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GOVERNMENT DOCUMENTS

PROTECTION OF PERSONS EMPLOYED IN
CONSTRUCTION AND DEMOLITION WORK

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of Codes, Rules and Regulations
of the State of New York
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As Amended
Effective August 1, 1963

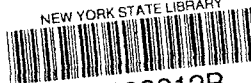


State of New York

Department of Labor

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<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
23.37	Stepladders	41
(a)	Length	41
(b)	Bracing	41
(c)	Bases	41
23.38	Structural runways, ramps and platforms	41
(a)	Application	41
(b)	Runways and ramps	41
(c)	Platforms	42
23.39	Catch platforms and sidewalk sheds	42
(a)	Use	42
(b)	Platform construction	42
(c)	Platform enclosures	42
(d)	Sidewalk sheds	42
23.40	Chutes	43
(a)	Enclosure	43
(b)	Construction	43
(c)	Protection at openings	43
(d)	Danger signs	43
23.41	Combustion devices used for temporary heating	43
(a)	Room ventilation	43
(b)	Setting	43
(c)	Location	43
(d)	Tarpaulins	43
(e)	Bottled gas	43
23.42	Material handling and hoisting machinery: general requirements	44
(a)	Maintenance and operation	44
(b)	Loading	44
(c)	Operators and signalmen	44
(d)	Signals for hoisting engine operation	44
(e)	Protection of operator	45
(f)	Protection of moving parts	45
(g)	Refueling	45
(h)	Engine exhaust	45
(i)	Machinery at rest	45
(j)	Tag line	45
(k)	Riding	45
(l)	Hoist brakes	45
(m)	Electrically driven machines	45
(n)	Repairs and lubrication	45
(o)	Anchorage for hoisting machines	45
(p)	Hoppers and chutes	45
23.43	Rigging, rope, chains for material hoisting	46
(a)	Hoisting rope—material	46
(b)	Fibre rope	46
(c)	Wire rope	46
(d)	Sheaves	46
(e)	Fittings	46
(f)	Use of chains	47
(g)	Heat treating of chains	47
23.44	Material platform or bucket hoists	47
(a)	Construction of hoist towers	47
(b)	Enclosure of hoists	47
(c)	Entrances to hoistways	48

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(d)	Hoist cars	48
(e)	Guide rails	48
(f)	Operation of hoist	48
(g)	Thoroughfare	48
(h)	Protection of hoist operators	49
(i)	Loading and roping of platform hoists	49
(j)	Warning device	49
(k)	Riding	49
23.45	Workmen's elevators	49
(a)	Elevators under Industrial Code Part (Rule No.) 8	49
(b)	Approval required	49
(c)	Maintenance and use	49
(d)	Hoistway enclosure	49
(e)	Hoistway doors	50
(f)	Car construction	50
(g)	Car door or gate	50
(h)	Wiring	50
(i)	Lighting	50
(j)	Thoroughfare	50
(k)	Enclosure of hoisting equipment	50
(l)	Car attendant	51
(m)	Initial inspection and lubrication	51
(n)	Tests	51
23.46	Cranes and derricks	51
(a)	Strength	51
(b)	Inspection	51
(c)	Footing	52
(d)	Hoisting mechanism brakes and locking devices	52
(e)	Attachment of loads	52
(f)	Limitations on modifications of cranes and derricks	52
(g)	Cranes—outriggers and counterweights	52
(h)	Cranes—construction	52
(1)	Booms	52
(2)	Boom extensions	53
(3)	Braking mechanism	53
(4)	Cast iron	53
(i)	Cranes—capacity chart	53
(j)	Cranes—boom angle indicator	53
(k)	Cranes—general operation	53
(l)	Cranes—operation with demolition ball	54
(m)	Cranes—operation near power lines	54
(n)	Cranes—operators	54
(1)	Finding of fact	54
(2)	Limited application of this subdivision	55
(3)	Certificate of competence required	55
(4)	Application forms, and photographs	56
(5)	Physical condition	56
(6)	Experience required	56
(7)	Examining board	56
(8)	General examination	56
(9)	Operating examination	56
(10)	Contents of certificate	57
(11)	Term of certificate	57
(12)	Carrying certificate	57
(13)	Renewals	57
(14)	Suspension, revocation, refusal to renew, denial of certificates: hearings	57
(o)	Derricks—bracing of foot blocks	57
(p)	Derricks—guys	57

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(1)	Number and spacing	57
(2)	Attachment	58
(3)	Anchoring	58
(q)	Derricks—breast type	58
(r)	Derricks—construction	58
(1)	Materials	58
(2)	Mast fittings	58
(3)	Cast iron	58
(s)	Derricks—capacity chart	58
(t)	Derricks—load limitation	58
23.47	Conveyors and cableways	58
(a)	Walkways	58
(b)	Trippers	58
(c)	Spillage	58
(d)	Overhead protection	58
(e)	Signal system required	58
(f)	Riding prohibited	59
23.48	Excavating and grading machines	59
(a)	Footing	59
(b)	Protection of operator	59
(c)	Operation	59
(d)	Power shovel operation near power lines	59
(e)	Trenching	59
(f)	Stopping or parking machines	60
23.49	Auto trucks	60
(a)	Brake maintenance	60
(b)	Blocks	60
(c)	Loading	60
(d)	Backing	60
(e)	Riding	60
(f)	Dumping	60
(g)	Cab protector	60
23.50	Hand-propelled vehicles	60
(a)	Maintenance	60
(b)	Wheels and handles	60
(c)	Buggy counterbalance	60
(d)	Curbing	60
(e)	Storage	60
23.51	Lift and fork trucks	60
(a)	Capacity	60
(b)	Loading	61
(c)	Brakes and load-elevating mechanisms	61
(d)	Hand-lift handles	61
(e)	Operating surfaces	61
(f)	Packaged masonry units	61
(g)	Loose masonry units	61
(h)	Support of pallets	61
(i)	Protection of operator	61
(j)	Prohibited use	61
23.52	Power buggies	61
(a)	Definition	61
(b)	Assigned operator	61
(c)	Defective machines	61

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(d)	Mechanical requirements	61
(1)	Stability	61
(2)	Braking power	62
(3)	Accidental starting	62
(4)	Warning devices	62
(5)	Seats and visibility	62
(6)	Speed	62
(e)	Operation	62
(1)	Parking on grades	62
(2)	Prohibited operation	62
(f)	Special requirements for runways, etc.	62
23.53	Pile drivers	63
(a)	Footings	63
(b)	Inspection	63
(c)	Protection of operator	63
(d)	Qualifications of operator	63
(e)	Handling of piles	63
(f)	When not in use	63
(g)	Temporary interruption	64
(h)	Steam and air lines	64
(i)	Driving plates, cushions, striking heads ..	64
(j)	Ladders	64
(k)	Working platforms	64
23.54	Mixing machines	64
(a)	Charging skips	64
(b)	Hoppers	64
(c)	Bucket hoists	64
(d)	Flywheels	64
(e)	Trough type mixers	64
23.55	Jacks	64
(a)	Capacity marking	64
(b)	Overtravel	64
(c)	Lubrication	65
(d)	Loads	65
(e)	Supervision	65
23.56	Electrical and pneumatic hand tools	65
(a)	Power shut-off requirements	65
(b)	Electrical and hose lines	65
(c)	Grounding electrical tools	65
23.57	Welding and flame cutting	65
(a)	Compressed gas cylinders	65
(b)	Hose and hose connections	65
(c)	Torches	66
(d)	Protection for workmen	66
(e)	Fire prevention	66
(f)	Tanks or containers—explosion hazard	66
23.58	Lead fumes and dust—structural steel	66
(a)	Hot riveting or welding	66
(b)	Cleaning coated surfaces	67
(c)	Flame cleaning or flame cutting operations ..	67
23.59	Painting	67
(a)	Definition	67
(b)	General	67
(c)	Spraying	67

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(d)	Brush work	67
(e)	Coating removal	67
(f)	Machine sanding	68
23.60	Exhaust gases of internal combustion engines	68
(a)	Prohibited employment	68
(b)	Presumptions	68
(c)	Maintenance of engines	68
(d)	Enclosed spaces	68
(e)	Exhaust piping	68
(f)	Special trucks	68
23.61	Explosives	68
(a)	Storage	68
(b)	Access to explosives	68
(c)	Handling—personnel	69
(d)	The blaster	69
(e)	Smoking and open lights	69
(f)	Marking	69
(g)	Prohibited explosives	69
(h)	Destroying explosives	69
(i)	Magazines—for explosives other than detonators	69
(j)	Magazines for detonators	69
(k)	Opening packages	69
(l)	Deepening holes	69
(m)	Size of holes	69
(n)	Removing cartridge wrappers	69
(o)	Loading—other operations	69
(p)	Loading and tamping	69
(q)	Firing	69
(r)	Connecting up detonators	70
(s)	Blasting circuit—type	70
(t)	Making connections	70
(u)	Testing circuits	70
(v)	Firing switch	70
(w)	Blasting circuit—plugs	70
(x)	Use of blasting machines	70
(y)	Warning and retreat	70
(z)	Return to the blast area	70
(aa)	Misfires	70
(bb)	Reloading holes	71
(cc)	Blasting mat	71
(dd)	Operations during electrical storms	71
(ee)	Prohibited use of two-way communication	71
23.62	Imminent danger—notice, warning and avoidance	71
23.63	Severability	71

A Rule of the Board of Standards and Appeals
relating to

PROTECTION OF PERSONS EMPLOYED IN
CONSTRUCTION AND DEMOLITION WORK

(Statutory Authority: Labor Law §§ 27-a, 28, 29, 200, 241, 241-a and 242)

Title 12 of the New York State Official Compilation of Codes, Rules and
Regulations, Chapter 1, Subchapter A, Part 23
(12 NYCRR 23)

Section 23.0 Finding of fact. The board finds that the trades and occupations of persons employed in construction and demolition work involve such elements of danger to the lives, health and safety of such persons as to require special regulations for their protection in that such persons are exposed to the hazards of falling and of falling objects and materials, the hazards associated with the operation of vehicles and of construction machinery, the hazards of fire, explosion and electricity, the hazards of injury from the use of and contact with dangerous tools, machines and materials, the hazards incidental to the handling and movement of heavy materials and the hazards of exposure to the elements and air contaminants.

23.1 Application. This Part (rule) of the Industrial Code for the protection of persons employed in construction work and demolition work applies to such persons and to their employers and to the owners, contractors, subcontractors and other persons obligated by law to provide such persons with safe working conditions or a safe place to work. This Part (rule) applies throughout the State of New York except as its application may be limited by law.

23.2 Definitions. As used herein or in connection with this Part (rule), the following terms mean:

- (a) *Approved.* In respect to a device or material: in compliance with a subsisting resolution of approval adopted by the board. In respect to action by the board: made the subject of a resolution of approval.
- (b) *Adequate.* See subdivision (d) of section 23.3 on "General requirement of quality".
- (c) *Bearer.* The horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.
- (d) *Board.* The Board of Standards and Appeals of the State of New York.
- (e) *Boatswain's chair.* A seat supported by slings attached to a suspension rope and designed to accommodate one workman in a sitting position.

(23.2)

(f) *Bricklayer's square scaffold*. A scaffold the platform of which is composed of planks supported on built-up squares secured to each other by diagonal bracing.

(g) *Commissioner*. The Industrial Commissioner of the State of New York.

(h) *Construction work*. All work of the types performed in the construction, erection, alteration, repair, maintenance, painting or moving of buildings and structures other than buildings, whether or not such work is performed in proximate relation to a specific building or structure and includes, by way of illustration but not by way of limitation, the work of land clearing, earth moving, grading, excavating, trenching, pipe and conduit laying, road and street building, concreting, equipment installation and the structural installation of wood, steel, glass, masonry and other building materials in any form or for any purpose.

(i) *Demolition work*. The work incidental to or associated with the total or partial dismantling or razing of a building or a structure other than a building including the removing or dismantling of machinery or other equipment.

(j) *Designated person*. A person selected and directed by an employer to perform a specific task or duty.

(k) *Effective*. See subdivision (d) of section 23.3 on "General requirement of quality".

(l) *Equal*. See subdivision (d) of section 23.3 on "General requirement of quality".

(m) *Equivalent*. See subdivision (d) of section 23.3 on "General requirement of quality".

(n) *Excavating machine*. A power-driven vehicle equipped to excavate, push, grade or elevate earth, rock or other material.

(o) *Excavation*. The removal of earth, rock or other material in connection with construction or demolition work.

(p) *Extension ladder*. A ladder of two or more sections traveling in guides or brackets which is so arranged that it may be adjusted to variable lengths.

(q) *Extension trestle ladder*. A self-supporting ladder consisting of a trestle ladder with an additional single ladder section having parallel sides, which is fastened to the top of the trestle ladder but which can be adjusted to various heights.

(r) *Firm*. See subdivision (d) of section 23.3 on "General requirement of quality".

(s) *Guard rail*. A horizontal rail secured to uprights and erected along the exposed sides of scaffolds, floor openings, runways, etc., to prevent persons from falling.

(t) *Heavy duty scaffold*. A scaffold designed and constructed to carry a maximum working load of 75 pounds per square foot, such as one in-

(23.2)

tended for stone masons and required to support heavy materials in addition to the workmen.

(u) *Independent pole scaffold*. A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

(v) *Job*. The site of a project involving construction or demolition work.

(w) *Ladder jack scaffold*. A scaffold the platform of which is supported by brackets or jacks attached to the side rails of ladders.

(x) *Ledger*. The horizontal scaffold member which extends from post to post and which supports the putlogs or bearers and forms a tie between the posts.

(y) *Life net*. A life net made and used in compliance with the provisions of this Part (rule).

(z) *Light duty scaffold*. A scaffold designed and constructed to carry a working load up to 25 pounds per square foot, such as one intended for carpenters or painters and required to support no load other than a small weight of material in addition to the workmen.

(aa) *Material platform hoist*. A power or manually operated suspended platform operating in guide rails and used for raising or lowering material exclusively and operated and controlled from a point outside the conveyance.

(bb) *Medium duty scaffold*. A scaffold designed and constructed to carry a working load up to 50 pounds per square foot, such as one intended for bricklayers or plasterers and required to support no load other than a moderate weight of material in addition to the workmen.

(cc) *Multiple-point suspension scaffold*. A scaffold having a continuous platform supported by three or more beams or bearers each of which is so suspended from an overhead support as to permit the raising or lowering of the platform to a desired position.

(dd) *Necessary*. See subdivision (d) of section 23.3 on "General requirement of quality".

(ee) *Needle beam scaffold*. A scaffold consisting of a plank platform supported by parallel horizontal beams which are suspended by ropes.

(ff) *Outrigger scaffold*. A scaffold the platform of which is built upon outriggers or thrust-outs projecting from the wall of the building and having their inner ends secured inside the building.

(gg) *Putlog*. The member of a single-pole scaffold which is supported by a ledger on one end and on the other end by a wall which supports the platform.

(hh) *Roofing bracket*. A bracket used in sloped roof construction and having sharp points or other means for fastening to prevent slipping.

(23.2)

(ii) *Safe*. See subdivision (d) of section 23.3 on "General requirement of quality".

(jj) *Safety belt*. A safety belt provided and used in accordance with the provisions of this Part (rule).

(kk) *Safety railing*. A railing constructed and maintained in compliance with the provisions of this Part (rule).

(ll) *Scaffold*. A temporary elevated working platform.

(mm) *Sectional ladder*. A ladder consisting of two or more sections and so constructed that the sections can be combined end to end to function as a single ladder.

(nn) *Secure*. See subdivision (d) of section 23.3 on "General requirement of quality".

(oo) *Shall*. The word "shall" is always mandatory.

(pp) *Single ladder*. A ladder of but one section.

(qq) *Single pole scaffold*. A platform resting on putlogs or crossbeams, the outer ends of which are supported on ledgers secured to a single row of posts or uprights, and the inner ends of which are supported on a wall or holes in a wall.

(rr) *Step ladder*. A self-supporting ladder with flat steps secured to the side rails and having a hinged backsection to provide support.

(ss) *Substantial*. See subdivision (d) of section 23.3 on "General requirement of quality".

(tt) *Sufficient*. See subdivision (d) of section 23.3 on "General requirement of quality".

(uu) *Suitable*. See subdivision (d) of section 23.3 on "General requirement of quality".

(vv) *Trestle ladder*. A self-supporting ladder consisting of two single ladder sections and hinged together at the top which when spread form equal angles with the base.

(ww) *Two-point suspension scaffold*. A scaffold of the type commonly known as a painter's scaffold, having a platform which is supported by stirrups or hangers at two points, and which is so suspended from overhead supports as to permit the raising or lowering of the platform to a desired position.

(xx) *Window jack*. A platform for one man which is supported by a bracket or jack which projects through a window opening.

(yy) *Workmen's elevator*. A power-operated car operating in guides and used primarily to carry workmen in a substantially vertical direction.

23.3 General provisions. (a) *Application*. These general provisions shall not be construed or applied in contravention of any specific provision of this Part (rule).

(b) *General duty to protect health and safety of persons employed in construction and demolition work.* All places where employees are suffered or permitted to perform work of any kind in construction or demolition work shall be so constructed, equipped, arranged, operated and conducted as to provide reasonable and adequate protection to the lives, health and safety of such persons. To this end, all employers, owners, contractors, subcontractors and other persons obligated by law to provide safe working conditions or safe places to work to persons employed in construction or demolition work shall provide or cause to be provided the working conditions, safety devices, types of construction and materials, and the means, methods and procedures required by this Part (rule). No employer shall suffer or permit an employee to work under working conditions which are not in compliance with this Part (rule), or to perform any act prohibited by this Part (rule).

(c) *General requirement of competency.* For the performance of work required by this Part (rule) to be done by or under the supervision of a designated person, an employer shall designate as such person only such an employee as a reasonable and prudent man experienced in construction and demolition work would consider competent to perform the work.

(d) *General requirement of quality.* Materials, devices, structures, methods and procedures which are required by this Part (rule) and either are not herein specified or described or which are described by general descriptive terms such as adequate, effective, equal, equivalent, firm, necessary, proper, safe, secure, substantial, sufficient, suitable and the like, shall be of such kind and quality as a reasonable and prudent man experienced in construction and demolition work would require in order to provide safe working conditions for himself in the performance of the work.

(e) *Responsibility of employees.* Every employee shall observe all provisions of this Part (rule) which directly concern or affect his conduct. He shall use the safety devices provided for his personal protection and he shall not tamper with or render ineffective any safety device or safeguard.

(f) *Condition of equipment and safeguards.* (1) No employer shall suffer or permit an employee to use any machinery or equipment which is not in good repair and safe working condition.

(2) All safety devices and safeguards in use shall be kept sound and operable, and shall be immediately repaired or restored if damaged.

(g) *Strength of equipment.* All load-carrying equipment shall be designed and constructed throughout to safely support the intended loads.

(h) *Overhead hazards.* Every place where persons are required to work or to pass that is normally exposed to falling material or objects shall be provided with suitable overhead protection, and where no one is required to work or pass but employees are at work in the vicinity the exposed area shall be roped off or otherwise guarded against inadvertent entry.

(i) *Falling hazards.* Every hole into or through which a person may fall shall be guarded by a barrier sufficient to prevent falls, except where free access is required by work actually in progress.

(23.3)

(j) *Drowning hazards.* Where employees are exposed to hazard of falling into the water in which one may drown there shall be provided at all times during the exposure, equipment for promptly rescuing persons from the water, including a manned and properly equipped boat where necessary.

(k) *Slipping hazards.* No employer shall suffer or permit an employee to use a passageway, or a scaffold, platform or other elevated working surface which is in a slippery condition. Ice, snow, grease and other substances causing slippery footing shall be removed, sanded or covered to provide safe footing.

(l) *Tripping and other hazards.* (1) *Passageways.* All passageways shall be kept free from accumulations of dirt and debris and from other obstructions or defects which could cause tripping. Sharp projections which could cut any employee shall be removed or covered.

(2) *Working areas.* The parts of floors, platforms and similar areas where employees must work shall be kept free from accumulations of dirt and debris and from scattered tools and materials and from sharp projections insofar as may be consistent with the work being done.

(m) *Vertical passage.* Stairways, ramps or runways shall be provided as the means of access to working levels above or below ground except where the nature or progress of the work prevents their installation in which case ladders or other safe means shall be provided.

(n) *Control of dusts and gases.* Dusts and gases shall be controlled by ventilation or otherwise so as to prevent concentrations tending to injure health or obstruct vision.

(o) *Corrosive substances.* All lime, acid and other corrosive substances shall be so stored and used as not to endanger workmen. Protective equipment for the use of such substances shall be provided.

