



**DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS**

**DIRECTOR'S OFFICE**

**CONSTRUCTION SAFETY STANDARDS**

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These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306.

Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of licensing and regulatory affairs by sections 19 and 21 of 1974 PA 154, MCL 408.1019 and 408.1021 and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445.2011, 445.2025, and 445.2030)

R 408.41501, R 408.41505, R 408.41510, R 408.41515, R 408.41520, R 408.41521, R 408.41522, R 408.41523, R 408.41524, R 408.41525, R 408.41526, R 408.41527, R 408.41530, R 408.41531, R 408.41540, R 408.41541, R 408.41542, R 408.41543, R 408.41550, R 408.41560, R 408.41561, R 408.41562, R 408.41563, R 408.41564, R 408.41570, R 408.41580, R 408.41590, and R 408.41595 of the Michigan Administrative Code are added, as follows:

**CONSTRUCTION SAFETY AND HEALTH STANDARD  
PART 15. EXCAVATORS, HOISTS, ELEVATORS, HELICOPTERS,  
AND CONVEYORS**

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## GENERAL PROVISIONS

### R 408.41501 Scope.

**Rule 1501.** (1) This part applies to mobile hydraulic excavators, personnel hoists, material hoists, elevators, helicopters, conveyors, and variations of such equipment when used during construction operations.

(2) This part applies to equipment included in subrule (1) of this rule when used with any attachment, whether mechanically attached or suspended.

(3) These rules do not cover any of the following:

(a) Equipment included in Construction Safety Standard Part 10 "Cranes and Derricks," as referenced in R 408.41505.

(b) Excavation equipment other than mobile hydraulic excavators, such as wheel loaders and backhoes. This equipment is covered in Construction Safety Standard Part 13 "Mobile Equipment," as referenced in R 408.41505.

### R 408.41505 Adopted and referenced standards.

**Rule 1505.** (1) The following standards are adopted by reference in these rules and are available from IHS Global, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at website: <http://global.ihs.com>; at a cost as of the time of adoption of these rules, as stated in this subrule.

(a) Power Crane and Shovel Association (PCSA) standard No. 5 "Mobile Hydraulic Excavator Standards," 1983 edition and "Referenced Material for PCSA Standards No. 4 and No. 5", 1982 edition. Cost: \$25.00.

(b) American National Standards Institute (ANSI) standard A10.4 "Safety Requirements for Personnel Hoists and Employee Elevators for Construction and Demolition Operations," 2004 edition. Cost: \$128.00.

(c) ANSI/American Society of Safety Engineers standard (ASSE) A10.5 "Safety Requirements for Material Hoists," 1992 edition. Cost: \$69.00.

(d) ANSI/American Society of Mechanical Engineers (ASME) A17.1 "Safety Code for Elevators and Escalators, Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices," 1965 edition with addenda A17.1a-1967, A17.1b-1968, A17.1c-1969, and A17.1d-1970. Cost: \$281.00.

(e) ANSI/ASME A17.2 "Guide for Inspection of Elevators, Escalators, and Moving Walks - Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, Inclined Elevators, Private Residence Elevators, and Escalators and Moving Walks," 1960 edition with addenda A17.2a-1965, and A17.2b-1967. Cost: \$96.00.

(f) ANSI B20.1, "Safety Standard for Conveyors, and Related Equipment," 1999 edition. Cost: \$52.00.

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

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

(4) The following Michigan occupational safety and health standards (MIOSHA) are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Michigan Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at:

[www.michigan.gov/mioshastandards](http://www.michigan.gov/mioshastandards). For quantities greater than 5, the cost, at the time of adoption of these rules, is 4 cents per page.

(a) Construction Safety Standard Part 10 "Cranes and Derricks," R 408.41001 to R 408.41099a.

(b) Construction Safety Standard Part 13 "Mobile Equipment," R 408.41301.

(c) Construction Safety Standard Part 18 "Fire Protection and Prevention," R 408.41801 to R 408.41884.

(d) Construction Safety Standard Part 22 "Signals, Signs, Tags, and Barricades," R 408.42201 to R 408.42243.

### R 408.41510 Definitions; Generally

**Rule 1510.** (1) "Competent person" means a person who is trained, experienced, and capable of identifying existing or potential hazards in the surroundings or under working conditions that are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

(2) "Operator" means a person who is operating the equipment.

(3) "Power lines" means electric transmission and distribution lines.

(4) "Qualified person" means a person who, through attainment of a recognized degree or certificate of professional standing or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

### R 408.41515 Power line clearances; generally.

**Rule 1515.** (1) When working in proximity to power lines, all equipment covered by this part shall maintain clearances as prescribed in Table A "Minimum Clearance Distances."

(2) When traveling with no load in proximity to power lines, all equipment covered by this part shall maintain clearances as prescribed in Table B "Minimum Clearance Distances While Traveling with No Load."

(3) The employer shall designate an employee to observe the clearance and give timely warning if it is difficult for the operator to maintain the prescribed clearance by visual means.

<b>TABLE A MINIMUM CLEARANCE DISTANCES</b>	
<b>Voltage (nominal, kV, alternating current)</b>	<b>Minimum clearance distance (feet)</b>
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner or operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)
Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.	

