they cross.

**Exception:** On an existing installation where a regular operator is stationed on the car, existing grill work will be accepted unless an especially hazardous condition exists.

(b) The car walls of every passenger elevator hereafter installed shall be constructed of solid incombustible panels on incombustible frame to a height of not less than 5 feet, and the panel in front of the counterweight runway shall be solid to the car ceiling. Wood veneer finish may be used inside of metal cars. The floor covering may be made of wood or other non-slip material.

**Order 429. Furnishings for Passenger Elevator Cars, New and Existing Installations.**

(b) A metal handrail not less than 1 inch in diameter, or equivalent, and approximately  $3\frac{1}{2}$  feet above the floor, shall be placed on each side, except the entrance side, or sides, of every passenger car.

**Order 430. Gates or Doors for Passenger Elevator Cars.**

(a) In new installations, each entrance to every passenger elevator car which travels faster than 150 feet per minute shall be equipped with an approved car gate, or an approved car door.

Car doors shall be of approved incombustible construction. If glass panels are desired in car doors, wired glass or non-shatterable glass in panels of not more than 250 square inches each, mounted in substantial incombustible frames, shall be used.

**Order 431. Enclosures for Freight Elevator Cars.**

(c) Where any entrance opening in an elevator shaftway is not equipped with an interlocked or contacted door filling the opening, or where the entrance side of the car is not equipped with an approved car gate, the cover of the car shall be equipped with a hinged section facing each entrance, unless such entrance occurs only at the lowest landing. This hinged section shall be at least 12 inches wide, shall extend the full width of the entrance to within 5 inches of the landing sill, and shall be constructed so it will rise easily if it meets an obstruction as the car descends. (See order 482 (a) for covers on hand power hospital elevators and hand power invalid lifts).

**Note:** On an existing elevator, the wire screen enclosure may remain if the mesh is not greater than 1 inch, measured along the wire from center to center of wires at points where they cross, and is properly braced and fastened. The wire must be of sufficient size to give rigidity.

**Order 433. Gates or Doors for Freight Elevator Cars.**

(b) In every new freight elevator installation, each secondary entrance shall be protected by an approved car gate, or an approved door, not less than 6 feet in height, completely filling the width of opening and equipped with electric contact, except that in the case of belt driven elevators, hydraulic elevators and hand power elevators, such car gate or car door shall be semi-automatic and equipped with an approved locking device.

(c) Every car gate shall run in guides, shall extend to the floor and be at least 6 feet high, and in the case of a vertically sliding gate, shall contain no openings greater than 3 inches measured in a horizontal direction.

(d) Every car gate which weighs more than 35 pounds, or which is more than 8 feet in width, shall be counter-balanced with a secondary rope and weight.

(e) Every car gate hereafter installed shall be semi-automatic or be equipped with an approved device such that the elevator cannot be started unless the car gate is closed.

(f) Every freight elevator car operating in a shaftway outside a building and which is inclosed only at the ground landing, shall be protected on the landing side by a semi-automatic car gate, or by a gate with electric contacts and in either case complying in other respects with order 433.

**Order 434. Non-Slippery Landing Sills.**

The sill and floor at every shaftway landing shall have a non-slippery surface, and shall be constructed of durable material which will retain the non-slip property, except that in connection with freight elevators, solid metal protection not more than 6 inches in width in the plane of the floor may be installed at the edge of each landing sill.

**Order 435. Passenger Elevator Shaftway Landing Doors.**

(a) In every passenger elevator hereafter installed, the shaftway shall be equipped at each landing with a horizontally sliding door, or doors which shall entirely fill the opening to the shaftway. Every such door shall be an approved fire door and shall be solid to a height of not less than 12 inches above the floor level. Upper sections of such doors may be of wired glass, or of solid metal. Every landing door shall be of sufficient strength to resist a lateral pressure of 100 pounds applied at the center.

**Exception:** In cases where the doors in outside walls of elevator shaftway enclosures are not required by the Building Code to be fire-proof, the phrase in the preceding paragraph reading "every such door shall be an approved fire door" does not apply.