(p) *Eye protection.* Approved eye protection equipment shall be provided for and shall be used by workmen while employed in welding or cutting operations or in chipping, cutting or grinding any material from which particles may fly, or while engaged in any other operation which may endanger the eyes.

(q) *Respirators.* (1) All respirators shall be approved.

(2) Where these rules require respirators to be provided, the employer shall provide and the employee shall use a respirator approved for the type of operation for which it is to be used. The employer shall maintain such respirator in good repair and shall furnish the means for its continued efficient working condition; and he shall provide daily inspection, cleansing and sterilization of such equipment. Respirators that are used by more than one person during a day shall be sterilized before use by each person. Such equipment, when not in use, shall be stored in closed containers.

(3) (i) The air supply line from an air compressor to an air line respirator shall be provided with a filter which will effectively remove

pipe scale, water, oil mists and noxious vapors and with a pressure reducing valve to prevent the pressure of the air supply from exceeding 25 pounds per square inch. There shall also be a pressure release valve between the reducing valve and the mask set to release at 25 pounds per square inch pressure or less.

(ii) The air supply line from a bottled air source to an air line respirator of the demand type shall be provided with a pressure reducing valve to prevent the pressure of the air supply to the mask from exceeding 125 pounds per square inch and with a pressure release valve between the reducing valve and the mask set to release at less than such pressure.

(4) Air supplied to any type of air line respirator shall be taken from a source containing no harmful contaminants.

(r) *Protective apparel.* (1) *Head protection.* Every employee required to pass or work within areas where there is danger of being struck by falling objects or materials shall be provided with an approved safety hat.

(2) *Boots.* Every employee required to work in water, wet concrete or other wet footing shall be provided with waterproof boots with safety insoles.

(3) *Waterproof clothing.* Every employee required to work in rain or similar wetting conditions shall be provided with a waterproof coat and hat.

(4) *Corrosive substances.* Every employee required to use or handle corrosive substances shall be provided with appropriate protective apparel.

(s) *Cleanliness of personal protective equipment.* (1) All personal protective equipment shall be kept clean and in good repair. Before being transferred from one employee to another, safety hats, foul weather hats, boots and hat or boot liners shall be washed or dry cleaned so as to be clean and sanitary.

(2) Goggles, glasses and welders' shields shall be sterilized before being transferred from one employee to another.

(t) *Power-driven machines—general.* Power-driven machines not herein specifically considered shall be guarded in accordance with the requirements of Part (Rule No.) 19 of the Industrial Code covering the "Guarding of Dangerous Machinery, Vats, Pans and Elevated Runways".*

(u) *Keys, set-screws and similar projections.* All keys, set-screws, bolts or similar projections on shafts, pulleys, gears, collars, or couplings and other revolving members, where such projections are not countersunk or protected by location from accidental contact by workmen, shall be protected by smooth, cylindrical safety sleeves of wood or metal surrounding the projection, or shall be guarded by a stationary enclosure of sheet metal,

* Title changed January 15, 1952 to "Guarding of Dangerous Machinery, Vats and Pans."

(23.3)

wire mesh, expanded metal or other suitable material. Any openings therein shall not exceed one-half inch in greatest dimension.

(v) *Power driven saws.* (1) All portable power-driven hand operated saws which are not mounted with saw tables except chain saws and circular brush saws, shall be equipped with guards above the base plate which will completely protect the operator from contact with the saw blade when in motion and with self-adjusting guards below the base plate which will completely cover the saw to the depth of the teeth when the saw is removed from the cut.

NOTE: Electrically driven portable saws are also subject to the requirements of section 23.56.

(2) Every power-driven saw which is mounted with a saw table shall be equipped with a guard which shall cover the saw blade to such an extent as will prevent contact with any part of the teeth which are more than two inches above the saw table and which are not protected by the spreader or similar device. In operation, the guard shall automatically rise by pressure from the material or shall be so adjusted that as the saw cuts the material, the distance from the material to the underside of the guard does not exceed one-half inch. The exposed teeth of the saw blade beneath the table shall be effectively guarded.

(3) Every table circular saw used for ripping shall be provided with a spreader securely fastened in position and with an effective device to prevent the kicking back of the material.

(w) *Sprockets, gears and friction-disc drives.* Sprockets, gears and friction-disc drives, which are not protected by location from accidental contact by workmen, shall be completely enclosed or shall be provided with hand guards which shall have side flanges extending below the roots of the teeth.

(x) *Belts, pulleys, flywheels and wire rope.* (1) All belts except conveyor belts and all pulleys and flywheels which are less than seven feet above a floor or other working platform or a runway, and not protected by location from accidental contact by workmen, shall have all moving parts guarded by substantial enclosures or by a safety railing which will prevent workmen from approaching within a horizontal distance of 18 inches. Enclosures required by this Part (rule) may be temporarily removed when starting the machine or for the purpose of adjustment or maintenance, but shall be immediately replaced thereafter.

(2) The nip point between power winches or sheaves and the wire rope shall be similarly guarded.

(y) *Hand tools.* Edged tools shall be kept sharp and striking tools shall be maintained free of burrs and mushroomed heads. Split or loose tool handles shall not be used.

(z) *Safety railing.* A safety railing shall consist of a two inch by four inch wooden hand rail not less than 36 inches nor more than 42 inches above the walking level, securely supported by two inch by four inch posts at intervals of not more than eight feet and shall include a one inch by four

inch midrail and a toeboard at least four inches high. The handrail shall be smooth and free from splinters or protruding nails. Other material or construction may be used provided the assembly assures equivalent safety.

(aa) *Temporary electric wiring.* (1) All wiring shall be supported on proper insulators and not looped over nails or brackets. No bare wires or other unprotected current-carrying parts shall be located within eight feet of any surface where workmen may work or pass, unless completely guarded by a fence or other barrier.

(2) Electrical systems and current carrying equipment shall be properly grounded except as provided for blasting circuits in subdivision (s) of section 23.61. Where it is necessary to lay electric wiring on the ground, the wiring shall be of the weatherproof type and heavy enough to withstand the wear and abuse to which it may be subjected. No conductor shall be used to carry a higher voltage than the manufacturer's rating.

(3) Elevated power lines shall have a sufficient vertical clearance where they cross highways, access roads or areas traveled by trucks, cranes, shovels or other similar equipment.

(4) Fuses and other automatic cutouts shall not exceed a size that will blow at a point lower than the carrying capacity of the protected conductor or equipment.

(5) Where two or more voltages are used on the same job, all electrical equipment and circuits shall be suitably identified.

(bb) *Electrical hazard.* (1) *Investigation and warning.* Before work is begun the employer shall ascertain by inquiry or direct observation, or by instruments, whether any part of an electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool or machine into physical or electrical contact therewith. The employer shall post and maintain proper warning signs where such a circuit exists. He shall advise his employees of the location of such lines, the hazards involved and the protective measures to be taken.

(2) *Protection of employees.* No employer shall suffer or permit an employee to work in such proximity to any part of an electric power circuit that he may contact the same in the course of his work unless the employee is protected against electric shock by de-energizing the circuit and grounding it or by guarding it by effective insulation or other means. In work areas where the exact location of underground electric power lines is unknown, workmen using jack-hammers, bars or other hand tools which may contact a line shall be provided with insulated protective gloves.

(3) *Guarding of switches, etc.* If protection for the employee is supplied by de-energizing the circuit the employer shall cause the open switch or other circuit interruption to be guarded against inadvertent closing until the employee is no longer exposed.

(4) *Notifying utility company.* At least 24 hours before work is begun in proximity to any live overhead power line or any excavation work

(23.3)

is performed which may contact or disturb a live underground power line, the employer shall notify the utility company whose line may be affected.

(5) *Generators.* Portable electric power generators on the job shall be grounded.

(6) *Public Service Commission operations.* None of the provisions of this section shall apply to or in connection with operations conducted under the jurisdiction of the Public Service Commission.

(cc) *Lighting.* Illumination sufficient for safe working conditions shall be provided wherever persons are required to work or pass. For passageways, stairways and landings the illumination shall permit reading of 10-point type.

(dd) *Lumber and nail fastenings.* Lumber used in construction of equipment or temporary structures required by this Part (rule) shall be sound and shall not contain defects such as ring shakes, large or loose knots or other defects which may impair the strength of the piece for the purpose for which it is to be used. Nails shall be driven full length and the nails shall be of proper size, length and number to provide the required strength at the joints.

(ee) *Specified lumber dimensions.* The lumber dimensions herein specified are nominal or trade dimensions except in the case of ladders and except as otherwise stated.

(ff) *Public vehicular traffic.* (1) Whenever any work is being performed over, on or in close proximity to a highway or any other place where public vehicular traffic may cause danger to men at work, the working area shall be so barricaded as to direct traffic away from it or the traffic shall be specially controlled by persons authorized for that purpose.

(2) The person authorized to control traffic shall be provided with a traffic flag or paddle measuring not less than 18 inches in length and width colored fluorescent red or orange and mounted on a suitable hand staff. He shall be stationed not less than 200 feet nor more than 300 feet from the area of the work so as to face approaching traffic. He shall be instructed to stop traffic when necessary by extending the traffic flag or paddle horizontally to face the traffic and to move traffic by lowering the flag or paddle and signaling with his free hand.

(gg) *Stability of structures.* No wall, chimney or other structure or part of a structure shall be left unguarded in such condition that it may fall, collapse or weaken due to wind pressure or vibration.

23.4 Approval of materials and devices. Application may be made to the board for the approval of any device, apparatus, material or equipment which may be used in compliance with the intent of this Part (rule) and approval by the board shall be deemed to authorize such use.

23.5 Maintenance and housekeeping.

(a) *Storage of material and equipment.* (1) All building material shall be stored in a safe and orderly manner and so that material piles are stable under all conditions and so located that they do not obstruct any passageway, walkway or stairway.

(2) Material or equipment shall not be stored upon any floor or platform in such quantity as to exceed its safe carrying capacity nor so close to any edge of a floor or platform as to endanger persons below.

(b) *Disposal of debris.* Debris shall be handled and disposed of by a method which will not endanger persons. Debris shall not be allowed to accumulate on the job so as to constitute a hazard and shall be kept sufficiently moist to lay the dust.

23.6 Sanitation and drinking water. (a) *Toilet facilities.* Toilet facilities shall be provided or made available in a sufficient number to accommodate all employees on the basis of at least one unit for every 30 persons or fraction thereof. Such facilities shall consist of water closets but chemical toilets or privies may be provided instead of water closets where water and sewer connections are not readily available. Toilet facilities shall be maintained in a sanitary condition.

(b) *Accessibility of toilets.* Toilet facilities shall be readily accessible to all employees and in building construction shall be located not more than four stories above or below the place of work.

(c) *Shelter.* All toilet and washing facilities shall be sheltered to provide privacy to the user and protection from the weather and shall be protected from any hazard of falling objects.

(d) *Washing facilities.* Washing facilities including warm water, soap and individual towels shall be provided for all employees who are required to use or handle corrosive substances or substances containing compounds of lead, arsenic, antimony, mercury or cadmium or metal chromates on the basis of at least one wash basin with warm running water for every 10 such employees. Where running water is not available at least one pail of fresh warm water shall be supplied for every four such employees.

(e) *Change houses.* Where employees change their clothes on the job, change houses or other sheltered locations of sufficient size to accommodate the workmen shall be provided for the purpose of changing clothes.

(f) *Drinking water.* There shall be provided in readily accessible locations on every job, a supply of clean, pure and cool drinking water. Such drinking water shall be running water or water in clean and covered receptacles. The use of common drinking cups or dippers is prohibited.

23.7 Demolition. (a) *General method of demolition.* All demolition operations shall be conducted in accordance with subdivisions (b) through (r) of this section inclusive, except that operations performed by the

(23.7)

mechanical method of demolition shall be subject only to subdivisions (b) and (c) in addition to the requirements of subdivision(s).

(b) *Preparations.* Before starting demolition all glass in exterior openings shall be removed. All gas, electric, water, steam and other supply lines shall be shut off and capped. In each case the service company involved shall be notified in advance. Where it is necessary to maintain any power, water, gas or electric lines during demolition, such lines shall be so relocated or protected with substantial coverings as to protect them from injury and to afford safety to the workmen.

(c) *Protection of adjacent structures.* During the demolition of any structure, the employer performing such demolition shall examine the walls of all structures adjacent to the structure which is to be demolished. Such examination shall include a determination of the thickness and method of support of the walls of all such adjacent structures. Where there is reason to believe that an adjacent structure is unsafe or will become unsafe because of demolition operations, no demolition shall be performed at this point until there has been provided sheet-piling, shoring, bracing or other such means as may be necessary to insure the stability of the adjacent structure and to prevent such structure or other property from collapsing.

(d) *Demolition of walls, partitions, etc.* (1) Demolition of walls and partitions shall proceed in a systematic manner and all work above each tier of floor beams shall be completed before the safety of its supports is impaired.

(2) Masonry shall neither be loosened nor permitted to fall in such masses as to endanger the structural stability of any floor or structural support.

(3) No wall, chimney or other structure or part of a structure shall be left unguarded in such condition that it may fall, collapse or weaken due to wind pressure or vibration.

(4) No employer shall suffer or permit any employee to work on top of a wall.

(5) In the demolition by hand of exterior walls, safe footing for the workmen shall be provided in the form of sound flooring or scaffolds.

(6) Walls or partitions which are to be demolished by hand shall not be left standing more than one story high above the uppermost floor on which men are working. Such walls or partitions shall be removed before the aggregate area of openings in such floor exceed 25 per cent of its total area.

(e) *Inspection.* During demolition, continuing inspections shall be made as the work progresses to detect any hazards to workmen resulting from weakened or deteriorated floors or walls or loosened material. No employee shall be suffered or permitted to work where such hazards exist unless they are corrected by shoring, bracing, or other effective means.

(f) *Boarding of wall openings.* Windows and other exterior wall openings in buildings more than 25 feet in height and which are within 20

(23.7)

feet of any floor opening used to remove debris from floors above shall be solidly boarded up during demolition operation.

(g) *Methods of operation.* Debris, bricks and other material shall be removed:

- (1) by means of chutes constructed in compliance with section 23.40;
- (2) by means of buckets or hoists; or
- (3) through openings in the floors of the building in compliance with subdivisions (k), (l) and (m) of this section.

(h) *Access to floors.* There shall be provided at all times safe access to and egress from every building in the course of demolition by means of entrances, hallways, stairways or ladder runs so protected as to safeguard the persons using them from falling material.

(i) *Protection in other areas.* Every floor area within the building that is subject to the hazard of material falling from above shall be boarded up to prevent passage or shall be fenced off by a substantial rail placed not less than 20 feet from the floor opening or shall be provided with overhead protection in the form of tight planking to eliminate such hazard.

(j) *Demolition of structural steel.* All steel construction shall be demolished column length by column length and tier by tier. Every structural member which is being dismembered shall not be under any stress other than its own weight and such member shall be chained or lashed in place to prevent any uncontrolled swinging or dropping. Large structural members shall not be thrown or dropped from the building, but shall be carefully lowered. Where a derrick is used in the demolition of buildings of skeleton steel construction, the floor on which the derrick rests shall be completely planked over. Where other methods are used, the workmen engaged in the dismantling of steel shall be protected by solidly planked flooring or sound floor arches not more than two stories below and directly under that portion of any tier of beams where such men are at work.

(k) *Demolition of floor arches.* Before demolishing any floor arch, debris and other material shall be removed from such arch and other adjacent floor area. Planks not less than two inches by nine inches in cross section, full size undressed, shall be provided for and shall be used by the workmen to stand on while breaking down floor arches between beams. Such planks shall be so located as to provide a safe support for the workmen should the arch between the beams collapse. The open space between planks shall not exceed 16 inches.

(l) *Floor openings—permissible area.* The aggregate area of openings in the floor immediately beneath the floor being demolished shall not exceed 25 per cent of the total area of such floor.

(m) *Floor openings—required protection.* (1) Every opening used for the removal of debris on every floor which is not closed to access, except the top or working floor, shall be provided with an enclosure from floor to ceiling equivalent to that afforded by planking not less

(23.7)

than two inches in thickness, full size undressed. The enclosure shall be solid except for portions openable for loosening blocked debris. Alternatively, the opening shall be so barricaded that no person shall have access to within a horizontal distance of 20 feet from any opening above through which debris is being dropped. Every opening not used for the removal of debris in any floor to which access is permitted shall be protected by a solid enclosure as herein prescribed or by a safety railing and toeboard or shall be solidly planked over.

(2) Openings in the top or working floor more than 16 inches in least dimension shall be protected on all sides, except the side at which debris is deposited, by a safety railing and toeboard, or the sides of the opening shall be roped off at a distance of not less than two feet from the edge of the opening by not less than one-half inch diameter rope securely tied to provide a guard of a height equivalent to that provided by the safety railing. That portion of any floor opening adjacent to and immediately below a point where men are employed in any work on a wall shall be provided with a solid flooring not less than five feet wide measured from the inside face of the wall.

(n) *Storage of material—general.* (1) Material shall not be stored on catch platforms, scaffold platforms, floor or stairways of the building being demolished, except that the floor of a building may be used for the temporary storage of material when such floor is of such strength as to support safely the load to be superimposed.

(2) Storage spaces shall not interfere with access to any stairway or passageway and suitable barricades shall be provided so as to prevent material from sliding or rebounding into any space used by the workmen or the public. All material shall be safely piled in such locations as will not interfere with any operations nor present a hazard to those at, or frequenting, the demolition site.

(o) *Storage of debris in cellar.* When debris is piled in the cellar it shall not be piled above the top of the foundation wall. The person in charge of demolition operations shall provide sheet-piling, shoring, bracing or such other means as may be necessary to insure the stability of the walls and to prevent any wall from collapsing due to the pressure of the accumulated material.

(p) *Safe footing required.* No employer shall suffer or permit an employee working above the first floor level to use accumulated debris or piled material as a footing for the performance of his work. Every employee shall be provided with safe footing in the form of sound planking or flooring.

(q) *Catch platforms.* During the demolition of an exterior masonry wall or a roof from a point more than 75 feet above the adjoining ground level, if persons below are exposed to falling objects, catch platforms in compliance with section 23.39 shall be provided and maintained at a level not more than 20 feet below the working level except in the case of chimney demolition and except where an exterior built-up scaffold provides equivalent protection.

(r) *Barricades.* (1) Along every sidewalk or thoroughfare bordering demolition operations there shall be erected a substantial barricade to prevent unauthorized persons from entering the site of such operations, except that where a sidewalk shed in compliance with section 23.39 is erected, such barricade may be omitted.

(2) Such barricade shall be a fence not less than six feet in height. It shall be built solid for its entire height and length except for such openings provided with solid doors as may be necessary for the proper prosecution of the work.

(3) Where the distance from the face of the building to be demolished to the inside edge of a sidewalk or thoroughfare is more than one half the height of the building and the height of the building is not more than 25 feet, a substantial railing not less than 36 inches high and provided with an intermediate rail, may be constructed at the inside edge of such sidewalk or thoroughfare in lieu of a solid barricade or sidewalk shed.

(s) *Mechanical method of demolition.* The use of a swinging weight, clamshell bucket, power shovel, bulldozer or other mechanical contrivance for the purpose of demolishing walls shall be in accordance with the following requirements:

(1) The building or structure or remaining portion thereof shall be not more than 80 feet in height.

(2) (i) Where a swinging weight is used, a zone of demolition at least one and one-half times the height of the structure or portion thereof being so demolished shall be maintained around the points of impact.

(ii) Where a clamshell bucket is being used, a zone of demolition shall be maintained within 25 feet of the line of travel of the bucket.

(iii) Where other mechanical contrivances are being used to effectuate total or partial collapse, there shall be maintained in the area into which the affected portion may fall a zone of demolition at least one and one-half times the height of the structure or remaining portion thereof.

(3) No person other than workmen essential to the operation of the equipment shall be suffered or permitted to enter a zone of demolition.

(4) Substantial barricades as set forth in subdivision (r) of this section shall be erected wherever there is likelihood of persons other than essential workmen entering the zone of demolition.

(5) The controls of mechanical devices used in such method of demolition shall be located and operated a safe and reasonable distance from the point of demolition.

(6) Where a swinging weight is used the supporting cables shall be of such length or shall be so restrained that it is not possible for the weight to swing against any structure other than the structure being demolished.

(23.8)

23.8 Excavation. (a) *Stability of structures.* Where there is any question of stability of structures adjoining or over areas to be excavated, such structures shall be supported where necessary by underpinning, sheet piling, shoring, bracing or other means to prevent injury to any employee.