<b>TABLE B MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD</b>	
<b>Voltage (nominal, kV, alternating current)</b>	<b>Minimum clearance distance (feet) while traveling</b>
Up to 0.75	4
Over .75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1,000	20
Over 1,000	(as established by the utility owner or operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

## EXCAVATORS

### R 408.41520 Scope.

**Rule 1520.** This section applies to mobile hydraulic excavators when used during construction operations.

### R 408.41521 Definition.

**Rule 1521.** "Excavator", for the purposes of this standard, means mobile hydraulic excavator, either crawler or rubber-tire mounted. An excavator is a self-propelled machine with an upper structure capable of continuous rotation and which digs, elevates, swings, and dumps material by action of the boom and arm or telescoping boom with bucket. Equipment that does not rotate 360 degrees, such as rubber-tired backhoe, is not considered to be an excavator.

### R 408.41522 Operator training.

**Rule 1522.** An employer shall assure that a prospective operator, before being assigned as an operator of an excavator, has been trained in all of the following areas:

- (a) The capabilities of equipment and attachments.
- (b) The purpose, use, and limitations of controls.
- (c) The making of daily inspections.

### R 408.41523 Inspection requirements.

**Rule 1523.** (1) A thorough, annual inspection of all excavators shall be made by a qualified person. An employer shall maintain, on the jobsite or attached to the equipment, a copy of the latest equipment inspection record with the date and results for each piece of equipment.

(2) The inspection procedure for excavators in regular service is divided into 2 general classifications based upon the intervals and inspection that should be performed. The intervals in turn are dependent upon the nature of the critical components of the excavator and the degree of their exposure to wear, deterioration, or malfunction. The 2 general classifications are designated in these rules as "frequent" and "periodic," with respective intervals between inspections as follows:

(a) Frequent inspection – daily to monthly intervals.

(b) Periodic inspection – 1 to 12-month intervals, or as specifically recommended by the manufacturer.

(3) All of the following items on all boom-equipped excavators shall be inspected at frequent intervals:

(a) All control mechanisms shall be inspected daily for maladjustment that interferes with proper operation.

(b) All control mechanisms shall be inspected daily for excessive wear of components and contamination by lubricants or other foreign matter.

### R 408.41524 Fire protection.

**Rule 1524.** A portable fire extinguisher with a rating of not less than 10BC shall be kept in the cab or operating enclosure or within a 200-foot radius of the excavator.

### R 408.41525 Hand signals.

**Rule 1525.** When using hand signals, the signal person, operator, or lift director shall use 1 of the following methods:

(a) Standard hand signals for excavators as shown in Appendix A.

(b) Non-standard hand signals. When used, the signal person, operator, and lift director, when there is one, shall contact each other prior to the operation and agree on the non-standard hand signals that will be used.

### R 408.41526 Operations.

**Rule 1526.** (1) An operator shall not leave an excavator unattended with the boom or load suspended above the ground, floor, or platform during working operations. The operator shall not leave a bucket or blade suspended above the ground when a machine is unattended.

(2) Windows of an excavator shall be equipped with safety glass or its equivalent. Visual distortions that are caused by broken or defective glass and which would affect the safe operation of the equipment when in use shall be corrected.

(3) An employee shall not be permitted under a suspended load.

(4) The boom or bucket shall not be used for hoisting or transporting employees.

(5) An excavator shall not be loaded beyond the rated load.

(6) Hooks that are attached to the bucket or boom that are used for hoisting material shall be equipped with self-closing latches or their equivalent where employees are exposed.

(7) Materials being hoisted shall be rigged to prevent unintentional displacement.

(8) A load shall not be moved in a manner that could contact obstructions.

(9) An employer shall comply with the requirements of the Power Crane and Shovel Association (PCSA) standard No. 5 "Mobile Hydraulic Excavator Standards," 1983 edition and "Referenced Material for PCSA Standards No. 4 and No. 5", 1982 edition as adopted in R 408.41505.

**R 408.41527 Pinch point and struck by protection.**

**Rule 1527.** If an employee could be struck by the rotating superstructure of an excavator or if clearances between the rotating or moving structure of an excavator can create a pinch point for an employee, the employer shall do either of the following:

- (a) Barricade the hazardous area.
- (b) Train and instruct each employee to stay out of the danger area and require a danger sign, as prescribed in Construction Safety Standard Part 22 "Signals, Signs, Tags, and Barricades," as referenced in R 408.41505, be affixed to the rear and sides of the house and counterweight. The danger sign shall have additional lettering to indicate that the counterweight is swinging.

**HOISTS AND ELEVATORS**

**R 408.41530 Scope; material hoists, personnel hoists, and elevators.**

**Rule 1530.** This section applies to material hoists, personnel hoists, and elevators when used during construction operations.

**R 408.41531 Definitions.**

**Rule 1531.** (1) "Audible signal" means a signal made by a distinct sound or series of sounds. Examples include, but are not limited to, sounds made by a bell, horn, or whistle.

(2) "Base" means the mounting flanges or feet for attachment of a hoist to the machine's supporting structure or foundation.