(b) Existing wooden doors in an existing shaftway will be accepted, but if such doors contain grill work or screen, the openings shall not be larger than described in order 428 (a). Doors shall not swing on vertical axes except on automatic push button elevators, and except where approved in writing by the Industrial Commission because restricted spaces will not permit the use of sliding doors.

(c) On an existing installation, solid metal or metal screen on substantial door framing will be accepted. The screen shall be the equivalent in strength, rigidity and protection of wire screen described in order 428 (a).

**Exceptions:**

(1) On an existing door where the openings in the grill-work are larger than specified in order 428 (a), a screen may be stretched across the inner face of the door.

(2) On an existing installation where a regular operator is stationed on the car, existing grill-work will be accepted unless an especially hazardous condition exists.

Notice of repeal: Paragraph (3) of the exceptions under (c), and all of paragraph (d) have been repealed.

**Order 436. Passenger Elevator Shaftway Landing Door Interlocks.**

(a) Interlocks, either mechanical or electro-mechanical, shall be provided on the shaftway landing doors of every passenger elevator installation.

(c) On every passenger elevator installation, provision shall be made for opening one landing door from the landing side at the bottom landing.

**Order 437. Push Button Elevators; Electric Contacts.**

(a) Electric contact shall be provided on every required car gate and every required car door of every push button controlled elevator.

(b) Shaftway landing doors and gates on all push button freight elevators shall be equipped with electric contacts.

**Order 438. Freight Elevator Shaftway Landing Doors and Gates.**

(a) All openings in the shaftway enclosure of every freight elevator shall be protected at landings in one of the following ways:

(1) Doors which comply with the requirements of order 435 may be used where an operator is stationed on the car. Such doors shall be equipped with self-locking devices which cannot be opened from the outside, except the door at the bottom landing shall be arranged to be opened from the outside by means of a key not easily duplicated, which key shall be placed in the care of a responsible per-

son. In new installations, such doors shall be equipped with shaftway door interlocks, either mechanical or electro-mechanical. Doors which comply with the above requirements may swing on vertical axes.

(2) Vertically sliding gates. Where the car speed does not exceed 50 feet per minute in new installations, or 75 feet per minute in existing installations, the gates at the terminal landings shall be semi-automatic, or full automatic, or equipped with gate electric contacts and gate locks. At intermediate landings, the gates shall be either semi-automatic or equipped with gate electric contacts and gate locks. If approved in writing by the Industrial Commission, full automatic gates may be installed at intermediate landings of elevators where the car speed does not exceed 50 feet per minute.

Where the car speed exceeds 50 feet per minute in new installations, or 75 feet per minute in existing installations, vertically sliding gates, whether at terminal or intermediate landings, shall be either semi-automatic or equipped with gate electric contacts and gate locks.

(3) Balanced gates or doors. In new installations, counter-balanced or counter-weighted gates, or counter-balanced or counter-weighted doors, will be permitted if they are equipped with electric contacts, with approved gate or door locks, in connection with an electric brake. In existing installations, counter-balanced gates, or counter-balanced doors, may be installed where a regular operator is stationed on the car and the gates, or doors, are equipped with self-acting locks which cannot be opened from the outside.

**Note:** By counter-balanced doors, or gates is meant doors, or gates, which balance one another.

By counter-weighted doors, or gates, is meant doors, or gates, which are balanced separately by weights.

**General Exception:** In every existing installation where there is a vertically-rising hatch cover at the top floor, if there is not less than three feet of headroom above the cover when the car is at such floor, and the cover is so located or guarded that it cannot be used as a passageway, then a landing gate is not required at such top floor landing.

(b) In new installations where fire doors are used as gates at freight elevator shaftway landings, the doors shall be equipped with either mechanical or electro-mechanical interlocks.

(d) Except in the case of push button elevators, gates over 8 feet wide may be full automatic provided the car speed is not over 50 feet per minute and an operator is stationed on the car, or where there is provided means of stopping the elevator without reaching over, through, or under the gates.