(b) *General requirements.* (1) No employee shall be permitted to enter any excavated area unless sheet piling, shoring or other safeguard that may be necessary for his protection is provided.

(2) Where any employee in an excavation is exposed to the hazard of falling or sliding material from any bank or side more than five feet high above his footing, adequate piling and bracing shall be provided against the bank or side to eliminate such hazard. The excavation shall be checked after every rain storm or other hazard-increasing occurrence and the protection against slides and cave-ins increased if necessary.

(3) Temporary sheet piling installed to permit construction of a retaining wall shall not be removed until the wall has developed its full strength.

(4) Shoring adequate to support the overhanging material shall be provided where banks are undercut.

(5) Excavated material and other superimposed loads shall be placed at least 24 inches back from the edge of open excavations and trenches and shall be so piled or retained that no part thereof can fall into the excavation.

(6) Banks shall be stripped of loose rock or other material which may slide, roll, or fall upon persons below.

(7) Open sides of excavations where a person may fall six feet or more shall be guarded by an adequate barricade.

(8) No employee shall be suffered or permitted to work where he may be struck or endangered by an excavating machine or by material dislodged by it or falling from it.

(c) *Piling, shoring and bracing.* (1) Planks used as sheet piling shall be at least two inches thick. The maximum spacing between horizontal stringers or wales shall be such as to keep the planks within their safe bending stress.

(2) Shores and braces shall be of adequate dimensions for stiffness and shall not be placed at an angle of more than 30 degrees with the horizontal. Each end of each stringer piece shall be separately braced.

(3) Earth-supported shores or braces shall bear against a footing of sufficient area and stability to prevent their shifting.

(d) *Access.* In every excavation more than four feet deep there shall be provided ladders, stairways or ramps to furnish safe access to and egress from such excavation. Such ladders, stairways or ramps shall be in compliance with the provisions of this Part (rule) and shall be installed in sufficient number and in such locations as to be readily accessible.

TABLE I

Minimum Sizes of Bracing and Sheet-Piling for Narrow Trenches
Trenches—not more than four feet in width

Depth of trench (feet)	Sheet-Piling		Stringers		Cross Bracing	
	Size (in.)	Hori- zontal spacing	Size (in.)	Verti- cal spacing	Size (in.)	Hori- zontal spacing
(a) Hard and solid soil						
5—10	2x6	6 feet	2x6	6 feet	2x6	6 feet
10—15	2x6	4 feet	2x6	6 feet	2x6	4 feet
More than 15 .	2x6	tight	4x8	4 feet	4x8	6 feet
(b) Soil likely to crack or crumble						
5—10	2x6	3 feet	2x6	5 feet	2x6	5 feet
10—15	2x6	2 feet	2x6	4 feet	2x6	4 feet
More than 15 .	2x6	tight	4x10	4 feet	4x10	6 feet
(c) Soft, sandy filled-in or loose soil						
5—10	2x6	tight	4x6	6 feet	4x6	6 feet
10—15	2x6	tight	4x6	5 feet	4x6	6 feet
More than 15 .	2x6	tight	4x12	4 feet	4x12	6 feet
(d) Where hydrostatic pressure exists						
To 10	2x6	tight	6x8	4 feet	6x8	6 feet
More than 10 .	3x6	tight	6x10	4 feet	6x10	6 feet

Steel sheet-piling and bracing of equivalent strength may be substituted for wood sheet-piling and timber bracing.

TABLE II

Minimum Sizes of Bracing and Sheet-Piling for Wide Trenches
Trenches—not more than eight feet in width

Depth of trench (feet)	Sheet-Piling		Stringers		Cross Bracing	
	Size (in.)	Hori- zontal spacing	Size (in.)	Verti- cal spacing	Size (in.)	Hori- zontal spacing
(a) Hard and solid soil						
5—10	2x6	6 feet	4x6	4 feet	4x6	6 feet
10—20	2x6	tight	6x6	4 feet	6x6	6 feet
More than 20 .	2x6	tight	6x8	4 feet	6x8	6 feet
(b) Soil likely to crack or crumble						
5—10	2x6	3 feet	4x6	4 feet	4x6	6 feet
10—20	2x6	tight	6x6	4 feet	6x6	6 feet
More than 20 .	2x6	tight	6x8	4 feet	6x8	6 feet
(c) Soft, sandy filled-in or loose soil						
5—10	2x6	tight	4x6	4 feet	4x6	6 feet
10—20	2x6	tight	6x6	4 feet	6x6	6 feet
More than 20 .	2x6	tight	6x8	4 feet	6x8	6 feet
(d) Where hydrostatic pressure exists						
To 10	2x6	tight	6x8	4 feet	6x8	6 feet
More than 10 .	3x6	tight	6x10	4 feet	6x10	6 feet

Steel sheet-piling and bracing of equivalent strength may be substituted for wood sheet-piling and timber bracing.

(23.8)

(e) *Trench excavations.* (1) Piling, shoring and bracing used in a trench excavation to protect employees against falling or sliding material shall be at least equivalent in strength to that specified in Tables I and II.

(2) Where trenching more than five feet in depth is done by a mechanical digger the protection required by paragraph (1) above shall follow the boom as closely as possible.

(3) Supports shall be held in place by cross braces cleated and, where necessary, wedged in place, or by screw jacks properly secured in place. Where required by the width of the trench, the lower end of cross braces may bear against footings at the bottom of the trench and shall be secured against kicking out.

(4) Cleats shall be spiked or bolted to join cross braces to stringers so as to prevent their being displaced.

(5) Where the trench depth requires two lengths of sheet piling, one above the other, the lower piling shall be set inside the bottom stringers or wales of the upper piling and shall be driven down and braced as the excavation continues.

23.9 Structural steel assembly.

(a) *Placing of structural members.* (1) During the final placing of structural members, the load shall not be released from the hoisting rope until the members are securely fastened in place. Structural members shall not be forced into place by the hoisting machine while any employee is stationed where he may be injured thereby.

(2) Open web steel joists that are hoisted singly shall be transferred from their place of storage directly to their permanent location and secured against dislodgment. The load shall not be released from the hoisting rope until it is so secured. Bundles of such joists shall be placed to prevent accidental dislodgment. Immediately upon releasing the ties or straps from bundles, the joists shall be distributed to and placed in their permanent positions and secured against accidental dislodgment.

(3) No load shall be placed on open web steel joists until they are permanently located and secured.

(b) *Holing or cutting of structural members.* No load bearing structural member shall be materially weakened by cutting, holing or other means except in accordance with the advice of the designer thereof or a licensed professional engineer.

(c) *Tag lines.* While panels or structural members are being hoisted, tag lines shall be used to prevent uncontrolled movement.

(d) *Erection of lintels.* Where exterior metal lintels are erected on steel or concrete frame buildings after the permanent floors have been installed, a suitable scaffold shall be used unless each worker engaged in the erection of such lintels wears a safety belt.

23.10 Concrete work. (a) *General requirements.* Forms and reshores shall be structurally safe and shall be properly braced or tied together so as to maintain position and shape.

(b) *Inspection.* Designated persons shall continuously inspect the forms including the shores, braces and other supports during the placing of concrete. Reshores shall be similarly inspected. Any unsafe condition shall be remedied immediately.

(c) *Beams, floors and roofs.* (1) Horizontal and diagonal bracing shall be provided in both longitudinal and transverse directions, as may be necessary to provide structural stability. Shores shall be properly seated top and bottom, and shall be secured in place.

(2) Where shores rest upon the ground, mud sills or other bases shall be provided.

(3) Where the sum of the dead, live, and impact loads on the forms may exceed 150 pounds per square foot, the design of the forms including shores and reshores shall be as specified by a licensed professional engineer. His specification shall be in writing, it shall be signed by him and it shall be kept on the job for use by the commissioner. All form work shall be constructed in accordance therewith.

(d) *Stripping.* Stripped forms shall be removed or stock-piled promptly after stripping, in all areas in which persons are required to work or pass. Protruding nails, wire ties and other form accessories not necessary to subsequent work shall be pulled, cut or otherwise made safe.

(e) *Reshoring.* (1) Reshoring shall be provided when necessary to safely support slabs and beams after stripping, or where such members are subjected to superimposed loads due to construction above.

(2) The requirements of paragraphs (1) and (2) of subdivision (c) of this section also apply to reshores.

23.11 Special requirements for building construction.

(a) *Permanent flooring—skeleton steel construction in tiered buildings.* The permanent floors shall be installed as the erection of structural members progresses and there shall be not more than eight stories between the erection floor and the uppermost permanent floor.

(b) *Temporary flooring—skeleton steel construction in tiered buildings.*

(1) (i) The derrick or erection floor shall be solidly planked over its entire surface except for access openings. Planking shall be of proper thickness to carry the working load but shall be not less than two inches thick full size undressed, and shall be laid tight and secured to prevent movement.

(ii) Except as the Labor Law may otherwise provide, there shall also be a tight and substantial floor within two stories or 30 feet, whichever is less, below and directly under the portion of each tier of beams on which bolting, riveting, welding or painting is being done.

(2) Except as the Labor Law may otherwise provide, where erection is being done by means of a crane operating on the ground, a tight and substantial floor shall be maintained within two stories or 30 feet, whichever is less, below and directly under that portion of each tier of beams on which bolting, riveting, welding or painting is being done.

(c) *Flooring—other construction.* (1) In the erection of a building having double wood floor construction the rough flooring shall be completed as the building progresses including the tier below the one on which floor joists are being installed.

(2) For single wood flooring or other flooring systems the floor immediately below the story where the floor joists are being installed shall be kept planked over.

(d) *Protection of workmen in shafts—general.* (1) Persons required to perform work in or at shafts shall be provided with the following protection. To provide protection from falling material, a tight covering of two inch planks or three-quarters inch plywood or equivalent, shall be installed so as to cover the entire cross-sectional area of the shaft at a point not more than two stories above the level where men are working. In addition, to minimize injuries from falls, a tight wooden platform of two inch planks, three-quarters inch plywood or equivalent, or a life net shall be installed not more than one story below the level where men are working.

(2) In buildings where stair halls, stairwells or other similar shafts are to be constructed of masonry, floor slab forms or planking shall be installed as the work progresses, and shall be not more than two stories below the story on which any brickwork or masonry is being erected.

Note: Work in elevator shafts is covered in subdivision (e) below.

(e) *Protection of workmen in elevator shafts.* (1) During the installation or replacement of elevators a tight platform of two inch planks, three-quarters inch plywood or the equivalent, shall be installed one story above the level at which the car or buffer installation or replacement work is being done so as to provide protection against falling material. Such platform shall cover the entire cross-sectional area of the shaft except that spaces not exceeding 12 inches may be left for rail clearance between the edge of the platform and the boundary of the shaft.

(2) A similar platform shall also be installed level with the top landing of each hoistway so as to prevent any person from falling into the hoistway. In addition, when elevators are being replaced, a solid or wire mesh partition shall be provided where necessary to prevent contact with an adjacent elevator or counterweight.

(3) Where men are required to work at intermediate levels, overhead protection not less than 27 inches wide above the area where a man is working shall be provided if there is danger from falling objects, and either a life net shall be installed not more than three stories below the place of work or, in lieu of such net, safety belts shall be provided for and used by the workmen.

(4) During repair work in existing elevator shafts, all shaft doors shall be kept closed except that while a door must be kept open to perform the work, a barricade shall be erected or a person shall be stationed at the open door to prevent unauthorized entrance.

(f) *Catch platform required.* (1) During the construction of exterior masonry walls except those of chimneys, from a floor or scaffold which is more than 35 feet above the adjoining ground level, and where such floor or scaffold is located inside the building or structure, there shall be provided along the exterior face of such wall a catch platform except that in lieu of the fence specified in subdivision (c) of section 23.39 there may be provided a two inch by nine inch plank on edge on all open sides and except that a two inch space may be left between the inner edge of the platform and the face of the building.

(2) Such catch platform shall be maintained not more than 20 feet below the floor or scaffold platform from which the work is being performed.

23.12 General provisions for all scaffolds. (a) *Scope.* The provisions of this section shall not be construed or applied in contravention of the special provisions hereinafter set forth.

(b) *Footings—anchorage.* The footings or anchorage for every scaffold shall be sound, rigid, capable of carrying the maximum load without settling or deformation and shall be secure against movement in any direction. Unstable supports such as barrels, boxes, loose brick or loose stone shall not be used.

(c) *Scaffold structure.* All scaffolding shall be so constructed as to bear four times the maximum weight required to be dependent therefrom or placed thereon when in use (Labor Law, § 240, subd. 3). Such scaffolding shall be provided with all horizontal and diagonal bracing that may be necessary to prevent lateral movement.

(d) *Loading.* (1) Light duty scaffolds shall not be loaded in excess of 25 pounds per square foot.

(2) Medium duty scaffolds shall not be loaded in excess of 50 pounds per square foot.

(3) Heavy duty scaffolds shall not be loaded in excess of 75 pounds per square foot.

(4) No scaffold shall be loaded in excess of the maximum load for which it is intended. No load shall be concentrated so as to cause excessive stress.

(e) *Planking.* (1) Except on needle beam scaffolds, planks shall overhang their end supports not less than six inches nor more than 18 inches or they shall be fastened in place. Planks shall be laid tight and inclined planking shall be fastened in place.

(2) The maximum permissible working load for two inch planking shall be as follows: (heavy duty) 75 pounds per square foot for spans up to and including six feet; (medium duty) 50 pounds per square foot for spans over six feet and up to and including eight feet; (light duty)

23.13 Special provisions for pole scaffolds. (a) *Poles.* The foot end of poles shall rest on firm footing and shall be secured against lateral movement by nailing, cleats or any other effective means. Where wooden poles are spliced the ends shall be square and the upper section shall rest squarely on the lower section. Wood splicing pieces shall be provided on at least two adjacent sides and shall be not less than three feet in length. They shall overlap the abutting ends equally and shall have a combined cross-sectional area not less than 50 per cent of the cross-sectional area of the pole.

(b) *Putlogs.* Every wooden putlog shall be reinforced with a substantial steel strip secured to its lower edge throughout its entire length.

(c) *Bracing.* Pole scaffolds shall be braced or attached to the building to prevent movement away from the building. Diagonal bracing shall be provided to prevent the poles from moving in a direction parallel to the wall. Diagonal bracing shall be so installed that every spliced section of every pole is connected with the adjacent poles.

(d) *Connections.* The ends of all horizontal wooden supporting members and of all braces shall overlap the nailed fastening a sufficient amount to prevent splitting the ends of the member. Where bearers rest on a building wall, the length of bearing surface on the wall shall be at least four inches and they shall rest on a firm and level surface. Where ledgers lap each other, bearing blocks or other effective means attached to the pole shall be provided to support the ledger. Ledgers shall not be spliced between poles but shall be continuous from pole to pole.

(e) *Planking.* Where planking is lapped each plank shall lap its end supports at least 12 inches. Where the ends of planks abut each other to form a flush floor the butt joint shall be at the center line of a pole. The abutted ends shall rest on separate bearers. Intermediate beams shall be provided where necessary to prevent dislodgment of planks due to deflection and the ends shall be nailed or cleated to prevent their dislodgment.

(f) *Erection and removal.* When a new working level is desired, the existing platform shall be left undisturbed until the new working level is framed. As the platform level is abandoned with the progress of the work, all supporting members shall be left intact. Upon removal of a scaffold the sequence of removal of members shall be the reverse of that used in erection.

(g) *Specification requirements.* All pole scaffolds over 80 feet in height shall be designed by a licensed professional engineer and constructed in accordance with such design. A copy of the drawings and specifications shall be kept on the job for use by the commissioner. Such scaffolds shall be constructed of metal or of wood treated to make it incombustible material as defined in Part (Rule No.) 7 of the Industrial Code. Wooden pole scaffolds 80 feet or less in height shall conform with the following tables Nos. III, IV, V, VI, VII and VIII.

(23.13)

TABLE III

Minimum Nominal Size in Inches and Maximum Spacing
of Members of Single Pole Scaffolds
Light Duty Scaffolds

TYPE OF USE	LIGHT DUTY	
Uniformly distributed load	Not to exceed 25 lbs. per sq. ft.	
Maximum height of scaffold	20'	80'
Poles or uprights	2x4	4x4
Pole spacing (longitudinal)	6'-0"	10'-0"
Maximum width of scaffold	5'-0"	
Bearers To 3'-0" width or Putlogs (min.) To 5'-0" width	2x4 on edge	
Ledgers with 6'-0" pole space with 10'-0" pole space	3x4 or 2x6 on edge	
Vertical spacing of horizontal members	1½x4 on edge 1½x9 on edge	
Bracing, horizontal and diagonal	7'-0"	
Tie-ins	1x4	
Planking not more than 6' span not more than 10' span	1x4	
Toeboards	1½x9	
Guard rail	2x9	
	5" high	
	2x4	

TABLE IV

Minimum Nominal Size in Inches and Maximum Spacing
of Members of Single Pole Scaffolds
Medium Duty Scaffolds

TYPE OF USE	MEDIUM DUTY		
Uniformly distributed load	Not to exceed 50 lbs. per sq. ft.		
Maximum height of scaffold	60'	80'	
Poles or uprights	4x4	Top 60' 4x4	Lower Sec. 4x6
Pole spacing (longitudinal)	8'-0"		
Maximum width of scaffold	5'-0"	8'-0"	
Bearers or putlogs	3x4 on edge	3x5 or 2x9 on edge	
Spacing of bearers or putlogs	3'-4"	6'-0"	
Ledgers	2x9 on edge		
Vertical spacing of horizontal members	9'-0"		
Bracing, horizontal	1x6 or 1¼x4		
Bracing, diagonal	1x4		
Tie-ins	1x4		
Planking	2x9		
Toeboards	2x9 on edge		
Guard rail	2x4		

TABLE V

Minimum Nominal Size in Inches and Maximum Spacing
of Members of Single Pole Scaffolds
Heavy Duty Scaffolds

TYPE OF USE	HEAVY DUTY	
Uniformly distributed load	Not to exceed 75 lbs. per sq. ft.	
Maximum height of scaffold	60'	80'
Poles or uprights	4x4	Top 60' Lower Sec. 4x4 4x6
Pole spacing (longitudinal)	6'-0"	
Maximum width of scaffold	5'-0"	8'-0"
Bearers or putlogs	3x5 or 2x9 on edge	3x6 or 2x9 on edge
Spacing of bearers or putlogs	6' 0"	
Ledgers	2x9 on edge	
Vertical spacing of horizontal members	6'-6"	
Bracing, horizontal and diagonal	2x4	
Tie-ins	1x4	
Planking	2x9	
Toeboards	2x9 on edge	
Guard rail	2x4	

TABLE VI

Minimum Nominal Size in Inches and Maximum Spacing
of Members of Independent Pole Scaffolds
Light Duty Scaffolds

TYPE OF USE	LIGHT DUTY	
Uniformly distributed load	Not to exceed 25 lbs. per sq. ft.	
Maximum height of scaffold	20'	80'
Poles or uprights	2x4	4x4
Pole spacing (longitudinal)	6'-0"	10'-0"
Pole spacing (transverse)	6'-0"	10'-0"
Ledgers	With 6'-0" pole spacing 1½x4 on edge With 10'-0" pole spacing 1½x9 on edge	
Vertical spacing of horizontal members	7'-0"	
Bearers to 3'-0" span to 10'-0" span	2x4 on edge 1½x9 on edge	
Bracing, horizontal and diagonal	1x4	
Tie-ins	1x4	
Planking	Not more than 6'-0" span 1½x9	
Toeboards	Not more than 10'-0" span 2x9	
Guard rail	5" high 2x4	

(23.13)

TABLE VII
Minimum Nominal Size in Inches and Maximum Spacing
of Members of Independent Pole Scaffolds
Medium Duty Scaffolds

TYPE OF USE	MEDIUM DUTY		
Uniformly distributed load	Not to exceed 50 lbs. per sq. ft.		
Maximum height of scaffold	60'	80'	
Poles or uprights	4x4	Top 60'	Lower Sec. 4x6
Pole spacing (longitudinal)	8'-0"		
Pole spacing (transverse)	10'-0"		
Ledgers	2x9 on edge		
Vertical spacing of horizontal members	6'-0"		
Spacing of bearers	6'-0"		
Bearers	2x9 on edge		
Bracing, horizontal	1x6 or 1½x4		
Bracing, diagonal	1x4		
Tie-ins	1x4		
Planking	2x9		
Toeboards	2x9 on edge		
Guard rail	2x4		

TABLE VIII
Minimum Nominal Size in Inches and Maximum Spacing
of Members of Independent Pole Scaffolds
Heavy Duty Scaffolds

TYPE OF USE	HEAVY DUTY		
Uniformly distributed load	Not to exceed 75 lbs. per sq. ft.		
Maximum height of scaffold	60'	80'	
Poles or uprights	4x4	Top 60'	Lower Sec. 4x6
Pole spacing (longitudinal)	6'-0"		
Pole spacing (transverse)	10'-0"		
Ledgers	2x9 on edge		
Vertical spacing of horizontal members	4'-6"		
Bearers	2x9 on edge		
Bracing, horizontal and diagonal	2x4		
Tie-ins	1x4		
Planking	2x9		
Toeboards	2x9 on edge		
Guard rail	2x4		

23.14 Special provisions for outrigger scaffolds. (a) *Outrigger beams.* Outrigger beams shall extend not more than six feet beyond the face of the building. The inboard end of outrigger beams measured from the fulcrum point to the extreme point of support, shall be not less than one and one-half times the outboard end in length. The beams shall rest on edge, the sides shall be plumb, and the edges shall be horizontal. The fulcrum point of the beam shall rest on a secure bearing at least six inches in each horizontal dimension. The beam shall be secured in place against movement and shall be securely braced at the fulcrum point against tipping.