(3) "Base-mounted drum hoist" means a self-contained lifting unit that has a motor, a drum to receive the lifting cable, and mounting flanges for anchoring.

(4) "Crosshead" means an overhead structural member that supports the hoist platform to which the hoisting or load cables are attached.

(5) "Elevator" means, for the purposes of this standard, a permanently installed or existing passenger or freight elevator used for construction operations.

(6) "Hoist" means a system of power driven drums, gears, cables, chains, or hydraulic cylinders capable of lifting and lowering loads.

(7) "Hoist car" means the load-carrying unit, including its platform, car frame, car enclosure, and car door or gate.

(8) "Hoist tower" means a vertical structure used to support or house the platform and cab of an elevator or hoist.

(9) "Hoisting" means the act of raising, lowering, or otherwise moving a load in the air with equipment covered by this standard. As used in this standard, "hoisting" can be done by means other than wire rope/hoist drum equipment.

(10) "Lockout device" means a positive mechanical method for disconnecting the power supply.

(11) "Material hoist" means a mechanism for use in the hoisting or lowering of construction or demolition material only. A material hoist is equipped with a platform, car, cage, or bucket that moves vertically on guide members.

(12) "Personnel hoist" means a mechanism and its hoistway that is used for raising or lowering personnel or materials, or both, during construction operations, and is equipped with a car that moves vertically on guide members.

(13) "Rated load" for material hoists, personnel hoists, and elevators means the maximum load permitted by the manufacturer's specifications and by sections 1 to 24 of 1967 PA 227, MCL 408.821 to 408.824, and sections 1 to 10 of 1976 PA 333, MCL 338.2151 to 338.2160, respectively.

(14) "Running rope" means a rope that travels around sheaves or drums.

(15) "Signal system" means an audible or visual method of communication between the equipment operator and the persons on the landing or floors.

(16) "Standing rope" including guy rope, means a supporting rope that maintains a constant distance between the points of attachment to the 2 components connected by the rope.

(17) "Tie-in" means a rigid device used to affix the hoist tower to the structure.

(18) "Wire rope" means a flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope.

**GENERAL REQUIREMENTS FOR MATERIAL HOISTS, PERSONNEL HOISTS, AND ELEVATORS**

**R 408.41540 Operator training and conduct.**

**Rule 1540.** (1) An employer shall limit the operation of material hoists, personnel hoists, and elevators to the following entities:

(a) An employee who has been trained and qualified to operate the hoisting equipment to which the employee is assigned.

(b) Authorized maintenance personnel when performing their duties.

(2) Before assignment, an employer shall assure that an operator of a material and personnel hoist has been trained in all of the following areas:

(a) The capabilities of the equipment.

(b) The purpose, use, and limitations of the controls.

(c) How to conduct daily inspections.

(d) Operational practices of the assigned equipment through its functions necessary to perform the required job.

(e) Applicable state standards and company rules and regulations.

(3) An operator shall not engage in any practice that will divert his or her attention while engaged in operating a material hoist, personnel hoist, or elevator.

(4) Each operator shall be responsible for those operations under the operator's direct control. When there is any doubt as to safety, the operator shall stop operations and consult with the supervisor before continuing work.

(5) An operator shall not leave the equipment unattended unless it has been secured and rendered inoperable in the operator's absence.

(6) When controls are locked out for maintenance or for repair purposes, an equipment operator shall not start operations until the lock has been removed by the person or persons responsible for the safe operation.

(7) If a malfunction occurs during the operation of the equipment and the door remains locked, the operator and all other personnel shall remain in the hoist car until the operation is restored.

(8) An operator shall be familiar with the equipment and its proper care. If adjustments or repairs are necessary or if any defects are evident, the operator shall report the repairs or defects to the responsible supervisor and also notify the next operator of the equipment status.

(9) A hoist operator shall ensure that the rated capacity of the hoist is not exceeded.

**R 408.41541 Signaling.**

**Rule 1541.** (1) A signal system shall be established and communicated to all affected employees prior to hoisting operations.

(2) The signal system shall be posted at the operator station of the hoist.

**R 408.41542 Wire rope.**

**Rule 1542.** (1) Wire rope used for material hoists, personnel hoists, and elevators shall be removed from service when any of the following conditions exists:

(a) In hoisting ropes and running ropes, 6 randomly distributed broken wires in 1 rope lay or 3 broken wires in 1 strand in 1 rope lay.

(b) Abrasion, scrubbing, flattening, peening, kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure and causing loss of more than 1/3 of the original diameter of the outside wires.

(c) Evidence of any heat damage from any cause, including damage resulting from a torch or any damage caused by contact with electrical wires.

(d) Reduction from nominal diameter of more than 3/64 inch for diameters up to and including 3/4 inch; 1/16 inch for diameters 7/8 to 1-1/8 inches; and 3/32 inch for diameters 1-1/4 to 1-1/2 inches.

(e) In standing ropes, more than 2 broken wires in 1 lay in sections beyond end connections or more than 1 broken wire at an end connection.

(2) Hoisting ropes shall be installed in accordance with the wire rope manufacturers' recommendations.