**Order 439. Freight Elevator Shaftway Landing Gates; Construction.**

(b) In new installations, the main horizontal cross members of every landing gate, to which members the vertical slats or bars are fastened, shall extend into the guides or against uprights at the gate posts, so that pressure exerted on the gate from the landing side will not cause the gate to move into the shaftway in case the slat or bar fastenings become loose or disarranged.

(d) Every gate shall move in guides which shall be so constructed, in new installations, that the gate upright or shoe on the gate will have a lap of at least 1 inch on the guide strip or in the guide post furrow.

(f) Where a gate upright or shoe on the gate is continuous, the runway furrow in the guide post of any new installation shall be at least 1/4 inch wider than the gate upright or shoe.

(g) Every gate in any new installation shall be properly balanced, adequately counter-balanced, and hung with substantial cord or flexible cable over pulleys not less than 3 inches in diameter.

**Order 440. Power Freight Elevator Shaftway Landing Doors and Gates; Locking Devices. New Installations.**

In new installations of power freight elevators, every landing door and gate, except full automatic doors and gates, shall be equipped with an approved door lock or gate lock.

**Order 441. Factors of Safety for Cables. New and Existing Installations.**

(a) The factors of safety for hoisting and counter-weight cables, based on the cable manufacturer's schedule, shall not be less than is given in the following table:

FACTORS OF SAFETY FOR HOISTING CABLES

Car speed in feet per min.	Passenger Elevators	Factors of Safety Freight Elevators	Dumb-waiters
50 or less .....	7.0	6.7	5.2
100 .....	7.8	7.0	5.7
200 .....	8.5	7.6	6.3
300 .....	9.1	8.2	6.9
400 .....	9.7	8.7	7.5
500 .....	10.2	9.1	8.0
600 .....	10.6	9.5	.....
700 .....	11.0	9.8	.....
800 .....	11.25	10.0	.....
900 .....	11.4	10.2	.....

**Order 446. Cable Fastenings at Terminals.**

(b) Where an adjustable draw bar or equalizer is used in any new installation, the details of construction of such draw bar or equalizer for each condition of installation and type of apparatus shall be submitted to the Industrial Commission for approval and only approved construction shall be used.

**Order 447. Governor Cables.**

(a) A wire governor cable shall be used on every new elevator installation where a governor is required, except that in new installations where the governor cable is exposed to excessive moisture or other corrosive elements, hemp rope with wire center shall be used.

**Exception:** An approved fibre governor rope may be used on a freight elevator traveling not more than 50 feet with a car speed not to exceed 75 feet per minute and designed for a capacity of not more than 3,500 pounds, provided that the rope is required to run over only two sheaves, namely, the governor sheave at the top of the shaftway and the tension weight sheave at the bottom of the shaftway, and provided further that the setting of the dogs of the car safety device does not depend upon the traction of the rope in the governor sheave and a consequent continuous pull on the rope.

**Order 451. Bolting of Counterweights.**

(b) In every counter-weight stack hereafter installed over 8 feet high, there shall be a middle guide unless all weights are contained in a steel frame.

**Order 456. Sizes and Construction of Guide Rails. New Installations.**

(b) The size of wood guide rails shall be not less than as follows:



Total Weight of Car and Load per Pair Maple Guide Rails		
Above Pounds	To and Including Pounds	Dimensions of Each Guide Rail in Inches
5,000	5,000	2 x 2¼
	8,000	2½ x 3

**Order 459. Machinery—General Requirements.**

(d) Elevator gear housings in new installations shall have a sufficient number and correct size of openings so located as to permit proper inspection of the gears, and gear spider fastenings.

**Order 463. Limit Stops.**

(a) Every new elevator which is provided with an electric brake shall be equipped with limit switches that will automatically interrupt the power circuit and stop the car at each terminal landing. If the motor of such an elevator is operated by alternating current, the limit switches shall be so connected as to automatically stop the elevator in case of phase reversal.