(b) *Inboard supports.* The inboard ends of outrigger beams shall be securely supported either by means of struts bearing against sills in contact with the overhead beams or ceiling or by means of tension members secured to the floor joists underfoot or by both if necessary. The inboard ends of outrigger beams shall be secured against tipping and the entire supporting structure shall be securely braced in both directions to prevent any horizontal movement.

(c) *Design and construction.* (1) Unless outrigger scaffolds are designed by a licensed professional engineer the minimum size of the members shall be as follows:

TABLE IX

LIGHT DUTY SCAFFOLDS		MEDIUM DUTY SCAFFOLDS	
Maximum load 25 lbs. per sq. ft.		Maximum load 50 lbs. per sq. ft.	
Outrigger size	2"x10"		3"x10"
Maximum outrigger spacing ..	10'-0"		6'-0"
Planking	2"x9"		2"x9"
Guard rail	2"x4"		2"x4"
Guard rail uprights	2"x4"		2"x4"
Toeboards	1"x6"		2"x9"

(2) Outrigger scaffolds designed by a licensed professional engineer shall be constructed according to the design. A copy of the detailed drawings and specifications showing the sizes and spacing of members shall be kept on the job for the use of the commissioner.

(d) *Planking.* Planking shall be laid tight and shall extend to within three inches of the building wall. Planking shall be nailed or bolted to outriggers.

(e) *Enclosure.* Where there is danger of material falling from the scaffold, a wire mesh or other enclosure shall be provided between the guard rail and the toeboard.

(f) *Superstructures.* Supports for superstructures placed on outrigger scaffolds shall be placed directly over the outrigger beams and shall be nailed or otherwise secured in place. Such structures shall not exceed six feet in height and shall otherwise conform with this Part (rule), but in no case shall horses be used as supports for such superstructures.

(23.15)

23.15 Special provisions for all suspended scaffolds.

(a) *Inspection before installation.* All load-carrying parts of every scaffold and the supports shall be inspected before each installation and no part shall be used that does not comply with this Part (rule).

(b) *Installation and use.* The installation or change of position of every scaffold shall be in charge of and under the direct supervision of a person designated by the employer.

(c) *Fibre rope tackle.* Fibre ropes shall be of first quality manila hemp or its equivalent in strength. Blocks shall be of a size to fit the rope.

(d) *Hoisting machines.* (1) Hoisting machines used on suspended scaffolds shall be approved.

(2) At least four turns of wire rope shall at all times remain on the drum and the end of the rope shall be properly secured to the drum.

(e) *Limitation on use of fibre rope.* Fibre rope shall not be used for or near any work involving the use of corrosive substances nor shall fibre rope be used as supports exceeding 300 feet in length between blocks nor shall fibre rope be used on hoisting drums.

(f) *Tie-ins.* Scaffolds shall be tied in to the building or structure and means therefor shall be provided but window cleaners' anchors shall not be used for that purpose.

(g) *Platform supports.* End supports shall be placed not less than six inches nor more than 18 inches from the ends of the platform planks.

(h) *Planking.* Planking shall be either nailed in place or otherwise secured against displacement. Where planks rest directly upon stirrups without any intermediate supporting frame they shall be secured together by means of cleats nailed to the underside at intervals not exceeding four feet. Cleats or other equivalent means shall be provided to prevent the ends of the planks from slipping off their supports.

23.16 Special provisions for two-point suspension scaffolds.

(a) *Width and fastening.* Two-point suspension scaffold platforms shall be not less than 20 inches nor more than 30 inches wide over-all. The platform shall be of sufficient width to properly fit the hangers and shall be securely fastened thereto by U-bolts passing around the hangers and bolted up tight, or by other equivalent means.

(b) *Hangers.* The platforms of two-point suspension scaffolds shall rest on hangers of steel or iron. Each such hanger shall be provided with an eye to receive the tackle hook and a loop or equivalent means to receive the guard rail and midrail.

(c) *Roof irons.* Roof irons or hooks shall be of mild steel or wrought iron and shall be securely anchored. They shall be provided with tiebacks of at least three-quarters inch manila rope so installed that the tension is at right angles to the face of the building. Where the upper block hook does not directly engage the roof iron, the connection shall be made by

steel wire rope of required strength but not less than one-half inch in diameter.

(d) *Railings and toeboards.* A handrail consisting of a two inch by three inch wooden rail or the equivalent placed not less than 34 inches nor more than 42 inches above the platform shall be provided and securely fastened in place at intervals of not more than 10 feet. In addition there shall be provided a midrail between the handrail and platform. A toeboard not less than four inches high shall be provided on the outside edge of every platform. Where the condition of the scaffold is such that a person may fall from the inside edge of the platform, a handrail as above required shall be provided.

(e) *Use.* Two or more such scaffolds shall not be combined into one by bridging the distance between them. Workmen shall not pass from one such scaffold to another. Not more than two men shall be permitted to work on any such scaffold at one time.

(f) *Fibre rope.* All fibre rope shall be at least equivalent in strength to three-quarters inch first quality manila rope.

(g) *Types of platforms.* The platform of every swinging scaffold shall be one of the following types:

(1) *Type 1. Ladder type platforms.* (i) The side stringers of the horizontal supporting ladder shall be of clear spruce or other material equivalent in strength and durability. The rungs shall be of straight grained oak, ash or hickory not less than one and one-eighth inches in diameter with seven-eighths inch tenons mortised into the side stringers at least seven eighths of an inch. The stringers shall be tied together with tie rods not less than one-quarter inch in diameter passing through the stringers and riveted up tight against washers at both ends. Hangers shall be made fast to platforms at the second rung from either end by means of U-bolts at both ends of bottom of stirrups and passing over the rungs of the platform. (See also Table X.)

(ii) The flooring strips shall be spaced not more than five eighths of an inch apart except at the side rails where the space may be one inch. The ladder type platform shall be constructed in accordance with the schedule listed in Table X, "Schedule for Ladder Type Platforms".

(2) *Type 2. Plank type platforms.* Plank type platforms shall be composed of planks of uniform thickness and such planks shall be not less than two inches in thickness and eight inches in width full size undressed. The planks shall extend not less than six inches nor more than 18 inches beyond the supporting hangers and a bar shall be nailed across the platform on the underside at each end to prevent the platform from slipping off the hanger. Where two or more planks are used they shall be fastened together by cleats not less than one inch by six inches nailed on the underside at intervals of not more than four feet. Planks shall not be spliced. The clear span of the platform planks between supports shall not exceed 10 feet.

(23.16)

TABLE X
Schedule for Ladder Type Platforms

Side Stringers	Length of Platform--feet				
	12	14 & 16	18 & 20	22 & 24	28 & 30
Minimum cross section (finished sizes)					
(a) at ends (inches)	1 3/4 x 2 3/4	1 3/4 x 2 3/4	1 3/4 x 3	1 3/4 x 3	1 3/4 x 3 1/2
(b) at middle (inches)	1 3/4 x 3 3/4	1 3/4 x 3 3/4	1 3/4 x 4	1 3/4 x 4 1/4	1 3/4 x 4 1/4
Reinforcing strip (minimum)	A 3/8" x 7/8" steel reinforcing strip or its equivalent shall be attached to the underside, full length				
Rungs	Rungs shall be 1 1/8 inches minimum diameter with at least 7/8 inch diameter tenons, and the maximum spacing shall be 18 inches center to center				
Tie rods					
(a) number (minimum)	3	4	4	5	6
(b) diameter	The diameter shall be 1/4 inch (minimum)				
Flooring	The minimum finished size of flooring shall be 1/2" x 2 1/4"				

(3) *Type 3. Beam platforms.* Beam platforms shall have side stringers of straight grained lumber not less than two inches by six inches set on edge. The stringers shall be supported on the hangers and the clear span between hangers shall not exceed 16 feet. The ends of the stringers shall extend beyond the hangers not less than six inches nor more than 18 inches and shall be bolted to the hangers by U-bolts passing around the hangers and the stringers. The platform shall be supported on two inch by six inch cross beams laid flat and let into the upper edge of the stringers with a snug fit at intervals of not more than four feet and securely nailed in place. The platform shall be formed of material not less than one inch by six inches nailed tight together and extended to the outside face of the stringers. The ends of all platform boards shall rest on the cross beams and shall be nailed securely thereto.

23.17 Special provisions for multiple-point suspension scaffolds.

(a) *Design.* (1) Each scaffold including all its supports and fastenings shall be designed by a licensed professional engineer. A copy of the typical drawings and all specifications signed by the designer shall be kept on the job for use by the commissioner.

(2) The scaffold shall be designed to bear four times the maximum weight required to be dependent therefrom or placed thereon when in use (Labor Law, § 240, subd. 3) but the factor of safety of hoisting rope shall be not less than six for new and replacement installations. The minimum size of rope shall be not less than five-sixteenths inch diameter for light duty and one-half inch diameter for medium duty scaffolds. Factors such as abrasion and flexure which tend to weaken the rope shall be included in the design.

(23.17)

(3) Outrigger beams and platform bearers shall be of structural metal.

(4) Platform supports shall be designed to provide sufficient head-room for easy passage throughout the length of the scaffold.

(5) Effective means shall be provided where necessary to prevent rope supports from slipping off the ends of outrigger beams.

(b) *Installation.* (1) Each scaffold shall be installed in accordance with the required drawings and by persons designated by the owner of the scaffold. Relocation of scaffolds shall be under the direct supervision of such persons.

(2) The overhang of outrigger beams shall at no time exceed that specified on the required drawing.

(3) Outrigger beams shall be properly anchored and braced to provide rigidity and to prevent tipping.

(4) Supporting points for outrigger beams shall be level, smooth and of sufficient area to provide a firm seat.

(5) Wire rope connections shall be as specified elsewhere in this Part (rule) and at least four turns shall at all times remain on the hoisting drum.

(6) The hoisting rope shall be maintained properly lubricated.

(c) *Platform.* The platform shall be at least equivalent in strength to two-inch planking, full size undressed.

(d) *Railing and toeboard.* A safety railing shall be provided along the outer edges of the scaffold except that its supports shall be spaced not to exceed 10 feet center to center and the toeboard shall be at least five inches high. The space between the guard rail and the toeboard shall be filled with one-half inch mesh No. 18 gauge wire screen or by other equivalent means.

(e) *Overhead protection.* Overhead protection when required shall consist of planking not less than two inches thick or of material of equal strength. It shall be laid tight, shall extend the full width of the working platform and shall be placed not over 10 feet above same.

(f) *Platform.* Platform planking shall be at least two inches thick, full size undressed. Planking shall be laid tight and shall be fastened in place or cleated to prevent dislodgment.

(g) *Dismantling.* Unless the scaffold platform is lowered intact to the ground or other safe surface for dismantling, life belts shall be used by employees performing such operation.

23.18 Special provisions for needle beam scaffolds.

(a) *Use.* Needle beam scaffolds shall be used only for the support of men doing riveting, plastering, painting and other similar work and shall not be used for the storage of material.

(23.18)

(b) *Platform supports.* The needle beams, if of wood, shall be not less than four inches by six inches in size with the greater dimension vertical and shall be of one length. They shall not be spliced and shall be provided with intermediate supports or hangers so that the span shall not exceed 10 feet. If metal beams are used for needle platform supports, they shall be at least equal in strength to four inch by six inch wood beams.

(c) *Rope.* Rope used for the support of needle beams shall be of first grade manila fibre and not less than one inch in diameter. The rope shall be attached to the needle beams by a "square hitch" which shall be so tied on rectangular beams as to prevent the needle beam from rolling or otherwise becoming displaced. Mechanical stops such as cleats or pins shall be used to prevent the rope from slipping off the end of the beam.

(d) *Platform.* (1) Where the span between the needle beams is 10 feet or less the platform planks shall be not less than two inches in thickness full size undressed and shall be increased in thickness as the span is increased. The overhang of each end of the platform planks shall be not less than one foot nor more than 18 inches.

(2) Platforms shall be not less than four planks in width or more than six feet wide.

(3) When needle beam scaffolds are used with one beam higher than the other or where the planks are not level, the platform shall be secured against slipping.

(e) *Containers for tools.* Suitable containers for tools, bolts and similar articles shall be provided and securely attached to the scaffold.

23.19 Special provisions for horse scaffolds.

(a) *Limitation of height.* Horse scaffolds shall not be constructed with more than two tiers of horses and shall not exceed 10 feet in height.

(b) *Installation.* The footings for horses shall be level and secure against accidental movement in any direction. Where horse scaffolds are superimposed upon other types of scaffolds the horses shall be placed directly over supporting beams. All horse scaffolds shall be secured against tipping.

(c) *Construction of horses.* The minimum sizes of members for light duty use shall be two inches by four inches for the back or bearer and one inch by four inches for the legs and horizontal braces. For medium or heavy duty the minimum sizes shall be three inches by four inches for the back or bearer and one and one-quarter inches by four and one-quarter inches for the legs and horizontal braces except that for medium duty scaffolds the back or bearer may be one and one-quarter inches by nine inches. The bearer shall in every case rest on gusset braces at least one inch thick. The span of two inch by four inch bearers shall not exceed four feet and the span of three inch by four inch bearers shall not exceed six feet. Sufficient diagonal and horizontal bracing shall be provided to assure rigidity.

(d) *Spacing.* Horses used in construction of scaffolds designed for loads up to 25 pounds per square foot shall be spaced not to exceed 10 feet center to center. When used in scaffolds designed for loads up to 50 pounds per square foot the spacing shall not exceed eight feet center to center. When used in scaffolds designed for loads up to 75 pounds per square foot it shall not exceed six feet center to center.

23.20 Special provisions for carpenter's portable bracket scaffolds.

(a) *Construction of brackets.* Each supporting bracket shall consist of a triangular portable frame made of lumber not less than two inches by three inches in cross section or of metal of equivalent strength. The members shall be properly fitted and securely joined.

(b) *Bracket installation.* Each bracket shall be attached to the structure by means of a bolt not less than five-eighths inch in diameter which shall extend through the building wall and shall be secured to develop the required strength. Brackets shall be spaced not to exceed 10 feet.

(c) *Loading.* Not more than two persons shall occupy any carpenter's bracket scaffold at any one time. No load exceeding 75 pounds in addition to the occupants shall be placed thereon.

23.21 Special provisions for bricklayer's square scaffolds.

(a) *Limitation of use.* Bricklayer's square scaffolds shall not be used as heavy duty scaffolds.

(b) *Construction of squares.* (1) The squares shall not be larger than five feet wide and five feet high and the minimum size of members shall be not less than those specified in the following Table XI.

TABLE XI

Members	Dimensions
Bearers or horizontal members	2"x6"
Legs	2"x6"
Braces at corners	1"x6"
Braces diagonally from center frame	1"x8"

(2) The squares shall be reinforced on both sides of each corner with one inch by six inch gusset pieces cut in the form of a triangle. The square shall have braces one inch by eight inches in size both sides running from the center of each member to the center of the adjacent member or otherwise arranged to secure equivalent rigidity.

(c) *Construction of scaffolding.* The squares shall be set not more than five feet apart for medium duty scaffolds nor more than eight feet apart for light duty scaffolds. One inch by eight inch bracing extending from the bottom of one square to the top of the next adjacent square shall be provided on both the front and rearsides of the scaffold.

(23.21)

(d) *Platform.* Platform planks shall be not less than two inches in thickness, full size undressed. The ends of the planks shall overlap on the backs of the squares and each plank shall be supported by not less than three squares. Planks shall overlap the squares by not less than six nor more than 18 inches.

(e) *Multiple tiers.* Bricklayer's square scaffolds shall not be constructed with more than three tiers. When built up in tiers, they shall be so constructed that the squares shall be directly one above the other. The upper tiers shall stand on continuous rows of planks laid across the next lower tier and be nailed down or otherwise secured so as to prevent displacement. The scaffold shall be set up on a level and firm foundation equivalent to that afforded by two inch by nine inch planking.

23.22 Special provisions for lean-to scaffolds.

(a) *Limited use.* Lean-to scaffolds shall not be used or erected more than eight feet high and shall be used for light duty only.

(b) *Construction.* The spread between the foot of the legs shall be at least one half of the height. The minimum sizes of members of scaffold supports shall be as specified in Table XII below.

TABLE XII

Members	Dimensions
Horizontal bearer	2"x6"
Legs	2"x4"
Braces between legs	1"x6"
Gusset brace at top of legs	1"x6"
Half diagonal braces	1"x6"
Maximum span of planking	10' for 2"x9"s
Maximum span of planking	6' for 1 1/4"x9"s

23.23 Special provisions for trestle and extension trestle ladder scaffolds.

(a) *Permissible height.* Trestle ladders or combinations of trestle ladders and extensions shall not exceed a total height of 30 feet.

(b) *Bracing.* Where trestle ladders are used as a component part of a scaffold additional bracing shall be provided where necessary to prevent tipping.

(c) *Platforms.* Working platforms between trestles shall be at least 12 inches wide.

(d) *Limitations of use.* Trestle and extension trestle ladder scaffolds shall be used only for interior painting, decorating or maintenance. They shall not be used for exterior work, nor for work in which the equipment used or supplies of material may hamper or endanger the user.

23.24 Special provisions for ladder jack scaffolds. Only approved ladder jacks shall be used. Ladder jack scaffolds shall be used as light duty scaffolds only and shall not exceed a height of 20 feet above the foot of the ladder. The ladders used shall be designed, constructed and maintained in accordance with the provisions of this Part (rule) pertaining to ladders. The ladders shall be so placed, fastened or held, or shall be so equipped with approved devices as to prevent slipping. Platform planks shall be not less than two inches in thickness and shall overlap the bearing surface by not less than 12 inches. The span between supports shall not exceed eight feet. Not more than two persons shall occupy any ladder jack scaffold at any one time.

23.25 Manually propelled mobile scaffolds. (a) *Existing equipment.* Manually propelled mobile scaffolds which were in use prior to November 1, 1959 shall be constructed and used in accordance with the following provisions:

(1) Work platforms shall be tightly planked for the full width of the scaffold except for necessary entrance openings. Planks shall be secured in place.

(2) Platforms shall have a guard railing.

(3) Where a ladder is used to approach a platform, the ladder shall be affixed to the scaffold.

(4) Proper handholds shall be provided for safe passage from the ladder to the platform.

(5) In free-standing scaffolds the ratio of the platform height to the least base dimension shall assure stability when in use but in no case shall such height be more than four times the least base dimension.

(6) Provision shall be made to prevent the scaffold from falling during movement from one location to another.

(7) While the scaffold is in use by any person it shall rest upon a stable footing and shall stand plumb. The casters or wheels shall be locked in position.

(8) No person shall be suffered or permitted to ride on the scaffold while it is being moved.

(b) *New equipment.* Manually propelled mobile scaffolds which were not in use prior to November 1, 1959 shall be approved and, subject to the provisions of the resolution of approval, shall be constructed and used as above provided.

23.26 Special scaffolds—approval required. Scaffolds not named or described in this Part (rule) shall not be used unless approved.

(23.27)

23.27 Window jacks. All window jacks shall be approved and shall be used only for the purpose of working at the window opening through which the jack is placed. Window jacks shall be constructed and installed to conform with section 23.12 and not more than one person shall occupy a window jack at any one time. Window jacks shall not be used as the supporting element of scaffolds or other devices and the placing of planks between one window jack and the jack of an adjacent window is prohibited. Window jacks shall be limited to light duty use.