(3) A wire rope shall be in compliance with all of the following requirements:

(a) The minimum number of hoisting ropes used shall be 3 for traction hoists and 2 for drum-type hoists.

(b) The minimum diameter of hoisting and counterweight wire ropes shall be 1/2-inch.

(c) Not less than 2 ropes shall be used for the counterweights on the rack and pinion.

(d) Safety factors shall be as in Table C "Minimum Factors of Safety for Suspension Wire Ropes."

(e) The following formula shall be used to calculate the allowable gross load:

$$L = \frac{SN}{F}$$

L = Allowable gross load

S = Manufacturer's rated breaking strength

N = Number of parts of rope

F = Safety factor

<b>TABLE C MINIMUM FACTORS OF SAFETY FOR SUSPENSION WIRE ROPES</b>	
<b>Rope speed in feet per minute</b>	<b>Minimum Factor of safety</b>
50	7.60
75	7.75
100	7.95
125	8.10
150	8.25
175	8.40
200	8.60
225	8.75
250	8.90
300	9.20
350	9.50
400	9.75
450	10.00
500	10.25
550	10.45
600	10.70

**R 408.41543 Manufacturer specifications; rated load; safety devices; postings.**

**Rule 1543.** (1) An employer shall comply with the manufacturer's specifications and limitations applicable to the operation of all material hoists and personnel hoists. If the manufacturer's specifications are not available, then the limitations assigned to the equipment shall be determined by a qualified person who is competent in the field and shall be based on the requirements of ANSI A10.4 "Safety Requirements for Personnel Hoists and Employee Elevators for Construction and Demolition operations," 2004 edition and ANSI A10.5 "Safety Requirements for Material Hoists," 1992 edition, as adopted by reference in R 408.41505. A determination shall be documented and recorded.

(2) Attachments used shall not exceed the capacity, rating, or scope recommended by the manufacturer.

(3) The rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted on hoist cars.

(4) Safety devices shall not be altered or bypassed unless under the direct supervision of a qualified person.

(5) The installation of live booms on hoists is prohibited.

(6) An employer shall ensure that hoisting equipment and accessories are maintained in a condition that will not endanger an operator or other employees.

**MATERIAL HOISTS  
ADDITIONAL REQUIREMENTS**

**R 408.41550 Material hoist requirements.**

**Rule 1550.** (1) The material hoist requirements contained in this rule are in addition to the general requirements contained in R 408.41540 to R 408.41543.

(2) An employer shall ensure that operating rules are established and posted at the operator's station of the hoist. Such rules shall include signal system and allowable line speed for various loads. Rules and notices shall be posted on the car frame or crosshead in a conspicuous location, including the statement "No Riders Allowed."

(3) A person shall not be allowed to ride on a material hoist, except for inspection and maintenance.

(4) An overhead protective covering of 2-inch planking or other solid material of equivalent strength shall be provided on the top of every material hoist car.

(5) All entrances of the hoistway shall be protected by substantial gates or bars that shall guard the full width of the landing entrance from floor to ceiling. All hoistway entrance bars and gates shall be painted with diagonal contrasting colors, such as black and yellow stripes.

(6) Gates or bars protecting the entrance to a hoistway shall be equipped with a latching device and be not more than 4 inches from the edge of the landing sill. A gate shall extend a minimum of 6 feet 8 inches above the floor.

(7) An operator's station of a hoisting machine shall have overhead protection equivalent to tight planking that is not less than 2 inches thick. The support for the overhead protection shall be of equal strength.

(8) A hoist tower may be used with or without enclosures on all sides. However, whichever alternative is chosen, all of the following applicable conditions shall be met:

(a) When a hoist tower is enclosed, it shall be enclosed on all sides for its entire height with a screen enclosure of not more than 1/2-inch mesh of no. 18 U.S. gauge wire or equivalent, except for a landing access.

(b) When a hoist tower is not enclosed, the hoist platform, car, or cab shall be totally enclosed or caged on all sides for the full height between the floor and the overhead protective covering with 1/2-inch mesh of no. 14 U.S. gauge wire or equivalent. The hoist car enclosure shall include the required gates for loading and unloading. An 8-foot high enclosure shall be provided on the unused sides of the hoist tower at ground level.

(9) Car arresting devices shall be installed to function in case of rope failure and shall be tested at 90-day intervals.

(10) All material hoist towers shall be designed by a licensed professional engineer.

(11) All material hoists shall conform to the requirements of ANSI/ASSE A10.5 "Safety Requirements for Material Hoists," 1992 edition, as adopted in R 408.41505.

**PERSONNEL HOISTS AND ELEVATORS  
ADDITIONAL REQUIREMENTS**

**R 408.41560 Personnel hoist and elevator requirements.**

**Rule 1560.** (1) The personnel hoist requirements contained in this rule to R 408.41564 "Elevators; endless belt-type manlifts" are in addition to the general requirements contained in R 408.41540 "Operator training and conduct" through R 408.41543 "Manufacturer specifications; rated load; safety devices; postings."

(2) An employer shall ensure that an employee who is specifically engaged in installing personnel hoists or elevators is licensed by the state of Michigan in accordance with sections 1 to 24 of 1967 PA 227, MCL 408.801 to 408.824, and sections 1 to 10 of 1976 PA 333, MCL 338.2151 to 338.2160, respectively, and the rules of the department of licensing and regulatory affairs relating to elevators.