(b) Every new elevator controlled by a car switch, and every new freight elevator controlled by hold down push buttons, shall be equipped with two limit switches at each terminal of travel; one of these switches shall be a direction cut-off or equivalent device, and the other a final cut-out switch.

**Order 464. Car Safety Devices and Speed Governors.**

(i) Every type of car safety device, and every combination of car safety device and speed governor, shall be subjected to an actual drop test made at the risk and expense of the elevator manufacturer and under the direction of the Industrial Commission. The drop tests of car safety devices shall be made on the type of guides (wood or steel) that will be used in practice. Complete plans and specifications for every car safety device and speed governor shall be submitted to the commission for approval. The test load shall be equal to two-thirds of the capacity plus the maximum weight of the car in use. The car safety device shall stop and hold the elevator car within a drop of 10 feet from the point of release. No car safety device or speed gov-

ernor shall be used which has not been so tested and approved.

*Note:* Tests of car safety devices and other safety appliances by the United States Bureau of Standards will be recognized by the Industrial Commission.

**Order 466. Guards for Sheaves and Idlers. New and Existing Installations.**

In every hand cable controlled elevator, the sheaves which lead the hand cable from the shaftway to the machine shall be guarded to prevent injury to an operator and so that the cable cannot run off. Every sheave or idler under which is led any hoisting or counterweight cable shall be provided with a guide that will keep the cable on the sheave or idler if the cable becomes slack. Every idler sheave under which is led an operating cable or a governor cable shall be provided with a guide that will keep the cable on the sheave.

**Order 469. Brakes.**

(a) Every direct connected electric elevator hereafter installed, except sidewalk elevators, shall be equipped with an electrically released brake so designed, installed and maintained that it will not be released until the power has been applied to the motor. Under normal operating conditions, the action of the brake magnet shall not be retarded by any motor field discharge or counter voltage, nor by any single ground or short circuit.

(b) Every power elevator, except direct connected electric elevators, shall be equipped with a brake so designed, installed and maintained that it will be released whenever the control mechanism is shifted to the starting position, and so that the brake will be applied whenever the control device is moved to the stopping position.

**Order 470. Control Mechanism.**

(d) In new installations of mechanically controlled elevators, the operation of directional switches or operating valves shall, in no case, depend solely upon a belt or a chain.

(g) The car of every power freight elevator with hand-rope control shall be equipped with a cable lock so designed,

installed and maintained that the handrope can be locked at any landing to prevent the operation of the car by persons on other floors.

**Exception:** The requirements contained in the preceding paragraph need not apply to sidewalk elevators, elevators equipped with safety switches and elevators equipped with interlocks or electric contacts.

(h) The car of every electrically driven elevator equipped with an electric brake shall be provided with a switch (safety or so-called baby switch) to cut off the source of power.

**Exception:** This requirement need not apply to existing elevators controlled by hand cables.

#### Order 471. Push Button Controlled Elevators. New and Existing Installations.

(3) In an automatic push button elevator, the stop button on the car may be used as the safety switch if it is a button marked "STOP".

#### Order 472. Electrical Protection.

(a) Every new elevator driven by a polyphase alternating current motor shall be protected against damage due to phase reversal by either:

(1) Limit switches as specified in order 463 arranged to cut all wires, or all except one, which shall be the ground conductor on grounded systems, and so connected that after the car overtravels it cannot be moved until the phase reversal is corrected, or

(2) A reverse phase relay, or other protective device, which will prevent starting the motor if the phase rotation is in the wrong direction.

**Note:** While protection of existing elevators against phase failure is not required, this hazard should be recognized and removed so far as possible. Even though this requirement is not contained in the code, if there is an outstanding hazard, court ruling is that an owner is responsible for allowing an unsafe condition to exist, the same as though specific orders were in effect.

#### Order 473. Switches and Wiring.

(b) The floor underneath every unit of unenclosed electrical apparatus shall be covered with a fire resistive and heat insulating material.