23.28 Boatswain's chairs. (a) *Strength.* Boatswain's chairs and their supports shall be capable of sustaining four times the maximum weight that may be placed thereon.

(b) *Chair.* The chair shall be suspended from its four corners by means of rope slings. It shall have a seat not less than 24 inches long by 10 inches in width and two inches in thickness (or one and one-eighth inches if of hard wood). It shall be reinforced across the full width by cleats securely fastened to each end.

(c) *Tackle.* The tackle shall consist of rope at least equivalent in strength to five-eighths inch rope of first grade manila through proper size ball bearing or bushed blocks and attached thereto by a thimble and splice. Only safety hooks shall be used.

(d) *Anchorage.* The object to which the tackle is anchored shall be rigid and of ample strength and, where necessary, the rope shall be protected against chafing.

(e) *Seat guard or safety belt.* A rope or strap guard across the front and rear and 18 inches above the seat or an approved safety belt attached to the lower tackle hook or other fixed support shall be provided.

23.29 Work on steep roofs.

(a) *Roofing brackets.* (1) *Required use.* Roofing brackets shall be used on roofs having a slope steeper than 3 to 12 unless the use of crawling boards or safety belts is necessary.

(2) *Construction.* Roofing brackets shall be constructed to fit the pitch of the roof and when in use shall provide a level working platform.

(3) *Installation.* Roofing brackets shall be secured in place by nailing, pointed metal projections attached to the underside of the bracket and securely driven into the roof or by first grade three-quarter inch rope passed over the ridge pole and tied.

(b) *Crawling boards.* (1) *Construction.* Crawling boards shall be not less than 10 inches wide and one inch thick and shall have cleats at least one inch thick by one and one-half inches wide, spaced at equal intervals across the full width of the board and firmly nailed. Cleat nails shall be driven through and clinched. Such board shall extend from the ridge pole to the eaves when used in connection with roof construction, repair or maintenance.

(2) *Crawling board life line.* A firmly fastened life line of at least three-quarters inch rope shall be strung beside each crawling board.

(3) *Installation.* Crawling boards shall be secured to the roof by ridge hooks or equally effective means.

(c) *High roofs.* (1) *New roofs.* Where sheathing or surfacing work is being performed in building new roofs which (i) have a slope greater than 3 in 12, (ii) have no parapet, and (iii) are higher than 20 feet at the eaves, a substantial scaffold shall be installed below the working area and not more than two feet below the eaves. The scaffold shall be of sufficient width to extend outward at least two feet beyond the projection of the eaves and shall be provided with a safety railing. In addition, there shall be provided protection against sliding, consisting of roofing brackets or crawling boards. This provision shall not apply where every employee engaged in work upon such roofs is protected by a safety belt.

(2) *Repair or maintenance.* Where repair or maintenance work is being performed on such roofs, there shall be provided protection against sliding consisting of roofing brackets or crawling boards. This provision shall not apply where every employee engaged in work upon such roofs is protected by a safety belt.

23.30 Safety belts. (a) *Approval required.* Safety belts and all special devices for the attachment of life lines shall be approved.

(b) *Attachment required.* Every safety belt provided or furnished to an employee for his personal protection shall be used by the employee in the performance of his work, and at all times during use shall be attached to a life line which is securely attached to a sufficient anchorage and is no longer than is required to permit the employee to perform his work. The life line shall in all cases be so arranged that if the user should fall the line will suspend from a point not lower than the level of the working position.

(c) *Specifications for life lines.* The life line attached to a safety belt shall be at least the equivalent in strength and durability of five-eighths inch first grade manila hemp rope.

(d) *Instruction in use.* Every employee who is provided with a safety belt shall be instructed in the proper method of wearing and using it, and in the proper method of attaching the life line.

(e) *Protection of life lines.* Padding, wrapping or similar means shall be provided to protect every life line from contact with edges or objects which may cut or severely abrade it.

(f) *Inspection—defective belts or lines.* Every safety belt and every life line shall be inspected by a designated person before each use by an employee. No employer shall suffer or permit an employee to use a safety belt or life line which shows any indication of mildew or broken fabric or fibre, or which has sustained any wear, damage or deterioration ma-

(23.30)

terially affecting its strength, and no such belt or line shall be kept on the job.

23.31 Life nets. (a) *Materials and construction.* Every life net shall be made of first quality material throughout. The net shall be made of fibre cordage, wire or woven fabric and shall have a mesh not exceeding four inches. The perimeter of each net shall be reinforced with cloth-covered wire rope or with manila rope, and shall be equipped with proper size, padded thimbles, sockets or equivalent means of attachment to supports and anchorages.

(b) *Size, strength, location and attachment.* Every life net or combination of life nets shall be of sufficient size and strength to catch any employee for whose protection it is used, and it shall be located so as to cover the area of possible fall. It shall be attached to sufficient anchorages or supports outside of and beyond the area of possible fall, and it shall be supported at a height sufficient to prevent sagging to any surface or object beneath when cushioning the fall of an employee.

(c) *Maintenance.* Every life net in use shall be thoroughly dried before storage and shall be stored in a dry location. It shall be protected against damage from mechanical injury, acid or other corrosive substances.

(d) *Inspection—defective nets.* Each life net shall be inspected by a designated person before each installation. No life net which shows mildew, wear, damage or deterioration materially affecting the strength of any portion shall be installed.

23.32 Safeguards against falling in bridge construction. Where men are employed at an elevation of more than 50 feet above land or water and a falling hazard exists, safety belts or life nets shall be used or scaffolds shall be provided under the work locations except where the work of placing structural members or assemblies interferes with the use of such safeguards.

23.33 Stairways.

(a) *Construction.* (1) There shall be installed at least one stairway to within four floors of the uppermost working floor in the construction of reinforced concrete structures and to within two floors of the uppermost working floor in the construction of other structures. The stairway shall be continued up as the work progresses.

(2) Temporary stairways shall have treads of not less than two inch by ten inch plank, shall be not less than three feet in width and shall be substantially constructed and rigidly braced. Stairways more than five feet in width shall be provided with an intermediate stringer. Stairways with steel treads and landings which are to be afterward filled in with concrete or other tread surfacing, shall be provided with temporary wooden treads carefully fitted in place and extending to the edge of the metal nosing and over the full width of the treads and landings.

(3) Skeleton iron stairs shall have wooden treads of not less than two inch by ten inch planking.

(4) No flight of temporary stairs shall have an unbroken vertical rise of more than 12 feet.

(b) *Protective railings.* The stairwells of temporary wooden stairways and permanent stairways on which the enclosure or guard rail has not been erected shall be provided on all open sides with a safety railing. Open sides of stairways and landings shall be provided with handrails not less than 30 inches nor more than 40 inches high, measured vertically from the nose of the tread to the top of the rail.

23.34 General requirements for ladders and ladderways.

(a) *Special ladders—approval required.* Ladders not named or described herein shall not be used unless approved.

(b) *Strength.* Ladders shall be capable of sustaining without failure in any part at least four times the maximum load allowed to be placed thereon.

(c) *Materials of construction.* Wood used in the construction of ladders shall be thoroughly seasoned, sound, clear and straight-grained and the slope of the cross grain shall not exceed one in 15 at any point for rungs, steps or cleats, and shall not exceed one in 12 for rails.

(d) *Maintenance and replacement.* Ladders shall be maintained in good condition. No ladder shall be used which has a broken member or part, or any insecure joint between members or parts or any flaw or defect of material that may cause failure, or any wooden rung or step that is worn down to three quarters or less of its original thickness.

(e) *Installation and use.* (1) Ladders used as a regular means of access between levels shall be nailed or otherwise securely fastened in place. They shall extend at least 36 inches above the upper landing, or hand holds shall be provided at the upper levels to afford safe means of entering upon the ladder.

(2) All ladder footings shall be firm. Slippery surfaces and insecure objects such as bricks, boxes, etc., shall not be used as footing.

(3) A leaning ladder shall be rigid enough to prevent excessive sag.

(4) When work is done from ladder rungs between six and 10 feet above the footing a leaning ladder shall be held in place by a person stationed at the foot thereof unless the upper end is secured against side slip by its position or by mechanical means. When the work is done from higher rungs mechanical means of securing the upper end against side slip are required.

(5) The upper end of a ladder leaned against a slippery surface shall be mechanically secured against side slip while work is being performed therefrom.

(23.34)

(f) *Ladderways*. In continuous vertical runs of ladders, rest platforms shall be provided at intervals not greater than 35 feet unless ladders are equipped with safety back rests or equivalent. Where ladders are used in series and the danger of falling material exists they shall be staggered or so located as to provide overhead protection for the ladder beneath.

(g) *Ladder rungs—wood*. (1) Round rungs shall be not less than one and one-eighth inches in diameter and oval rungs shall be of equal strength. They shall not have less than seven-eighths inch diameter tenons. All tenons shall fit with a tight fit into holes which shall either extend through the side rails or be bored so as to give at least a thirteen-sixteenths inch length of bearing to the tenon. In through-bored construction, the rungs shall be flush with the outside rail surface. All holes shall be located on the center line of the wide face of the side rails. The shoulders of the rung shall be forced firmly against the side rails and the tenons secured in place with a nail or the equivalent thereof to prevent turning.

(2) Rung spacing shall be uniform and shall not exceed 14 inches center to center.

(h) *Splicing*. Ladders shall not be spliced to increase their length except that extension pieces may be spliced to the upper end for hand holds.

(i) *Metal ladders; limited use*. Ladders made with metal side rails shall not be used in any place where they may come into contact with energized electric power lines.

(j) *Spreaders*. All ladders with spreading bases such as step and trestle ladders shall be equipped with spreaders to hold bases rigid when in open position.

(k) *Placement; door openings*. Ladders shall not be placed in front of door openings unless the door is securely fastened open, closed and locked, or otherwise effectively guarded against swinging.

23.35 Single ladders. (a) *Length*. Rung type ladders consisting of a single section shall not exceed 30 feet in length.

(b) *Construction of cleat ladders*. The minimum size of cleats shall be three-quarters inch by three inches. The minimum size of side rails shall be one and five-eighths inches by three and five-eighths inches for ladders up to and including 19 feet long and one and five-eighths inches by five and five-eighths inches for ladders over 19 feet long. Cleats shall be let into side rails one-half inch with a snug fit or they shall be braced by filler blocks between cleats. Lumber used in the construction of cleat ladders shall be in accordance with subdivision (c) of section 23.34.

23.36 Extension ladders and sectional ladders. (a) *Length*. Extension ladders shall consist of not more than two sections and shall not exceed 55 feet in length when fully extended.

(b) *Adjustment.* The adjustment guides shall be so attached to the rails as to prevent the upper section from tipping or falling out while in use or during adjustment. The upper section shall be locked in place by two automatic locks.

(c) *Sectional ladders.* No sectional ladder shall be used which has a fully assembled length greater than 30 feet, unless approved.

23.37 Stepladders. (a) *Length.* Stepladders exceeding 20 feet in length of side rails shall not be used.

(b) *Bracing.* Such bracing as may be necessary for stiffness shall be provided and when standing the ladder shall be opened to full position and the spreader locked.

(c) *Bases.* Standing stepladders shall be used only on firm, level bases. When work is done from a step 10 feet or more above its base a standing stepladder shall be steadied by a person stationed at the foot thereof or shall be secured against sway by mechanical means.

23.38 Structural runways, ramps and platforms. (a) *Application.* This section does not apply to earth ramps.

(b) *Runways and ramps.* (1) All runways and ramps shall be substantially constructed and securely braced and supported. Runways and ramps for the use of motor truck or heavier vehicles shall have a width of not less than 12 feet and shall be provided with timber curbs not less than eight inches by eight inches placed parallel to, and secured to, the sides of the runway or ramp. The flooring shall be of not less than three inch planking, full size undressed.

(2) Runways and ramps for the use of workmen shall be not less than 18 inches in width and shall be constructed of not less than two-inch full size undressed planking, substantially supported and braced to prevent excessive spring or deflection. Planking shall be laid close and shall be butt jointed and securely nailed.

(3) Horizontal runways for the use of workmen and located more than 10 feet above the floor or ground shall be provided on the open sides with a safety railing. Runways used for wheelbarrows, hand carts or hand trucks shall be not less than 36 inches in width.

(4) Ramps shall have a slope not exceeding one in four and the total rise of a continuous ramp used by men carrying material or using wheelbarrows shall not exceed 12 feet, unless broken by horizontal landings at least four feet in length. If the slope is steeper than one in eight, the ramp shall be provided with cleats spaced not more than 14 inches apart and securely fastened to the planking to afford a foothold. Spaces in the cleats may be provided for the passage of the wheels of vehicles.

(5) Ramps which are located at or extend to a height of more than four feet above the adjacent ground or floor level, shall be provided with a safety railing on their open sides.

(23.38)

(c) *Platforms.* (1) Platforms used as working areas, or for the unloading of wheelbarrows, hand trucks or carts, shall have a floor of not less than two-inch planking. Platforms used for motor trucks shall have a floor of not less than three-inch planking.

(2) Except as provided in subdivision (j) of section 23.12 every platform more than 10 feet above the ground or above a floor shall be provided with a safety railing except that the sides of a platform used for the loading or unloading of vehicles may be protected only by a timber curb not less than eight inches by eight inches for motor trucks or heavier vehicles or four inches by four inches for wheelbarrows and hand trucks.

23.39 *Catch platforms and sidewalk sheds.* (a) *Use.* Catch platforms shall not be used for storage of material or as working platforms or walkways.

(b) *Platform construction.* Catch platform shall be at least five feet wide and shall be inclined so that the outer edge is six inches higher than the inner edge. If the supports consist of outriggers they shall be at least two inches by 10 inches in size, set on edge and spaced not more than 10 feet apart. Planking shall be at least two inches thick; each plank shall lap its end supports at least 12 inches; planks shall be laid close together and shall be nailed down.

(c) *Platform enclosures.* Except as otherwise herein permitted, the open sides of catch platform shall be provided with a fence of tight planking or of one-half inch mesh No. 18 gauge wire screen. The enclosure shall be at least 48 inches high from the platform to the upper edge with no opening between screen and platform. Supports for the enclosure shall be at least two inches by six inches in cross section and shall be spaced not more than 10 feet center to center.

(d) *Sidewalk sheds.* (1) The deck of every sidewalk shed shall be constructed to sustain a live load of at least 150 pounds per square foot, and if material is to be stored thereon it shall be constructed to sustain a load of not less than 300 pounds per square foot. The sidewalk shed shall be so erected as to provide a clear ceiling height of not less than eight feet above the walkway surface.

(2) The outside edge and the ends of the deck of every sidewalk shed shall be provided with a substantial enclosure at least 42 inches in height, consisting of boards laid close, or of screen formed of not less than No. 16 gauge steel wire with one and one-half inch mesh, or of corrugated metal or plywood.

(3) The deck of the sidewalk shed shall be watertight and of plank not less than two inches thick. Unless such deck is built solidly against the face of the structure in such a manner that no material can fall on the sidewalk, the side of the shed toward the structure shall be solidly fenced for the full height of the sidewalk shed. Solid sliding or swinging gates may be provided for the movement of men and materials.

(4) Steel or other materials of equivalent strength and suitability may be used in lieu of wood in the construction of sidewalk sheds.

(5) Sidewalk sheds shall be provided with sufficient light to insure safe movement of traffic through them.

23.40 Chutes. (a) *Enclosure.* Wooden or metal chutes provided for the removal of materials and which are at an angle of more than 45 degrees with the horizontal, shall be entirely enclosed on all sides, except openings used for the receiving or discharging of material. Such openings shall not exceed 48 inches in height, measured along the wall of the chute, and all openings, except the top opening, shall be closed when not in use. Chutes at an angle of 45 degrees or less with the horizontal may be open on the upper side.

(b) *Construction.* Every chute more than 24 inches in maximum inside dimension shall be constructed of not less than two-inch planking or of not less than three-sixteenths inch sheet metal. It shall have a metal bottom where the material strikes the chute and shall be rigidly supported throughout its height. A strong gate shall be constructed at the lower end of every loading chute to control the loading of material into trucks and to close the chute at all other times. Splash-boards or baffles shall be erected to prevent materials from rebounding into the street or under the sidewalk shed.

(c) *Protection at openings.* A bumper or curb not less than four inches by four inches in section shall be provided at each chute opening where such opening is level with or below the floor or platform. Every space between the chute and the edge of the opening in the floor or platform shall be solidly planked.

(d) *Danger signs.* Danger signs shall be placed in a conspicuous position at the discharge end of every chute to warn the workmen and public.

23.41 Combustion devices used for temporary heating. (a) *Room ventilation.* Where workmen are required to work in a room or space which is heated by combustion devices which may emit carbon monoxide into the room or space to an extent tending to injure health, ventilation shall be provided to prevent the accumulation of dangerous concentrations.

(b) *Setting.* Combustion devices shall be insulated from any combustible flooring upon which they rest. For salamanders the insulation shall extend at least two feet beyond all sides.

(c) *Location.* Combustion devices shall be located at least three feet horizontally from any combustible construction unless effective insulation is interposed. The overhead clearance shall be at least five feet.

(d) *Tarpaulins.* No tarpaulin or canvas covering shall be located less than 10 feet from a combustion heating device. Tarpaulins or canvas shall be securely fastened to prevent contact with such a device.

(e) *Bottled gas.* Bottled combustible gas shall not be used as a temporary heating medium unless it contains an agent to give it a distinctive

(23.41)

and easily detectable odor and sufficient ventilation to assure proper combustion is maintained. Rooms or areas in which gas is used shall have a readily legible warning sign affixed at the entrance. Such sign shall bear the words "DANGER—FLAMMABLE GAS." All connections shall be made by means of rigid metal pipe or flexible hose approved for the purpose and shall have metal screw connectors which shall be maintained tight. Containers shall be secured against accidental upsetting or displacement and when not in use shall be stored outside the building.

23.42 Material handling and hoisting machinery: general requirements.

(a) *Maintenance and operation.* (1) All material handling and hoisting equipment shall at all times be maintained in good repair and in proper operating condition and sufficient inspections for such maintenance shall be made. All defects shall be immediately corrected upon discovery of same either by necessary repairs or by replacement. All equipment shall be operated in a safe manner.

(2) Operators of such equipment shall remain at the controls while the load is suspended.

(b) *Loading.* Material handling equipment shall not be loaded in excess of the live load for which it was designed as specified by the manufacturer. Where there is any hazard to persons all loads shall be properly trimmed to prevent the dislodgment of any part during transit. Suspended loads shall be securely slung and properly balanced before they are set in motion.

(c) *Operators and signalmen.* Only trained, designated operators shall operate hoisting or material handling machinery. Operators and signalmen shall be able to comprehend signals readily and to execute them properly.

(d) *Signals for hoisting engine operation.* (1) Hoisting engines shall be operated in response to manual signals, telephone communications or according to a visible or audible signal code. Any of these may be used separately or in combination.

(2) Manual signals may be used only where the signalman has a clear and unobstructed view of the hoisting operation and the hoist operator has a clear and unobstructed view of the signalman and is not more than 80 feet below the signalman.

(3) A copy of the signal code shall be posted in a conspicuous place adjacent to the hoisting controls. All wires, cords or other devices used in connection with signal systems shall be protected against unauthorized or unintentional use, breakage or interference.

(4) The following signals may be used for platform, bucket and similar hoists:

- 1 bell (or light)—to stop
- 2 bells (or light)—to raise
- 3 bells (or light)—to lower
- 4 bells (or light)—to lower slowly

(e) *Protection of operator.* (1) Where an overhead hazard exists, the operator of material handling machinery other than a hoisting engine shall be provided with overhead protection against such hazard.

(2) Where an overhead hazard exists, the operator of a hoisting engine shall be provided with overhead protection equivalent to tight planking not less than two inches thick, supported to develop its full strength.

(3) The area occupied by the hoisting engine and its operator shall be protected from the elements and shall be heated in cold weather.

(f) *Protection of moving parts.* Gears, belts, sprockets, drums, sheaves, and points of contact between moving parts of power driven machines when not guarded by location shall be covered with substantial guards or railed off.

(g) *Refueling.* Open lights, flames or spark producing devices shall be kept at a safe distance while refueling internal combustion engines and no person shall smoke or carry lighted smoking material in the immediate area. The engine shall be stopped during refueling.

(h) *Engine exhaust.* Steam or exhaust gases from engines shall be discharged into the outer air at a point where they will not contaminate the air in a working zone.

(i) *Machinery at rest.* Material handling machines shall not be left with the load or blade suspended. The load shall be brought to rest on blocks or shall be lowered to the ground or to the extreme lower end of its travel.

(j) *Tag line.* Loads which have a tendency to swing or turn freely during hoisting shall be controlled by a tag line.