**R 408.41561 Inspections and testing.**

**Rule 1561.** (1) An inspection and test of all functions and safety devices of personnel hoists and elevators shall be made by a person who meets the criteria of both a competent and qualified person, or a competent person who is assisted by 1 or more qualified persons as prescribed by the following:

(a) Before being put into service.

(b) Following a major alteration of an existing installation.

(c) At not more than 90-day intervals.

(2) An employer shall prepare a certification record that includes all of the following information:

(a) The date of the inspection and test of all functions and safety devices that were performed.

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

(c) A serial number or other identifier for the hoist that was inspected and tested. The most recent certification record shall be maintained on file on the jobsite.

(3) In addition to the requirements in subrule (1) of this rule, personnel hoists and elevators shall have a load safety test performed by a licensed elevator contractor in the presence of a State of Michigan elevator inspector every 90 days as required by ANSI A10.4 "Safety Requirements for Personnel Hoists and Employee Elevators for Construction and Demolition Operations," 2004 edition, as adopted by reference in R 408.41003a.

(4) All control mechanisms shall be inspected daily for misadjustments that might interfere with proper operation and for excessive wear of components.



**R 408.41562 General requirements.**

**Rule 1562.** (1) A hoist tower outside the structure shall be enclosed for the full height on the side or sides used to enter and exit the structure. At the lowest landing, the enclosure on the sides not used to exit or enter the structure shall be enclosed to a height of not less than 10 feet. Other sides of the tower adjacent to floors or scaffold platforms shall be enclosed to a height of 10 feet above the level of the floors or scaffolds.

(2) A hoistway inside a structure shall be enclosed on all 4 sides throughout the full travel of the hoistway.

(3) A hoist tower shall be anchored to the structure at intervals of not more than 25 feet in height. When tie-ins are not practical, the tower shall be anchored by means of guys which are made of wire rope that is not less than 1/2 of an inch in diameter and which are securely fastened to the anchorage to ensure stability.

(4) Hoistway doors or gates shall be not less than 6 feet 6 inches high, be provided with mechanical locks that cannot be operated from the landing side, and be accessible only to persons on the hoist car.

(5) A hoist car shall be permanently enclosed on all sides and the top, except for sides used for entry and exit and sides that have gates or doors.

(6) A door or gate shall be provided at each entrance to the hoist car and shall protect the full width and height of the hoist car entrance opening.

(7) An overhead protective covering that consists of 2-inch planking or other solid material of equivalent strength shall be provided on the top of every personnel hoist car.

(8) Doors or gates shall have electric contacts that do not allow movement of the hoist when a door or gate is open.

(9) A car safety device shall be installed and shall be capable of stopping and holding the hoist car and the rated load when traveling at governor-tripping speed.

(10) A hoist car shall have a capacity and data plate secured in a conspicuous place on the car or crosshead.

(11) Internal combustion engines shall not be permitted for direct drive.

(12) Normal and final terminal stopping devices shall be provided. Final terminal stopping devices shall be installed in the hoistway and shall be mechanically operated.

(13) An emergency stop switch shall be provided in the hoist car and marked "STOP."

(14) All personnel hoists used by employees shall be constructed of materials and components that are in compliance with the specifications for materials, construction, safety devices, assembly, and structural integrity as stated in ANSI standard A10.4 "Safety Requirements for Personnel Hoists and Employee elevators for Construction and Demolition Operations," 2004 edition, as adopted in R 408.41505.

**R 408.41563 Bridge tower construction personnel hoists.**

**Rule 1563.** (1) A personnel hoist that is used in bridge tower construction shall be approved by a registered professional engineer and installed in accordance with R 408.41560(2).

(2) When a hoist tower is not enclosed, the car or hoist platform shall be totally enclosed or caged on all sides for the full height between the floor and the overhead protective covering with not less than 3/4-inch mesh of no. 14 U.S. gauge wire or equivalent. The hoist car enclosure shall include the required gates for loading and unloading.

(3) An employer shall ensure that hoists are inspected for defects, serviced, and maintained on a weekly basis, and repaired as necessary. If the hoisting equipment is exposed to winds of more than 35 miles per hour, authorized personnel must inspect and repair the hoisting equipment if necessary before reuse.

**R 408.41564 Elevators; endless belt-type manlifts.**

**Rule 1564.** (1) Permanent elevators under the care and custody of the employer and used by employees for work covered by this act shall comply with the requirements of ANSI/ASME A17.1 "Safety Code for Elevators and Escalators, Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices," 1965 edition with addenda A17.1a-1967, A17.1b-1968, A17.1c-1969, and A17.1d-1970, and inspected in accordance with ANSI/ASME A17.2 "Guide for Inspection of Elevators, Escalators, and Moving Walks - Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, Inclined Elevators, Private Residence Elevators, and Escalators and Moving Walks," 1960 edition with addenda A17.2a-1965, and A17.2b-1967, as adopted in R 408.41505.