(e) The wires to the emergency release, if such a switch is installed, shall be run as a separate cable so

grouped with relation to other wires or cables, if there are any, that the fault in these wires or cables will not prevent the emergency release or stop button from opening the circuit.

(k) Wires between the main circuit resistances and the backs of control panels shall have individual flameproof outer coverings. Other wiring on the control panels may be of the rubber covered type, provided the wires are laid flat against the panels and held in such a manner as to be immovable and not exposed to mechanical damage, nor to a temperature exceeding 120 degrees Fahrenheit.

(n) Limit switches shall be securely fastened to the steel guides by means of substantial iron clamps or brackets. Where the switches are mounted on shaftway walls, they shall be fastened by means of through bolts, or equivalent. The use of lag bolts, screws or nails for this purpose is prohibited.

Where shaftway walls are less than 8 inches in thickness, the walls shall be reinforced to secure the required strength.

#### Order 474. Grounding.

Exposed noncurrent carrying metal parts of electrically driven elevators operating at more than 100 volts to ground, including frames, conduit, handropes, etc., shall be permanently and effectively grounded in accordance with Section 103 of the Wisconsin State Electrical Code.

#### Order 475. Signal Systems. New and Existing Installations.

(a) Every elevator and every power dumbwaiter shall be equipped with a signal system or warning bell, so arranged that it can be safely and conveniently operated from any landing, except elevators and dumbwaiters controlled by push buttons, and except hand power elevators traveling not more than 25 feet.

(b) Every automatic push button elevator shall be provided with an emergency call bell at some point within hearing range of a caretaker, with properly placarded push button in the car.

**Order 478. Maintenance. New and Existing Installations.**

(a) Elevators, dumbwaiters and escalator equipment shall be kept in safe operating condition, properly lubricated and clean.

(b) Hatch covers of the vertically rising type used on elevators shall not be used for storage purposes, nor as passageways.

**Order 479. Dumbwaiters. New and Existing Installations.**

(b) Every dumbwaiter shaftway opening at the floor level shall be protected by a door or gate in compliance with orders 438 and 439. Every other dumbwaiter shaftway shall be enclosed on the loading side to a height of at least 30 inches above each floor.

**Order 480. Sidewalk Elevators.**

(e) A power sidewalk elevator which travels only one story, or not more than 30 feet, is subject to the following orders only: 400, 401, 402, 404, 405, 406, 407, 408, 412 (a), 418 (a), 427 (a) and (g), 438 and 439 as applied to lower terminal freight elevator landings, 441 (a) and (b), 442, 443, 453, 466, 468 where the travel is more than 15 feet, 469 (b), 473 (c), (d), (g), (j) and (m), 474, 476 (b), 478 (a), and 480. Hydraulic sidewalk elevators shall also be subject to such paragraphs of orders 485, 486, 487 and 488 as may reasonably be applicable to sidewalk elevators.

(g) Every hand power chain hoist sidewalk elevator shall comply with orders 412 (a), 438 and 439 as applied to lower terminal freight elevator landings, order 478 (a) and with 480 (a) and (b).

(h) Every sidewalk elevator car or platform hereafter installed shall be enclosed to a height of not less than 1 foot on the sides not used for entrance.

**Order 481. Freight Elevators of the Sidewalk Type.**

(b) Every elevator of the sidewalk type located within a building and traveling more than one story, or more than

30 feet, shall comply with all of the orders which apply to freight elevators.

(d) In new installations, the shaftway overhead clearance at the upper landing shall be not less than that required to insure safe operation of the elevator, but in no case less than 7 feet.

**Order 485. Construction and General Requirements. New Installations.**

(Only the caption is changed)

**Order 486. Safety Equipment. New Installations.**

(f) Every hydraulic elevator hereafter installed shall be provided with an independent automatic means of gradually stopping the car at the terminal landings.

**Order 487. Plunger Type Elevators. New Installations.**

(Only the caption is changed)

**Order 488. Maintenance. New and Existing Installations.**

(Only the caption is changed)

**Order 489. Recabling Hydraulic Elevators. New and Existing Installations.**

(Only the caption is changed)