(k) *Riding.* Riding on the loads, buckets, slings or hooks of hoisting, material-handling or excavating machinery is prohibited.

(l) *Hoist brakes.* Where hoist brakes are provided they shall be capable of stopping and holding 150 per cent of the rated hoisting capacity. In addition, a ratchet and pawl shall be provided on the drum to hold the load. Each electric motor driven hoist shall be provided with a mechanical automatic motor brake or an electrical or mechanical device to hold the load automatically in case of power failure.

(m) *Electrically driven machines.* All electrically driven material handling machinery shall be serviced and maintained by or under the direct supervision of a designated person.

(n) *Repairs and lubrication.* No repairing, cleaning and lubricating of machinery shall be done unless the machinery is at rest.

(o) *Anchorage for hoisting machines.* Hoisting machines shall be so constructed and so secured in position as to prevent tipping or dislodgment.

(p) *Hoppers and chutes.* Every chute and hopper shall be barricaded where necessary to prevent persons from being struck by material or from falling into the chute or hopper.

(23.43)

23.43 Rigging, rope, chains for material hoisting. (a) *Hoisting rope—material.* Only wire rope shall be used with power driven hoisting machinery, except winchheads or capstan hoists.

(b) *Fibre rope.* (1) Fibre rope shall be of first quality manila hemp. Means to prevent chafing shall be provided where necessary. Proper size blocks to accommodate the rope shall be used. Fibre rope shall be protected where acid or any other harmful or corrosive agent is used. Rope shall be stored dry and in a dry place.

(2) Rope that is unsound in any way or that shows the effects of severe wear or abrasion shall not be used. Frozen rope shall be thawed before being used.

(c) *Wire rope.* (1) Wire rope shall be so handled and stored as to prevent kinks and shall be maintained lubricated to prevent corrosion. No rope that is kinked shall be used for the purpose of raising or lowering men or materials, nor (i) when more than 10 per cent of the total wires are broken in any lay, a rope lay being that distance measured along the rope in which one strand makes a complete revolution around the rope axis, nor (ii) when the wires on the crown of the strands are worn down to less than 60 per cent of their original cross-sectional area, nor (iii) when by visual inspection, the rope shows marked signs of corrosion, nor (iv) when any combination of broken wires and abrasion have reduced the original strength of the rope to 80 per cent or less. The end shall be securely attached to the hoist drum and at least four turns shall remain on the drum at all times.

(2) Wire rope fastenings shall consist of zinc-filled sockets, wedge sockets with at least one rope clip above the socket, eye splices with pear-shaped thimbles to fit the rope, proper size thimbles with rope clips or other fastenings approved by the board.

(3) Where clips are used as rope fastenings, they shall conform with the following:

(i) at least two clips for rope to and including one-half inch diameter;

(ii) at least three clips for rope to and including three-quarters inch diameter;

(iii) at least four clips for rope to and including one inch diameter;

(iv) at least five clips for rope to and including one and one-quarter inch diameter;

(v) at least six clips for rope to and including three inch diameter.

(4) Clip spacing shall be at least six times the diameter of the rope. The U-bolt of clips shall be placed over the short end of the rope.

(5) Means shall be provided to prevent accidental contact with or injury to hoisting rope. Such means shall consist of substantial covering, fencing or location beyond reach.

(d) *Sheaves.* Load-bearing sheaves for wire rope shall be of proper diameter and grooving to accommodate the rope but in no case shall the

(23.43)

diameter be less than 20 times that of the rope. Sheaves and rope shall be maintained properly lubricated. Sheaves and blocks that are so badly worn, injured or otherwise defective as to cause failure of equipment or injury to the rope shall not be used. Sheaves intended for use with fibre rope shall not be used with wire rope.

(e) *Fittings.* All hooks, shackles and other fittings subject to tension or shear shall be drop-forged. No deformed hooks, shackles, chains or other fittings shall be used.

(f) *Use of chains.* (1) Chains shall not be used as slings in hoisting operations.

(2) Chains shall not be knotted nor shall they be shortened or spliced by the use of nails or bolts.

(3) Defective chains shall not be used.

(g) *Heat treating of chains.* Annealing or normalizing of chains shall be done by the manufacturer or his agent.

23.44 Material platform or bucket hoists.

(a) *Construction of hoist towers.* (1) Material hoist towers shall be constructed of strong sound timber, structural steel, steel pipe, wrought iron or other structural metal. They shall be supported by a firm foundation of such dimensions as to adequately distribute the load and so as not to exceed the safe bearing capacity of the ground upon which they stand. Hoist towers shall be plumb, and shall be securely braced to insure stability and rigidity. All timber hoist towers more than 70 feet high and four-pole timber hoist towers more than 50 feet in height shall have bolted connections throughout. Towers shall be anchored to the building at intervals of not more than 25 feet or shall be properly guyed by means of wire rope not less than one-half inch in diameter securely fastened to adequate anchorages. Hoist towers shall be erected and dismantled only under the direct supervision of designated persons. Hoist towers shall be erected only to a height necessary for immediate needs and extended in height only when construction work has progressed sufficiently to provide for the anchorage and bracing heretofore required.

(2) There shall be at least four feet of clearance between the cat-head sheave and the hoisting rope fastening on the car or bucket when the conveyance is at the uppermost terminal or landing.

(b) *Enclosure of hoists.* Exterior hoist towers shall be enclosed on all sides except entrance openings. Interior hoistways shall be enclosed at all floors to a height of at least eight feet except at entrance openings. Enclosures shall be by means of wire mesh or slatted partition adequately supported, braced and secured so as to provide a substantial enclosure. Wire mesh shall not be less than No. 18 gauge with openings not exceeding one-half inch. Wood slats shall be not less than three-quarters inch in thickness installed horizontally and spaced not more than two inches apart.

(23.44)

(c) *Entrances to hoistways.* (1) All entrances to hoistways shall be protected by substantial gates or bars which, when closed, shall guard the full width of the landing entrance.

(2) Gates, when used, shall be not less than 66 inches in height and located not more than four inches from the hoistway line and may have an underclearance of not more than two inches. Gates of grille, lattice or other open work shall have openings of not more than two inches.

(3) Where bars are used, they shall be not less than two inch by four inch wooden hinged bars or equivalent, located two feet from the hoistway line. Hinged bars shall be located not less than 36 inches nor more than 42 inches above the floor.

(4) When hinged bars are installed on interior hoistways, the hoistway enclosure shall be extended to two feet beyond the hoistway line. Every hoistway gate or bar shall be kept closed except when the entrance is in use.

(d) *Hoist cars.* (1) The platform of hoist cars shall be enclosed from floor to crosshead with a solid enclosure on all sides not being used for loading and unloading. At the crosshead a solid protective covering of two-inch planks or other material affording substantially equivalent protection, shall be provided to protect workmen from falling material.

(2) Enclosures of not less than No. 9 gauge expanded metal with one and one-half inch mesh securely fastened in place and equipped with four-inch toe-boards may be substituted for solid enclosures.

(3) Blocks and cleats shall be securely fastened to the floors of hoist cars to prevent accidental rolling of wheelbarrows or the shifting of other equipment.

(e) *Guide rails.* The guide rails of hoists shall be of steel or sound, hard wood securely fastened at intervals so as not to deflect more than one-quarter inch under normal operation.

(f) *Operation of hoist.* Hoists shall be operated only by designated persons. The operation of every hoist shall be controlled by an electrically or mechanically operated bell system with an experienced signalman at both loading and unloading points. Manual signals may be used where the engineman or operator is in a position to see the signalman, but where men are loading or unloading at more than one level or where the signalman cannot be readily seen, the electrically or mechanically operated bell system shall be provided and used. Such bell signals shall be as provided in subdivision (d) of section 23.42 "Signals." Intercommunication or telephone systems shall be provided in addition to manually operated electrical or mechanical bell signal systems where necessary for safe operation of the hoist. Weatherproof electrical connections and fittings shall be used for electrically operated signal or communication systems on hoist towers that are exposed to the weather.

(g) *Thoroughfare.* There shall be no thoroughfare through any hoistway. There shall be no thoroughfare under any hoistway except when

(23.44)

the hoisting unit has been made inoperative by disconnecting the suspension rope.

(h) *Protection of hoist operators.* Where the operator of hoisting machinery is exposed to dust or other airborne material in such quantities as to interfere with the safe operation of the hoist, the operator shall be provided with proper goggles for the purpose or a wooden or canvas screen shall be erected to minimize the exposure.

(i) *Loading and roping of platform hoists.* The maximum safe capacity of each platform hoist shall be determined by using a factor of safety of eight and shall be conspicuously posted on the crosshead or side members and so maintained. In no case shall the load on any hoist be such as to cause the platform to drop more than two inches below the loading level or rise more than two inches above the floor level when unloading.

(j) *Warning device.* All hoistway entrance barriers and gates shall be painted to provide the distinctive warning device of diagonal black and yellow stripes.

(k) *Riding.* Riding on a material platform hoist is prohibited and a sign to that effect shall be conspicuously posted on both sides of the crosshead or the side members.

23.45 Workmen's elevators. (a) *Elevators under Industrial Code Part (Rule No.) 8.* Workmen's elevators within a building, which are to be converted to permanent use after completion of the job, shall be constructed and equipped as required in Part (Rule No.) 8 of the Industrial Code except that hoistway enclosure, hoistway doors, car enclosure, door and gate locking devices, initial inspection and lubrication, and tests shall conform with the requirements of this section.

(b) *Approval required.* Elevators other than those set forth in subdivision (a) above shall be approved.

(c) *Maintenance and use.* Elevators shall be maintained in proper and safe operating condition. They shall be periodically inspected and lubricated as may be necessary for such maintenance. Necessary repairs or replacement of parts shall be promptly made. No elevator shall be loaded in excess of the load for which it is designed.

(d) *Hoistway enclosure.* (1) Every hoistway shall be enclosed on all sides to a height of at least 10 feet above the lowest landing level and on the sides facing car entrances or the building or structure, throughout its height except entrance openings.

(2) The hoistway enclosure shall be made of expanded metal of at least No. 16 U. S. gauge or other incombustible material equivalent in strength and rigidity when properly installed. Openwork metal enclosures shall reject a one and one-half inch diameter ball. The enclosure shall be so installed and reinforced that a horizontal pressure of 100 pounds against any point will not cause a deflection greater than one inch nor reduce the running clearance below the required minimum.

(23.45)

(e) *Hoistway doors.* (1) Every entrance opening in the hoistway enclosure shall be provided with a solid door which shall extend across the full width of the opening and which shall be provided with a vision panel securely covered with wire mesh. It shall be provided with a lock or latch which shall be openable from the hoistway side only and inaccessible from the landing side. Such door shall be at least 78 inches high and shall have an underclearance of not more than one-half inch.

Exception: The door at the lowest landing shall be provided with means accessible only to designated persons to unlock it from the landing side.

(2) In normal service every hoistway door shall be latched or locked shut except when in use for passage to or from the car and no person except the car attendant shall open such door.

(3) Doors shall be securely reinforced and hung to provide adequate durability.

(f) *Car construction.* All sides except landing sides shall be provided with substantial and tight enclosures at least six feet high. The top of the car shall be covered with tight material equivalent in strength to two inch planking and shall have an opening with a hinged hatch cover not less than 18 inches in its smallest dimension and not less than 400 square inches in area.

(g) *Car door or gate.* (1) Each landing side of the car shall be provided with a door or gate at least six feet high and of construction equivalent in strength to that of the car enclosure.

(2) Every opening in the door or gate shall be of such size and shape as to reject a three-inch ball at any point.

(3) The car shall be equipped with an approved electrical contact so arranged that the car cannot be operated unless each door or gate is shut.

(h) *Wiring.* Wiring and other electrical equipment shall be of proper quality and properly installed. Installations in accordance with the National Electrical Code may be presumed to comply herewith. Hoistway wiring may consist of heavy duty rubber-covered traveling cable. All wiring and other electrical equipment which may be exposed to the weather shall be weatherproof.

(i) *Lighting.* Inside the car and at each landing, means for artificial lighting shall be provided. The inside of the car, all landings and the space occupied by hoisting machines shall at all times be properly lighted.

(j) *Thoroughfare.* There shall be no thoroughfare through or under any hoistway.

(k) *Enclosure of hoisting equipment.* The top of the hoistway shall have a weathertight enclosure. The space occupied by the hoisting machine shall be similarly enclosed and where the operator is stationed at the hoisting machine the enclosure shall be heated in cold weather.

(23.45)

(l) *Car attendant.* No car shall be operated in service unless it is in the charge of a designated person stationed in the car as its attendant. No person other than the car attendant shall cause the car to move or open any car or hoistway door or gate. The attendant shall not cause the car to move unless he is satisfied that the load is prepared for movement. No person under 18 years of age shall be designated as an attendant.

(m) *Initial inspection and lubrication.* Before each installation of a workmen's elevator it shall be thoroughly inspected and subjected to trial runs by a designated person experienced in the installation of such equipment. The inspection shall include but not be limited to an examination of the entire length of each guide rope and hoisting rope, all rope connections, sheaves and their supports, and trial of the governor, the linkage of the car safeties and the limit stops. Initial lubrication of running parts and all linkage shall be done during such inspection and under the direct supervision of the designated person.

(n) *Tests.* After erection and before use, every elevator shall be tested. The test shall be made by a designated person and shall be performed as follows:

(1) The car shall be loaded to maximum carrying capacity and run at least twice to both limits of travel to test the action of the speed governor, the operation of the upper automatic limit devices and the operation of the hoisting machine brake at various levels of the hoistway.

(2) With such load in place, the car safeties shall be made to actuate with the car traveling downward at a speed slightly greater than that for which the elevator is designed.

(3) Such test shall be repeated at least once every month while the elevator is in use on the job.

(4) A complete written report of every test including the date, the test loads and speeds involved and the test results shall be kept on the job for use by the commissioner. The report shall be signed by the person making the test.

23.46 Cranes and derricks. (a) *Strength.* Cranes and derricks shall be so constructed, placed and operated as to be stable. No part of any such machine shall be stressed beyond the capacity determined for it by the manufacturer or builder.

(b) *Inspection.* Every crane and derrick, including all blocks, shackles, sheaves, wire rope, connectors and the various devices on the mast and boom shall be thoroughly inspected by a designated person. Such inspections shall be at intervals not exceeding three months. Cranes and derricks shall also be inspected before being first erected or operated on each job. Inspection and repair of crane booms shall be made only when the boom is lowered and adequately supported. A written, dated and signed record by a designated person of the most recent inspection of

(23.46)

each crane and derrick shall be made on a form provided by the commissioner and shall be kept on the job for his use.

(c) *Footing.* Firm and uniform footing shall be provided for cranes and derricks. Where such a footing is not otherwise supplied, it shall be provided by substantial timbers, cribbing or other structural members sufficient to distribute the load so as not to exceed safe bearing capacity of the underlying material.

(d) *Hoisting mechanism brakes and locking devices.* Every power-operated crane and derrick shall be provided with hoisting mechanism brakes capable of sustaining at rest one and one-half times the maximum rated load on a single part line. Hand or foot-operated brakes shall be provided with a substantial locking device to lock the brake in engagement. Electrically driven cranes or derricks shall be provided with a device to hold the load automatically in case of power failure.

(e) *Attachment of loads.* (1) On concrete work the hoisting rope shall be provided with a safety hook or a closed shackle. Where a sling is employed to hoist long-length material, a spreader bar shall be used to space the sling legs for proper balance.

(2) Reinforcing rods, conduit and lumber, when of uneven lengths, column clamps and similar items which cannot be easily secured to form a safe draft or load shall be hoisted in a box. The box shall be substantially constructed and supported from its four corners by individual lengths of wire rope having spliced or clipped loops for attachment to the load line. Its construction and suspension shall be capable of holding at least four times the load for which it is intended.

(3) In steel erection, when a load is suspended at two or more points with slings, the eyes of the lifting legs of the slings shall be shackled together, and this shackle or the eyes of the shackled slings shall be placed on the hook. Alternatively, the eyes of the lifting legs may be shackled directly to the hoisting block, ball or balance beam. The eyes may be placed on the lifting hook without shackles if the hook is of the safety type.

(f) *Limitations on modifications of cranes and derricks.* No load-bearing part of any crane or power-driven derrick shall be replaced by another part, and no such machine shall be modified by the addition thereto or removal therefrom of any load-bearing part unless the replacement or modification shall be as certified by either the manufacturer or the builder of the machine or a qualified licensed professional engineer.

(g) *Cranes—outriggers and counterweights.* Outriggers and counterweights shall be provided and used as specified by the manufacturer of the crane or by a qualified licensed professional engineer. Counterweights shall be properly placed and secured. Leveling jacks shall be provided and used with outriggers of truckmounted mobile cranes.

(h) *Cranes—construction.* (1) *Booms.* The boom of every crane shall be of suitable steel. The crane shall be capable of lifting its boom by its own power when the outer end is at the level of the surface on

which the crane rests, without placing undue strain on either the boom or the tackle. Boom stops shall be provided to prevent overtopping.

(2) *Boom extensions.* Any boom extension not provided by the manufacturer of the machine shall be designed by a qualified licensed professional engineer. A copy of such design shall be kept on the job for inspection by the commissioner. Where boom extensions are used, reductions in the capacity chart ratings shall be posted.

(3) *Braking mechanism.* In addition to the hoisting mechanism brakes above required every crane shall be provided with:

- (i) an adequate braking mechanism for the boom hoist;
- (ii) a swing lock or swing brake capable of preventing rotation;
- (iii) a brake or other device adequate to bring the crane to a stop from any travel for which it is designed, together with a means of locking the crane so as to hold it stationary.

(4) *Cast iron.* Cast iron shall not be used for members or parts subject to tension or torsion.

(i) *Cranes—capacity chart.* (1) A capacity chart shall be provided for every crane. Such chart shall be posted and maintained in a place clearly visible to the operator and shall set forth the safe loads for various lengths of boom at various boom angles and radial distances. Where outriggers are provided, such loads shall be set forth with and without the use of outriggers. The chart shall also indicate whether or not load handling accessories such as hooks, blocks and slings are included.

(2) Unless furnished by the manufacturer or builder of the crane, a capacity chart shall be prepared and certified by a qualified licensed professional engineer and a copy thereof submitted, on request, to the commissioner.

(3) No load shall be lifted by any crane that exceeds the relevant maximum specified by its capacity chart.

(j) *Cranes—boom angle indicator.* A crane having either a boom exceeding 40 feet in length or a maximum rated capacity exceeding 15 tons shall be provided with an approved boom angle indicator which shall make the boom angle in degrees clearly visible to the operator at all times and give a warning signal when the angle is unsafe.

(k) *Cranes—general operation.* (1) Before hoisting any load at a new job site the boom shall be test operated to its maximum height. Crane loads are to be raised vertically so as to avoid swinging during hoisting, except as such operation is allowed for by the capacity charts.

(2) Cranes must not be traveled with a suspended load except upon a safe runway. During travel without load, crane falls shall be secured or placed so as to prevent accident or damage by swinging.

(3) Crane cabs shall be locked when the operator is not present and no unauthorized person shall enter the cab or remain immediately

(23.46)

adjacent to any crane in operation. Ignition locks, a locking bar or other equivalent devices shall be provided to prevent unauthorized operation.

(4) In concrete building construction, loads lifted by cranes to levels higher than 150 feet may only be discharged to a hopper or other appropriate facility so located as to permit operation of the boom at a minimum load radius.

(1) *Cranes—operation with demolition ball.* In addition to the general requirements for mechanical demolition of subdivision (s) of section 23.7, the operation of cranes with a demolition ball shall be subject to the following requirements:

(1) The weight of the demolition ball shall not exceed 50 per cent of the safe load capacity of the boom length used at its maximum angle of operation.

(2) During operation with a demolition ball, the swing of the boom shall not exceed 30 degrees from the center line, front to back, of the crane mounting.

(3) Crane cab windows shall be of shatterproof glass or protected by adequate metal screens.

(4) The load line and the attachment of the demolition ball to the load line shall be checked at least twice daily.

(5) Truck cranes without outriggers shall not be used to swing a demolition ball.

(m) *Cranes—operation near power lines.* (1) If a crane is operated in such a location that any part of the crane or of its load in any position of boom or swing may come within 10 feet of a live power line:

(i) the power line shall be de-energized, or

(ii) the power line shall be effectively insulated or isolated, or

(iii) the crane shall be effectively grounded as hereinafter provided.