(2) When multiple permanent elevators are available and 1 elevator is being used for construction or renovation purposes, that elevator shall be for the exclusive use of construction personnel and shall be operated by a designated operator. The elevator signal system shall be separate from any other elevators.

(3) The use of endless belt-type manlifts for construction is prohibited.

## BASE-MOUNTED DRUM HOISTS

### **R 408.41570 Base-mounted drum hoists, general requirements.**

**Rule 1570.** (1) Exposed moving parts, such as gears, projecting screws, setscrews, chain, cables, chain sprockets, and reciprocating or rotating parts, which constitute a hazard, shall be guarded.

(2) All controls used during the normal operation cycle shall be located within easy reach of the operator's station.

(3) An employer shall ensure that electric motor operated hoists are provided with all of the following:

(a) A device to disconnect all motors from the line upon power failure and not permit any motor to be restarted until the controller handle is brought to the "off" position.

(b) Where applicable, an overspeed preventive device.

(c) A means whereby remotely operated hoists stop when any control is ineffective.

(4) All base-mounted drum hoists in use shall meet the applicable requirements for design, construction, installation, testing, inspection, maintenance, and operations, as prescribed by the manufacturer.

(5) This section does not apply to base-mounted drum hoists used in conjunction with derricks. Base-mounted drum hoists used in conjunction with derricks shall conform to Construction Safety Standard Part 10 "Cranes and Derricks," as referenced in R 408.41505.

## OVERHEAD HOISTS

### **R 408.41580 Overhead hoists, general requirements.**

**Rule 1580.** (1) The safe working load of the overhead hoist, as determined by the manufacturer, shall be indicated on the hoist and shall not be exceeded.

(2) The supporting structure to which the hoist is attached shall have a safe working load equal to the working load of the hoist.

(3) The support shall be arranged so as to provide for free movement of the hoist and shall not restrict the hoist from lining itself up with the load.

(4) The hoist shall be installed only in locations that will permit the operator to stand clear of the load at all times.

(5) Air hoists shall be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. All air hoses supplying air shall be positively connected to prevent the air hose becoming disconnected during use.

(6) All overhead hoists in use shall meet the applicable requirements for construction, design, installation, testing, inspection, maintenance, and operation, as prescribed by the manufacturer.

## HELICOPTERS

### **R 408.41590 Helicopters; general requirements.**

**Rule 1590.** (1) This section applies to helicopters used during construction operations.

(2) Helicopter cranes must comply with any applicable regulations of the federal aviation administration.

(3) Prior to each day's operation a briefing shall be conducted by the pilot, ground crew, general contractor overseeing the work, and any sub-contractors involved. This briefing shall set forth the plan of operation for the pilot and ground personnel.

(4) A load shall be properly slung. Tag lines shall be of a length that will not permit the tag line being drawn up into rotors. Pressed sleeve, swedged eyes, or equivalent means shall be used for all freely suspended loads to prevent hand splices from spinning open or cable clamps from loosening.

(5) All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation. In addition these cargo hooks shall be equipped with an emergency mechanical control for releasing the load. The hooks shall be tested prior to each day's operation by the helicopters employees, pilot, or mechanic, to determine that the release functions properly both electrically and mechanically.

(6) Personal protective equipment shall meet the following requirements:

(a) Personal protective equipment for employees receiving the load shall consist of complete eye protection and hard hats secured by chinstraps.

(b) An employee shall not wear loose-fitting clothing likely to flap in the downwash, and thus be snagged on hoist line.

(7) An employer shall ensure that every practical precaution is taken to provide for the protection of the employees from flying objects in the rotor downwash. All loose gear within 100 feet of the place of lifting the load, depositing the load, and all other areas susceptible to rotor downwash shall be secured or removed.

(8) An employer shall ensure that good housekeeping shall be maintained in all helicopter loading and unloading areas.

(9) The helicopter operator shall be responsible for size, weight, and manner in which loads are connected to the helicopter. If, for any reason, the helicopter operator believes the lift cannot be made safely, the lift shall not be made.

(10) When employees are required to perform work under hovering craft, a safe means of access shall be provided for employees to reach the hoist line hook and engage or disengage cargo slings. Employees shall not perform work under hovering craft except when necessary to hook or unhook loads.

(11) Static charge on the suspended load shall be dissipated with a grounding device before ground personnel touch the suspended load, or protective rubber gloves shall be worn by all ground personnel touching the suspended load.

## CONVEYORS

(12) The weight of an external load shall not exceed the manufacturer's rating.

(13) Hoist wires or other gear, except for container or roll off a reel, shall not be attached to any fixed ground structure, or allowed to foul on any fixed structure.

(14) When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors. An employer shall take precautions to eliminate as far as practical reduced visibility.

(15) Signal systems between aircrew and ground personnel shall be understood and checked in advance of hoisting the load. This requirement applies to either radio or hand signal systems. When using hand signals, either of the following methods shall be used:

(a) Standard helicopter hand signals as shown in Appendix B.

(b) Non-standard hand signals. When used, the signal person, operator, and lift director, when there is one, shall contact each other prior to the operation and agree on the non-standard hand signals that will be used.

(16) No unauthorized person shall be allowed to approach within 50 feet of the helicopter when the rotor blades are turning.