(a) The crane shall be provided with a permanent clamp or other means for convenient and effective attachment of a grounding conductor. The cable connecting the clamp to the ground shall be equivalent to a No. 2 AWG or larger single conductor, superflexible, rope-stranded copper, composed of not less than 1,600 individual wires, with 600 volt covering for mechanical protection and with terminal parts that insure a good connection with hand-type screw clamps.

(b) An effective ground shall be one having a resistance of 25 ohms or less, which shall be measured, or a connection to a continuous underground metallic water piping system.

(2) The provisions of this subdivision shall not apply to operations conducted under the jurisdiction of the Public Service Commission.

(n) *Cranes—operators.* (1) *Finding of fact.* The board finds that the trade or occupation of operating cranes of the type below described in

construction and demolition work involves such elements of danger to the lives, health and safety of persons employed in such work as to require special regulations for their protection and the protection of other employees and the public in that such cranes may fall over, or collapse, or contact electric power lines, or dislodge material and cause it to fall, or fail to support intended loads and convey them safely, unless operated by persons of proper ability, judgment and diligence.

(2) *Limited application of this subdivision.* This subdivision applies only to cranes having a manufacturer's maximum rated capacity exceeding five tons, operated in construction or demolition work, and of the following type: that type of crane which consists of a mobile carrier-mounted, power-operated hoisting machine utilizing hoisting rope and a power-operated boom moveable laterally by rotation of the machine on the carrier. The word "crane" as used in this subdivision refers only to a crane to which this subdivision applies.

(3) *Certificate of competence required.* (i) No person, whether the owner or otherwise, shall operate a crane in the State unless he is a certified crane operator by reason of the the fact that:

(a) he holds a valid certificate of competence, issued by the commissioner, to operate a crane; or

(b) he is at least 21 years of age and holds a valid license issued by the federal government, a State government, or by any political subdivision of this or any other State, and such license has been accepted in writing by the commissioner as equivalent to a certificate of competence issued by him.

(ii) Notwithstanding the foregoing provisions:

(a) a person who is at least 21 years of age and who is employed by the federal government, the State or a political subdivision, agency or authority of the State may operate a crane owned or leased by the federal government, the State or such political subdivision, agency or authority if his assigned duties include operation of a crane;

(b) a person who is at least 21 years of age and who is employed only to test or repair a crane may operate it for such purpose while under direct supervision of a certified crane operator; or under direct supervision of a person, employed by the federal government, the State, or a political subdivision, agency or authority of the State, whose assigned duties include the operation of a crane;

(c) an apprentice or learner who is at least 18 years of age and who has the permission of the owner or lessee of a crane to take instruction in its operation may operate such crane under the direct supervision of a certified crane operator; or under direct supervision of a person, employed by the federal government, the State, or a political subdivision, agency or authority of the State, whose assigned duties include the operation of a crane.

(23.46)

(4) *Application forms, and photographs.* Application for a certificate of competence or for a renewal thereof shall be made on forms provided by the commissioner. Upon notice from the commissioner to an applicant that a certificate of competence or a renewal will be issued to him, the applicant must forward photographs of himself in such numbers and sizes as the commissioner shall prescribe, and such photographs must have been taken within 30 days of the request for such photographs.

(5) *Physical condition.* No person suffering from a physical handicap or illness, such as epilepsy, heart disease, or an uncorrected defect in vision or hearing, that might diminish his competence, shall be certified by the commissioner.

(6) *Experience required.* An applicant for a certificate must be at least 21 years of age and must have had practical experience in the operation of cranes for at least three years and in addition have a practical knowledge of crane maintenance.

(7) *Examining board.* The commissioner may appoint an examining board which shall consist of at least three members, at least one of whom shall be a crane operator who holds a valid certificate of competence, issued by the commissioner, and at least one of whom shall be a representative of crane owners. The members of the examining board shall serve at the pleasure of the commissioner and their duties will include:

(i) the examination of applicants and their qualifications, and the making of recommendations to the commissioner with respect to the experience and competence of the applicants;

(ii) the holding of hearings regarding appeals following denials of certificates;

(iii) the holding of hearings prior to determinations of the commissioner to suspend or revoke certificates, or to refuse to issue renewals of certificates; and

(iv) the reporting of findings and recommendations to the commissioner with respect to such hearings.

The acts and proceedings of the examining board shall be in accordance with regulations issued by the commissioner.

(8) *General examination.* Each applicant for a certificate will, and each applicant for a renewal may, be required by the commissioner to pass an appropriate general examination.

(9) *Operating examination.* An applicant who passes the general examination will also be required to pass a practical examination in crane operation, except that the commissioner may waive this requirement with respect to an applicant for the renewal of a certificate of competence.

(10) *Contents of certificate.* Each certificate issued shall include the name and address of the certified crane operator, a brief description of him for the purpose of identification, and his photograph.

(11) *Term of certificate.* Each certificate or renewal shall be valid for three years from the date issued, unless its term is extended by the commissioner or unless it is sooner suspended or revoked. The commissioner may extend the term of any certificate as he may find necessary to relieve a certified operator of unnecessary hardship.

(12) *Carrying certificate.* Each certified operator shall carry his certificate on his person when operating a crane, and failure to produce the certificate upon request by a Department of Labor inspector will be presumptive evidence that the operator is not certified.

(13) *Renewals.* An application for removal of a crane operator's certificate shall be made within one year from the expiration date of the certificate sought to be renewed, except that the commissioner may extend the time to make such application to prevent undue hardship to a certified operator.

(14) *Suspension, revocation, refusal to renew, denial of certificates; hearings.*

(i) The commissioner may, upon notice to the interested parties and after a hearing before the examining board, suspend or revoke a certificate upon finding that the certified operator has failed to comply with an order of the commissioner; or that the certified operator is not a person of proper competence, judgment, or ability; or for other good cause shown.

(ii) Prior to a determination by the commissioner not to renew a certificate of competence the commissioner shall require a hearing before the examining board, upon notice to the interested parties.

(iii) (a) An applicant whose application for a certificate has been denied by the commissioner may, upon his written request made to the commissioner within 30 days after the mailing or personal delivery to him of a notice of such denial, have a hearing before the examining board.

(b) Such hearing shall be held by the examining board, which shall make its recommendations to the commissioner within three days after the hearing has been concluded. A written notice of the commissioner's decision, containing the reasons therefor, shall be promptly given to the certified operator or applicant, as the case may be, and to any interested parties who appeared at the hearing. Every hearing shall be held in accordance with such regulations as the commissioner may establish.

(o) *Derricks—bracing of foot blocks.* The foot blocks of derricks shall be securely supported and firmly anchored against movement in any direction.

(p) *Derricks—guys.* (1) *Number and spacing.* The top of a guy derrick mast more than 25 feet in height shall be steadied by not less than

(23.46)

six wire rope guys so spaced as to make the angles between adjacent guys approximately equal.

(2) *Attachment.* Wire rope guys shall be secured by either weldless steel sockets, thimble and splice connection, thimbles with proper size and number of rope clips, or cast steel guy plates having grooved bearing surfaces of the same shape and size as the wire rope thimbles, using a spliced or wire rope clip attachment.

(3) *Anchoring.* Guys shall be attached to strong permanent construction or to substantial "dead men" securely anchored in the ground.

(q) *Derricks—breast type.* Breast derricks shall be guyed from both the front and the rear of the derricks. Where a front guy is not possible because of the use to which the derrick is put, provision shall be made to prevent the derrick from tipping over backward. Breast derricks which are operated by hand power shall have hand grips securely and positively fastened to the shaft and a ratchet and pawl shall be provided which will hold the load.

(r) *Derricks—construction.* (1) *Materials.* The mast, boom, frame and similar parts of a derrick shall be of suitable steel or of selected wood of proper strength and durability.

(2) *Mast fittings.* On derricks which have a boom longer than the mast, the gudgeon pin, mast top and gooseneck shall be securely fastened to the top of the mast to prevent the pulling out of these parts when the boom is raised.

(3) *Cast iron.* Cast iron shall not be used for members or parts subject to tension or torsion.

(s) *Derricks—capacity chart.* A capacity chart shall be provided for every derrick. Such charts shall be kept on the job site. Unless furnished by the manufacturer or builder of the derrick, the capacity chart shall be prepared and certified by a qualified licensed professional engineer and a copy thereof shall be submitted, on request, to the commissioner.

(t) *Derricks—load limitation.* No load shall be lifted by any derrick that exceeds the relevant maximum specified by its capacity chart.

23.47 Conveyors and cableways. (a) *Walkways.* Walkways along conveyor belts shall be kept free of materials and, where three feet or more above the ground, shall be provided with a safety railing.

(b) *Trippers.* Where trippers are used to control discharge, a device for throwing the belt drive into neutral shall be installed at each end of the runway.

(c) *Spillage.* Where conveyor belts cross any traveled way, trays shall be installed to catch spillage.

(d) *Overhead protection.* When men work or pass directly below any conveyor, overhead protection shall be provided.

(e) *Signal system required.* A signal system shall be used for starting and stopping and raising or lowering of loads.

(f) *Riding prohibited.* No person shall ride any conveyor belt or the bucket or load being handled by any cableway.

23.48 Excavating and grading machines. (a) *Footing.* Excavating machines as herein defined shall not be used where an unstable condition or slope of the ground may cause a dangerous tilt of the machine. To prevent such unstable condition, mats of timber or equivalent means to afford stable footing shall be provided.

(b) *Protection of operator.* Where the operator may be exposed to an overhead hazard a cab or equivalent cover affording protection against such hazard shall be provided.

(c) *Operation.* Excavating machines and grading machines shall be operated only by designated persons. No person except the operating crew shall be permitted on an excavating or a grading machine while it is in motion or operation. No person other than the pitman and excavating crew shall be permitted to stand within range of the back of a power shovel or within range of the swing of the dipper while the shovel is in operation. When the machine is not in use, the blade or dipper shall rest on the ground. The operator of the machine shall not leave the controls at any time when the master clutch is engaged. Oiling and greasing shall be done only while the machine is at rest and the master clutch disengaged. The boom or the bucket, dipper or clamshell of a power shovel or crane shall not be passed over the seat or cab of a truck or other transporting equipment while any employee is in the cab.

(d) *Power shovel operation near power lines.* If a power shovel is operated in such a location that any part of the machine or of its load in any position of boom or swing may come within 10 feet of a live power line:

- (1) the power line shall be de-energized, or
- (2) the power line shall be effectively insulated or isolated, or
- (3) the power shovel shall be effectively grounded as hereinafter provided.

(i) The power shovel shall be provided with a permanent clamp or other means for convenient and effective attachment of a grounding conductor. The cable connecting the clamp to the ground shall be equivalent to a No. 2 AWG or larger single conductor, superflexible, rope-stranded copper, composed of not less than 1,600 individual wires, with 600 volt covering for mechanical protection and with terminal parts that insure a good connection with hand-type screw clamps.

(ii) An effective ground shall be one having a resistance of 25 ohms or less, which shall be measured, or a connection to a continuous underground metallic water piping system.

(e) *Trenching.* Material shall not be pushed manually into the path of trenching machines.

(23.48)

(f) *Stopping or parking machines.* The operator of the machine shall not leave his controls until he has lowered the bucket or blade into firm contact with the ground.

23.49 Auto trucks. (a) *Brake maintenance.* Brakes shall be so maintained that the vehicle with full load may be securely held on any grade that may be encountered in normal use on the job.

(b) *Blocks.* (1) Provision shall be made to apply wheel blocks to trucks ascending ramps of steeper than one in 10 slope in case the vehicle shall stall or slide.

(2) No person shall work under the raised body of a dump truck unless the body is securely blocked to prevent accidental lowering.

(c) *Loading.* Trucks shall not be loaded beyond their capacity and the load shall be trimmed before the truck is set in motion. Loads that are apt to become dislodged in transit shall be securely lashed in place.

(d) *Backing.* Trucks shall not be backed or dumped in places where men are working nor backed into a hazardous location, unless guided by a person so stationed that he can see the truck driver and the space in back of the vehicle.

(e) *Riding.* No employee shall be suffered or permitted to ride on running boards or fenders or elsewhere on a truck or similar vehicle except where a properly constructed seat or platform is provided for his use.

(f) *Dumping.* No person shall be within the body (load-carrying portion) of a truck while the dumping mechanism is being operated.

(g) *Cab protector.* Dump truck bodies which are loaded by mechanical means shall be equipped with a suitable steel cab protector, covering at least the rear quarter of the top of the cab.

23.50 Hand-propelled vehicles. (a) *Maintenance.* Hand-propelled vehicles shall be maintained in good repair. Vehicles with damaged handles or loose parts shall not be used.

(b) *Wheels and handles.* Wheels shall be maintained free-running and well secured to the frame. Buggy handles shall not extend beyond the wheels on either side.

(c) *Buggy counterbalance.* Loose weights shall not be hung on buggy handles as counterbalances. When counterbalance weights are used, they shall be fastened securely to the handles.

(d) *Curbing.* Curbing shall be provided along edges over which material is dumped to a lower level.

(e) *Storage.* When not in use, hand-propelled vehicles shall be left in a location away from passageways and places of work.

23.51 Lift and fork trucks. (a) *Capacity.* A metal plate with readily legible etched or stamped figures giving the capacity rating in pounds shall be attached to every lift or fork truck.

(23.51)

(b) *Loading.* No lift or fork truck shall be loaded beyond its capacity rating. No hand-operated pallet truck loaded so that any point on the load is at a greater height than four feet six inches above the floor shall be moved by pushing unless handled by two men.

(c) *Brakes and load-elevating mechanisms.* Every power-operated lift and fork truck shall be provided with a lockable brake. The load-elevating mechanism shall be lockable at any elevation.

(d) *Hand-lift handles.* Every pallet truck having a hand-lift handle shall be provided with an automatic device to retain the raised load and free the handle until it is re-engaged by the operator.

(e) *Operating surfaces.* No lift or fork truck, whether hand or power-operated, shall be used on any surface that is so uneven as to make up-setting likely.

(f) *Packaged masonry units.* No masonry units packaged by means of wire or metal tape shall be handled by a lift or fork truck when any part of such wire or tape binding is broken.

(g) *Loose masonry units.* Unless palletized masonry units are securely bound in package form, provision shall be made to prevent spillage.

(h) *Support of pallets.* Loaded pallets shall be kept level at all times. Masonry units used as supports shall be securely lashed to the pallet and shall be of proper quality and number to provide stable footing for the load. Loose material and other unstable supports shall not be used.

(i) *Protection of operator.* After April 2, 1962 every fork lift truck shall be provided with a substantial overhead canopy or screen to protect the operator against falling objects.

(j) *Prohibited use.* No lift or fork truck shall be in motion when the loaded forks are elevated higher than necessary to clear floor obstructions except as required for positioning the load.

23.52 Power buggies. (a) *Definition.* As used herein, the term "power buggy" means an automotive vehicle designed solely for the transportation of materials on and about construction and demolition sites. It does not include automobiles, motor trucks, general purpose tractors, bulldozers, scoops or other excavating or material handling machinery.

(b) *Assigned operator.* No person other than a trained operator designated by the employer shall operate a power buggy.

(c) *Defective machines.* No power buggy shall be operated unless it has the mechanical characteristics, features and devices herein required and is in good operating condition.

(d) *Mechanical requirements.* (1) *Stability.* Every power buggy shall be so designed and constructed as to withstand without tilting:

(i) a 45 degree turn at full rated load and maximum designed forward speed;

(23.52)

(ii) a collision stop against wheel blockage on a level grade at full rated load and one-half maximum designed forward or full reverse speed;

(iii) lateral traversal of 10 per cent slopes at full rated load and maximum designed speed.

(2) *Braking power.* (i) Every power buggy shall be provided with brakes and tire surfaces capable of bringing it to a full stop within 25 feet on a level dry plank surface or frictional equivalent at full rated load and maximum designed speed.

(ii) Brakes shall be capable of being fixed in engagement to hold the full load stationary on a 25 per cent grade.

(3) *Accidental starting.* The controls of every power buggy shall be so arranged or shielded that they cannot be accidentally engaged.

(4) *Warning devices.* Every power buggy shall be equipped with an easily operable horn or other audible warning signal.

(5) *Seats and visibility.* Every power buggy of the riding type shall be provided with an operator's seat or standing platform designed and secured to prevent slipping off and so located that the operator may have maximum practicable driving visibility.

(6) *Speed.* Every power buggy of the riding type shall be so designed or equipped that it cannot travel faster than 12 miles per hour on a level surface.

(e) *Operation.* (1) *Parking on grades.* No power buggy shall be left unattended on any grade sufficiently steep to cause it to coast if free of engine and brake resistance.

(2) *Prohibited operation.* No power buggy shall be operated:

(i) at a speed greater than 12 miles per hour,

(ii) when carrying more than its full rated load,

(iii) on insecure or skiddy surfaces or surfaces so inclined or uneven as to endanger stability,

(iv) on grades steeper than 25 per cent, or

(v) on ramps, runways, or other surfaces not in compliance with this Part (rule).

(f) *Special requirements for runways, etc.* Runways, ramps, platforms and other surfaces upon which power buggies are operated shall conform to the following requirements:

(1) They shall be substantially constructed and securely supported, braced and fastened to prevent movement.

(2) They shall be constructed to sustain without failure at least four times the maximum load for which they are intended.

(3) The minimum width inside of curbs for any ramp, runway or platform shall be two feet wider than the outside width of any power

(23.53)

(f) *When not in use.* When the pile driver is not in use the hammer shall be chocked or blocked in the leads or lowered to the ground.

(g) *Temporary interruption.* The operator of every pile driver shall remain at his post when the driving is interrupted until the hammer has been chocked or blocked in the leads, or has been lowered and is resting on a driven pile or on the ground.

(h) *Steam and air lines.* Steam and air hose shall be securely fastened in place at couplings and intermediate points to prevent dangerous whipping of the hose in the event of a break. The control valves for steam and air lines shall be located within easy reach of the operator.

(i) *Driving plates, cushions, striking heads.* Driving plates, cushions and striking heads shall be securely and positively fastened in such a manner as to prevent their dislodgment during the driving operations.

(j) *Ladders.* A ladder extending from the bottom of the leads to the overhead sheaves shall be permanently attached to the structure supporting the leads.

(k) *Working platforms.* Where a structural tower supports the leads, working platforms consisting of not less than two-inch planking laid tight shall be provided on all levels of the leads at which it is necessary for men to work. Such platforms shall be provided with a safety railing and toeboard on all sides, except on the hammer or lead side of the platform. Where such platforms cannot be provided a safety belt shall be provided.

23.54 Mixing machines. (a) *Charging skips.* Each time before raising or lowering the charging skip, the operator shall satisfy himself that no one is in the danger area. In addition, there shall be a guard rail on both sides of the charging skip so arranged as to prevent passage under the raised skip.

(b) *Hoppers.* Hoppers into which a person may fall shall be effectively protected by cross grating with maximum openings of one square foot.

(c) *Bucket hoists.* Where a falling hazard exists at the point at which a mixer discharges into a bucket hoist, protection shall be provided by location or a substantial railing.

(d) *Flywheels.* Flywheels and power transmission mechanisms shall be kept covered against accidental contact.

(e) *Trough type mixers.* The revolving blades of mixing machines of the trough or batch type shall be guarded with a substantial iron grating consisting of crossbars of one-half inch round stock or its equivalent, spaced not to exceed five inches between bars and located at least five inches above the blades.

23.55 Jacks. (a) *Capacity marking.* The rated capacity of every jack shall be legibly marked in a prominent location on the jack by casting or stamping.

(23.55)

(b) *Overtravel*. Every jack shall, where practicable, be provided with a positive stop to prevent overtravel; otherwise an indicator to clearly show overtravel shall be provided on the jack.

(c) *Lubrication*. Jacks shall be maintained properly lubricated.

(d) *Loads*. When the object has been lifted to the desired height, blocking or cribbing shall be immediately placed under it.

(e) *Supervision*. The use of jacks shall at all times be under the direct supervision of a designated person.

23.56 *Electrical and pneumatic hand tools*. (a) *Power shut-off requirements*. Electric and pneumatic tools shall be disconnected from the source of power and the pressure in hose lines shall be released before any adjustments or repairs are made except replacement of bits in electric drills. The air shall be shut off before disconnecting air hose.

(b) *Electrical and hose lines*. Electric lines and hose lines shall be guarded by location or by covering to prevent severe abrasion.

(c) *Grounding electrical tools*. Electrically operated tools shall be grounded during use. The ground wire shall be connected to the frame of the machine and the other end shall be properly grounded.

23.57 *Welding and flame cutting*.