(17) Whenever approaching or leaving a helicopter with blades rotating, all employees shall remain in full view of the pilot and keep in a crouched position. Employees shall avoid the area from the cockpit or cabin rearward unless authorized by the helicopter operator to work in the area.

(18) An employer shall ensure that sufficient ground personnel are provided when required for safe helicopter loading and unloading operations.

(19) There shall be constant reliable communication between the pilot and a designated employee of the ground crew who acts as a signalman during the period of loading and unloading. This signalman shall be distinctly recognizable from other ground personnel.

(20) Open fires shall not be permitted in an area that could result in such fires being spread by the rotor downwash.

### **R 408.41595 Conveyors; general requirements.**

**Rule 1595.** (1) This section applies to conveyors when used during construction operations.

(2) Means for stopping the motor or engine shall be provided at the operator's station. Conveyor systems shall be equipped with an audible warning signal to be sounded immediately before starting up the conveyor.

(3) If the operator's station is at a remote point, the employer shall provide similar provisions for stopping the motor or engine at the motor or engine location.

(4) Emergency stop switches shall be arranged so that the conveyor cannot be started again until the actuating stop switch has been reset to running or "on" position.

(5) Screw conveyors shall be guarded to prevent employee contact with turning flights.

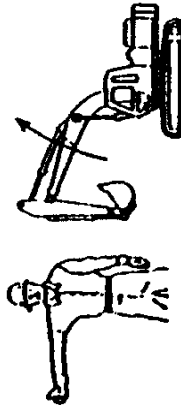

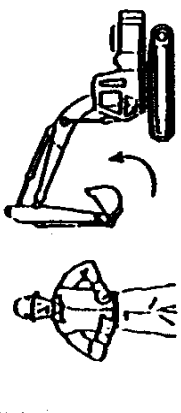
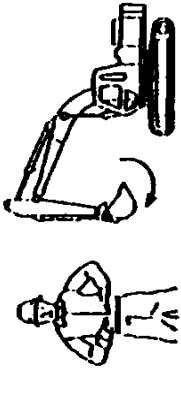
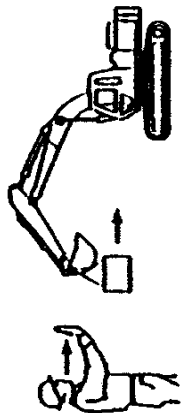
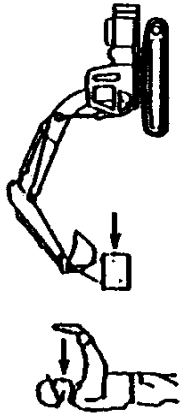
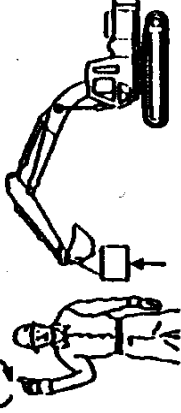
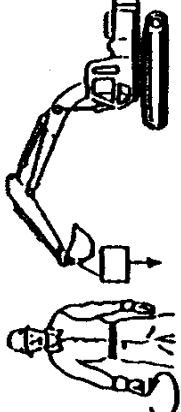

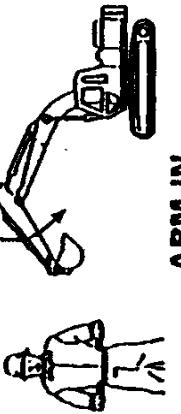
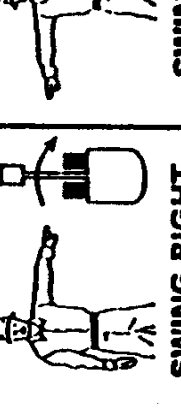
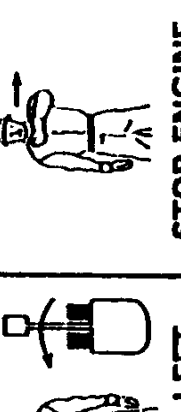

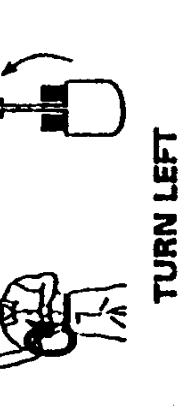
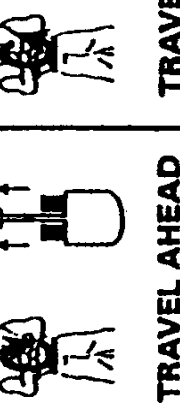
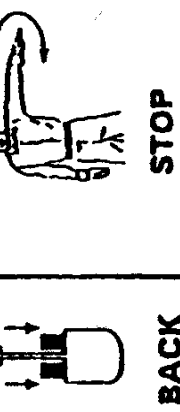
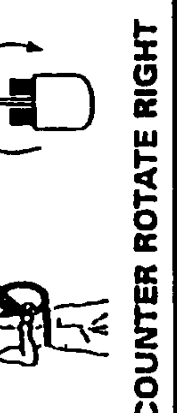
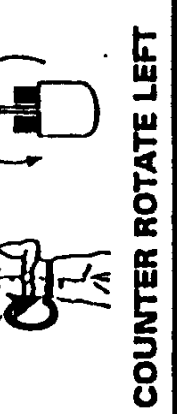
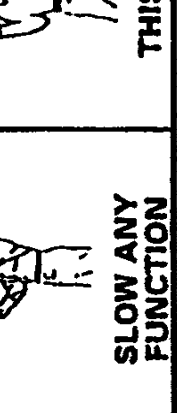
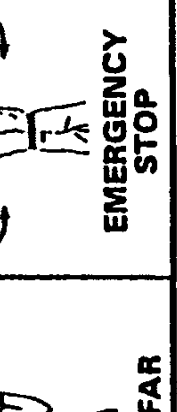
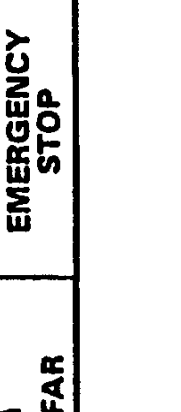
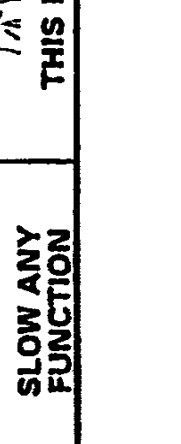

(6) Where a conveyor passes over work areas, aisles, or thoroughfares, the employer shall provide suitable guards to protect employees required to work below the conveyors.

(7) The employer shall ensure that all crossovers, aisles, and passageways are conspicuously marked by suitable signs, as required by Construction Safety Standard Part 22 "Signals, Signs, Tags, and Barricades," as referenced in R 408.41505.

(8) The employer shall ensure that conveyors are locked out or otherwise rendered inoperable, and tagged out with a "DO NOT OPERATE" tag during repairs and when operation is hazardous to employees performing maintenance work.

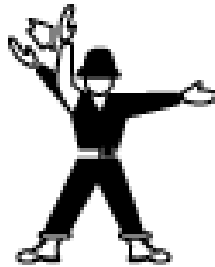
(9) All conveyors in use shall meet the applicable requirements for design, construction, inspection, testing, maintenance, and operation, as prescribed in the ANSI B20.1, "Safety Standard for Conveyors, and Related Equipment," 1999 edition, as adopted in R 408.41505.

APPENDIX A STANDARD HAND SIGNALS FOR EXCAVATORS

 <p><b>BOOM UP</b></p>	 <p><b>BOOM DOWN</b></p>	 <p><b>BUCKET IN</b></p>	 <p><b>BUCKET OUT</b></p>
 <p><b>LOAD IN</b></p>	 <p><b>LOAD OUT</b></p>	 <p><b>LOAD UP</b></p>	 <p><b>LOAD DOWN</b></p>
 <p><b>ARM OUT</b></p>	 <p><b>ARM IN</b></p>	 <p><b>SWING RIGHT</b></p>	 <p><b>SWING LEFT</b></p>
 <p><b>TURN RIGHT</b></p>	 <p><b>TURN LEFT</b></p>	 <p><b>TRAVEL AHEAD</b></p>	 <p><b>TRAVEL BACK</b></p>
 <p><b>COUNTER ROTATE RIGHT</b></p>	 <p><b>COUNTER ROTATE LEFT</b></p>	 <p><b>SLOW ANY FUNCTION</b></p>	 <p><b>THIS FAR</b></p>
			 <p><b>STOP ENGINE</b></p>
			 <p><b>STOP</b></p>
			 <p><b>EMERGENCY STOP</b></p>

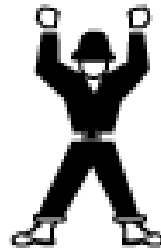
APPENDIX B HELICOPTER HAND SIGNALS

**MOVE  
RIGHT**



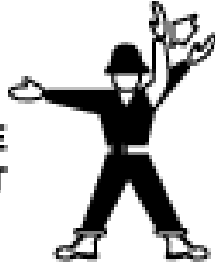
Left arm extended horizontally; right arm sweeps upward to position over head.

**HOLD-  
HOVER**



The signal "Hold" is executed by placing arms over head with clenched fists.

**MOVE  
LEFT**



Right arm extended horizontally; left arm sweeps upward to position over head.

**TAKEOFF**



Right hand behind back; left hand pointing up.

**MOVE  
FORWARD**



Combination of arm and hand movement in a collecting motion pulling toward body.

**LAND**



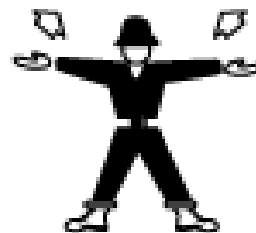
Arms crossed in front of body and pointing downward.

**MOVE  
REARWARD**



Hand above arm, palms out using a noticeable shoving motion.

**MOVE  
UPWARD**



Arms extended, palms up; arms sweeping up.

**RELEASE  
SLING LOAD**



Left arm held down away from body  
Right arm cuts across left arm in a slashing movement from above.

**MOVE  
DOWNWARD**



Arms extended, palms down; arms sweeping down.



Michigan Occupational Safety and Health Administration  
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