(a) *Compressed gas cylinders*. (1) Cylinders shall be stored in an upright position, away from open flames, radiators and other sources of heat and so arranged or placed that they will not be knocked over or damaged by passing or falling objects. During use cylinders shall be securely lashed to a stationary object unless other suitable provision has been made to prevent their upsetting. During use every cylinder shall have the valve key or wrench set in place on the valve spindle. All cylinders shall be used in an upright position. Cylinders containing oxygen shall not be stored so near to cylinders containing combustible gas, or to combustible material, oil or grease as to create a spontaneous combustion hazard. Cylinder valves shall be closed at all times when not in use. Regulators or reducing valves shall be tightly connected with a gastight connection. Gas or oxygen cylinders shall not be used unless equipped with the proper regulator or automatic reducing valve. All valves shall be opened by hand.

(2) Empty cylinders shall be immediately removed from working areas, and stored in a designated location. The valves shall be closed and a tag or sign indicating that the tank is empty shall be attached. The use of cylinders as rollers, props or supports is forbidden.

(b) *Hose and hose connections*. (1) All hose shall be first quality and of a type manufactured for use on construction jobs. Oxygen hose shall have fittings of a different design and shall be of a different color from the hose used for the fuel gas connections. Hose connections shall be of either the ferrule or clamp type and the hose shall be

(23.61)

shall designate the necessary personnel to dispose of the misfire and shall determine the safe and proper method of its disposal. No persons except those designated to effect such disposal shall enter the danger zone until the misfire has been disposed of.

(bb) *Reloading holes.* In case a charge fires without shattering the burden, it is permissible to reload the bore hole, but only after the temperature of the hole has been reduced by water or otherwise to not more than 100 degrees Fahrenheit.

(cc) *Blasting mat.* Wherever any person may be endangered the rock to be blasted shall be covered on all exposed sides with a strong woven matting of rope not less than one and one-half inches in diameter, or of wire rope not less than one-half inch in diameter, or other covering which will be equally effective in preventing particles from being projected into the air by the blast.

(dd) *Operations during electrical storms.* All use of explosives and any handling thereof shall be stopped immediately upon the approach of a thunderstorm and all personnel in the area shall immediately seek a place of safety in a proper location designated by the person in charge of the job.

(ee) *Prohibited use of two-way communication.* No two-way radio signal or radio telephone communication shall be used in a blasting area and a sign to that effect shall be conspicuously posted.

23.62 Imminent danger—notice, warning and avoidance. Where noncompliance with a provision of this Part (rule) causes or tends to cause imminent danger to a person employed in construction or demolition work and written notice thereof is given by the commissioner to the appropriate employer, owner, contractor or subcontractor, or to his agent, such person shall either (a) at once effect compliance sufficiently to end the danger or (b) unless the commissioner does such posting or tagging on his behalf, forthwith post the dangerous area or tag the dangerous device or material with suitable posters or signs warning of the danger and forbidding unauthorized entry into the area or unauthorized use of the device or material, and shall maintain such posters or signs until the danger has been ended. While such noncompliance exists no employer shall suffer or permit any person employed by him to enter or be within an area or to use a device or material as to which he has received such a notice of imminent danger, or which is so posted or tagged, except to effect compliance with this Part (rule). No unauthorized person shall remove such a poster or sign.

23.63 Severability. If any provision of this Part (rule) or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of this Part (rule) which can be given effect without the invalid provisions or applications and to this end the provisions of this Part (rule) are declared to be severable.

STATE OF NEW YORK
NELSON A. ROCKEFELLER
Governor

DEPARTMENT OF LABOR
LOUIS L. LEVINE
Industrial Commissioner

BOARD OF STANDARDS AND APPEALS
11 North Pearl Street, Albany, New York 12207

Harry R. Mason, Chairman
George Archinal, Member
B. Franklin Spencer, Member

Copies of this Rule may be obtained, free of charge, by individuals and groups when in the judgment of the Commissioner, such distribution will further safety education and compliance with the Code Rules.

Requests for copies by mail should be directed to the State of New York, Department of Labor, Administrative Officer, State Office Building Campus, Albany, New York 12226. However, single copies may be obtained by applying in person at the Department's office at Albany, and in New York City at the Business Administration office, 80 Centre Street, New York, New York 10013.

STATE OF NEW YORK
DEPARTMENT OF LABOR
BOARD OF STANDARDS AND APPEALS } SS.:

In pursuance of the authority vested in me by subdivision 1 of section 102 of the Executive Law, I, HARRY R. MASON, Chairman of the New York State Board of Standards and Appeals, DO HEREBY CERTIFY that the copy of Industrial Code Rule No. 23 (12 NYCRR 23), Protection of Persons Employed in Construction and Demolition Work, hereto attached is a correct transcript of the original amendment of said rule duly adopted by said Board on the 28th day of June, 1963, pursuant to the authority of sections 27-a, 28, 29, 200, 241, 241-a and 242 of the Labor Law, prescribed to take effect on the 1st day of August, 1963, and duly filed in the office of Secretary of State of the State of New York on the 31st day of July, 1963, except only the designations and numbering determined by the Secretary of State in, by and for the Official Compilation of Codes, Rules and Regulations of the State of New York, pursuant to section 102 of the Executive Law.



Given under my hand and the seal of office of the Department of Labor at the City of Albany, New York on the 16th day of January, 1969.

HARRY R. MASON
Chairman, New York State
Board of Standards and Appeals

HISTORICAL NOTES

Industrial Code Bulletin No. 23 relating to Erection, Repair or Demolition of Buildings, which was adopted by the State Industrial Commission, became effective April 15, 1920. This was repealed by the Board of Standards and Appeals; when Industrial Code Rule No. 23 relating to Protection of Persons Employed in the Erection, Repair or Demolition of Buildings or Structures, adopted by the Board October 1, 1941, became effective on February 1, 1942.

The Board has further amended or revised Industrial Code Rule No. 23, effective successively on October 1, 1944; July 1, 1947; February 1, 1950; September 15, 1951; April 15, 1954; December 22, 1954; July 1, 1957; November 1, 1959; April 2, 1962; and June 28, 1963. The present title of the rule has been used since July 1, 1957.

EXTRACTS FROM THE LABOR LAW

Section 27-a. General powers and duties of the board of standards and appeals. The board of standards and appeals shall have power, subject to the provisions of section twenty-nine of this chapter, to make, amend and repeal rules for carrying into effect the provisions of this chapter, applying such provisions to specific conditions and prescribing means, methods and practices to effectuate such provisions.

* * * * *

Section 240. Scaffolding and other devices for use of employees. 1. A person employing or directing another to perform labor of any kind in the erection, demolition, repairing, altering, painting, cleaning or pointing of a building or structure shall furnish or erect, or cause to be furnished or erected for the performance of such labor, scaffolding, hoists, stays, ladders, slings, hangers, blocks, pulleys, braces, irons, ropes, and other devices which shall be so constructed, placed and operated as to give proper protection to a person so employed or directed.

2. Scaffolding or staging more than twenty feet from the ground or floor, swung or suspended from an overhead support or erected with stationary supports, except scaffolding wholly within the interior of a building and covering the entire floor space of any room therein, shall have a safety rail of suitable material properly attached, bolted, braced or otherwise secured, rising at least thirty-four inches above the floor or main portions of such scaffolding or staging and extending along the entire length of the outside and the ends thereof, with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3. All scaffolding shall be so constructed as to bear four times the maximum weight required to be dependent therefrom or placed thereon when in use.

4. The commissioner shall immediately inspect a scaffold or device concerning which complaint is made. He shall attach to every scaffold or device that he inspects a certificate stating that he has made the inspection and has found the same safe or unsafe, as the case may be. If unsafe, the commissioner shall at once, in writing, notify the person responsible for the scaffold or mechanical device of the fact and shall prohibit the use of it by him or by any other person until all danger is removed by alteration, reconstruction or replacement as the commissioner may direct. Such notice may be served personally upon the person responsible or by affixing it conspicuously to the scaffold or device declared unsafe.

Section 241. Protection of employees on building construction or demolition work including excavation work in connection therewith. All contractors and owners, when constructing or demolishing buildings or doing any excavating in connection therewith, shall comply with the following requirements:

1. If the floors are to be arched between the beams thereof, or if the floors or filling in between the floors are of fireproof material, the flooring or filling in shall be completed as the building progresses.

2. If the floors are not to be filled in between the beams with brick or other fireproof material, the underflooring shall be laid on each story as the building progresses.

3. If double floors are not to be used, the floors two stories immediately below the story where the work is being performed shall be kept planked over.

4. If the floor beams are of iron or steel, the entire tier of iron or steel beams on which the structural iron or steel work is being erected shall be thoroughly planked over, except spaces reasonably required for proper construction of the iron or steel work, for raising or lowering of materials or for stairways and elevator shafts designated by the plans and specifications.

5. If elevators, elevating machines or hod-hoisting apparatus are used in the course of construction, for the purpose of lifting materials, the shafts or openings in each floor and at each landing level shall be inclosed or fenced in on all sides by a barrier of suitable height, except on two sides which may be used for taking

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off and putting on materials, and those sides shall be guarded by an adjustable barrier not less than four feet from the floor and not less than two feet from the edges of such shafts or openings.

6. The board of standards and appeals may make rules to provide for the protection of workmen in connection with the excavation work for the construction of buildings, the work of constructing or demolishing buildings and structures, and the guarding of dangerous machinery used in connection therewith, and the owners and contractors for such work shall comply therewith.

Section 241-a. Protection of workmen in or at elevator shaftways, hatchways and stairwells. Any men working in or at elevator shaftways, hatchways and stairwells of buildings in course of construction or demolition shall be protected by sound planking at least two inches thick laid across the openings at levels not more than two stories above and not more than one story below such men, or by other means specified in the rules of the board.

Section 242. Enforcement of article. The commissioner and the chief officer charged with the enforcement of the building laws of any city, town or village shall enforce this article. Such officer shall have all the powers for enforcement of it that are vested in the commissioner.

Section 213. Violations of provisions of labor law; the industrial code; the rules, regulations, or orders of the industrial commissioner and the board of standards and appeals. Any person who violates or does not comply with, any provision of the labor law, any provision of the industrial code, and rule, regulation or lawful order of the industrial commissioner or the board of standards and appeals, and the officers of any corporation who knowingly permit the corporation to violate such provisions, are guilty of a misdemeanor. . . .

NOTE

The phrase "suffer or permit" as employed in this rule implies knowledge or the opportunity through reasonable diligence to acquire knowledge. This presupposes a fair measure of continuity and permanence. The phrase further implies the power to prohibit, prevent or hinder an act or condition. See *Peo. ex rel, Price vs. Sheffield Farms, etc.*, 225 N.Y. 25, 30 and *Avon Bar and Grill, Inc. vs. O'Connell*, 276 A.D. 507 and cases cited.

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EXPLANATION OF NUMBERING SYSTEM

In accordance with the uniform numbering system established by the Secretary of State for the *Official Compilation of Codes, Rules and Regulations of the State of New York* the following arrangement has been used in the text of the Industrial Code Rule No. 23 (12 NYCRR 23) contained herein.

<i>Division of Numbering System</i>	<i>How Numbered</i>	<i>Example</i>
Title	Arabic numeral	Title 12 (Department of Labor)
Chapter	Capital roman numeral	Chapter I (Board of Standards and Appeals)
Subchapter	Capital letter	Subchapter A (The Industrial Code)
Part	Arabic numeral	Part 23 (Industrial Code Rule No. 23)
Section	Arabic numeral separated from Part number by decimal	23.1, 23.2 . . .
Subdivision	Small letter in parentheses	(a), (b) . . .
Paragraph	Arabic numeral in parentheses	(1), (2) . . .
Subparagraph	Small roman numeral in parentheses	(i), (ii) . . .
Clause	Small italic letter in parentheses	(a), (b) . . .

References in or in connection with the following text to "Part," "section," "subsection," "paragraph," "subparagraph" or "clause" are to be understood in accordance with the system outlined above.

INDUSTRIAL CODE RULE NO. 23 (12 NYCRR 23)

CONTENTS

Section No.	Subject	Page No.
23.0	Finding of fact	
23.1	Application	
23.2	Definitions	
23.3	General provisions	
(a)	Application	
(b)	General duty to protect the health and safety of persons employed in construction and demolition work	
(c)	General requirement of competency	
(d)	General requirement of quality	
(e)	Responsibility of employees	
(f)	Condition of equipment and safeguards	
(g)	Strength of equipment	
(h)	Overhead hazards	
(i)	Falling hazards	
(j)	Drowning hazards	
(k)	Slipping hazards	
(l)	Tripping and other hazards	
(1)	Passageways	
(2)	Working areas	
(m)	Vertical passage	
(n)	Control of dusts and gases	
(o)	Corrosive substances	
(p)	Eye protection	
(q)	Respirators	
(r)	Protective apparel	
(1)	Head protection	
(2)	Boots	
(3)	Waterproof clothing	
(4)	Corrosive substances	
(s)	Cleanliness of personal protective equipment	
(t)	Power-driven machines — general	
(u)	Keys, set-screws and similar projections	
(v)	Power-driven saws	
(w)	Sprockets, gears and friction-disc drives	
(x)	Belts, pulleys, flywheels and wire rope	
(y)	Hand tools	
(z)	Safety railing	
(aa)	Temporary electric wiring	
(bb)	Electrical hazard	
(1)	Investigation and warning	
(2)	Protection of employees	
(3)	Guarding of switches, etc.	
(4)	Notifying utility company	
(5)	Generators	
(6)	Public Service Commission operations	
(cc)	Lighting	
(dd)	Lumber and nail fastenings	
(ee)	Specified lumber dimensions	
(ff)	Public vehicular traffic	
(gg)	Stability of structures	
23.4	Approval of materials and devices	

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
23.5	Maintenance and housekeeping	11
(a)	Storage of material and equipment	11
(b)	Disposal of debris	11
23.6	Sanitation and drinking water	11
(a)	Toilet facilities	11
(b)	Accessibility of toilets	11
(c)	Shelter	11
(d)	Washing facilities	11
(e)	Change houses	11
(f)	Drinking water	11
23.7	Demolition	11
(a)	General method of demolition	11
(b)	Preparations	12
(c)	Protection of adjacent structures	12
(d)	Demolition of walls, partitions, etc.	12
(e)	Inspection	12
(f)	Boarding of wall openings	12
(g)	Methods of operation	13
(h)	Access to floors	13
(i)	Protection in other areas	13
(j)	Demolition of structural steel	13
(k)	Demolition of floor arches	13
(l)	Floor openings—permissible area	13
(m)	Floor openings—required protection	13
(n)	Storage of material—general	14
(o)	Storage of debris in cellar	14
(p)	Safe footing required	14
(q)	Catch platforms	15
(r)	Barricades	15
(s)	Mechanical method of demolition	15
23.8	Excavation	16
(a)	Stability of structures	16
(b)	General requirements	16
(c)	Piling, shoring and bracing	16
(d)	Access	16
	Table I	17
	Table II	17
(e)	Trench excavations	18
23.9	Structural steel assembly	18
(a)	Placing of structural members	18
(b)	Holing or cutting of structural members	18
(c)	Tag lines	18
(d)	Erection of lintels	18
23.10	Concrete work	19
(a)	General requirements	19
(b)	Inspection	19
(c)	Beams, floors and roofs	19
(d)	Stripping	19
(e)	Reshoring	19
23.11	Special requirements for building construction	19
(a)	Permanent flooring—skeleton steel construction in tiered build- ings	19
(b)	Temporary flooring—skeleton steel construction in tiered build- ings	19
(c)	Flooring—other construction	20

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(d)	Protection of workmen in shafts—general	20
(e)	Protection of workmen in elevator shafts	20
(f)	Catch platform required	21
23.12	General provisions for all scaffolds	21
(a)	Scope	21
(b)	Footings — anchorage	21
(c)	Scaffold structure	21
(d)	Loading	21
(e)	Planking	21
(f)	Maintenance and repair	22
(g)	Lumber	22
(h)	Erection and removal	22
(i)	Overhead protection	22
(j)	Guard rails and toeboards	22
(k)	Metal parts	22
(l)	Splices	22
23.13	Special provisions for pole scaffolds	23
(a)	Poles	23
(b)	Putlogs	23
(c)	Bracing	23
(d)	Connections	23
(e)	Planking	23
(f)	Erection and removal	23
(g)	Specification requirements	23
	Table III	24
	Table IV	24
	Table V	25
	Table VI	25
	Table VII	26
	Table VIII	26
23.14	Special provisions for outrigger scaffolds	27
(a)	Outrigger beams	27
(b)	Inboard supports	27
(c)	Design and construction	27
	Table IX	27
(d)	Planking	27
(e)	Enclosure	27
(f)	Superstructures	27
23.15	Special provisions for all suspended scaffolds	28
(a)	Inspection before installation	28
(b)	Installation and use	28
(c)	Fibre rope tackle	28
(d)	Hoisting machines	28
(e)	Limitation on use of fibre rope	28
(f)	Tie-ins	28
(g)	Platform supports	28
(h)	Planking	28
23.16	Special provisions for two-point suspension scaffolds	28
(a)	Width and fastening	28
(b)	Hangers	28
(c)	Roof irons	28
(d)	Railings and toeboards	29
(e)	Use	29
(f)	Fibre rope	29
(g)	Types of platforms	29

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
(1)	Type 1. Ladder type platforms	29
(2)	Type 2. Plank type platforms	29
	Table X	30
(3)	Type 3. Beam platforms	30
23.17	Special provisions for multiple-point suspension scaffolds	30
(a)	Design	30
(b)	Installation	31
(c)	Platform	31
(d)	Railing and toeboard	31
(e)	Overhead protection	31
(f)	Platform	31
(g)	Dismantling	31
23.18	Special provisions for needle beam scaffolds	31
(a)	Use	31
(b)	Platform supports	32
(c)	Rope	32
(d)	Platform	32
(e)	Containers for tools	32
23.19	Special provisions for horse scaffolds	32
(a)	Limitation of height	32
(b)	Installation	32
(c)	Construction of horses	32
(d)	Spacing	33
23.20	Special provisions for carpenter's portable bracket scaffolds	33
(a)	Construction of brackets	33
(b)	Bracket installation	33
(c)	Loading	33
23.21	Special provisions for bricklayer's square scaffolds	33
(a)	Limitation of use	33
(b)	Construction of squares	33
	Table XI	33
(c)	Construction of scaffolding	33
(d)	Platform	34
(e)	Multiple tiers	34
23.22	Special provisions for lean-to scaffolds	34
(a)	Limited use	34
(b)	Construction	34
	Table XII	34
23.23	Special provisions for trestle and extension trestle ladder scaffolds	34
(a)	Permissible height	34
(b)	Bracing	34
(c)	Platforms	34
(d)	Limitations of use	34
23.24	Special provisions for ladder jack scaffolds	35
23.25	Manually propelled mobile scaffolds	35
(a)	Existing equipment	35
(b)	New equipment	35
23.26	Special scaffolds—approval required	35
23.27	Window jacks	36

<i>Section No.</i>	<i>Subject</i>	<i>Page No.</i>
23.28	Boatswain's chairs	36
(a)	Strength	36
(b)	Chair	36
(c)	Tackle	36
(d)	Anchorage	36
(e)	Seat guard or safety belt	36
23.29	Work on steep roofs	36
(a)	Roofing brackets	36
(1)	Required use	36
(2)	Construction	36
(3)	Installation	36
(b)	Crawling boards	36
(1)	Construction	36
(2)	Crawling board lifeline	37
(3)	Installation	37
(c)	High roofs	37
(1)	New roofs	37
(2)	Repair or maintenance	37
23.30	Safety belts	37
(a)	Approval required	37
(b)	Attachment required	37
(c)	Specifications for life lines	37
(d)	Instruction in use	37
(e)	Protection of life lines	37
(f)	Inspection—defective belts or lines	37
23.31	Life nets	38
(a)	Materials and construction	38
(b)	Size, strength, location and attachment	38
(c)	Maintenance	38
(d)	Inspection—defective nets	38
23.32	Safeguards against falling in bridge construction	38
23.33	Stairways	38
(a)	Construction	38
(b)	Protective railings	39
23.34	General requirements for ladders and ladderways	39
(a)	Special ladders—approval required	39
(b)	Strength	39
(c)	Materials of construction	39
(d)	Maintenance and replacement	39
(e)	Installation and use	39
(f)	Ladderways	40
(g)	Ladder rungs—wood	40
(h)	Splicing	40
(i)	Metal ladders; limited use	40
(j)	Spreaders	40
(k)	Placement; door openings	40
23.35	Single ladders	40
(a)	Length	40
(b)	Construction of cleat ladders	40
23.36	Extension ladders and sectional ladders	40
(a)	Length	40
(b)	Adjustment	41
(c)	Sectional ladders	41