



**Division of Occupational Safety and Health
POLICY AND PROCEDURES MANUAL**

**Compliance Guidelines for Accessing
Communication Towers by Hoist**

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Issue Date: 8/13/14

Compliance Guidelines for Accessing Communication Towers by Hoist

Revised:
4/03/15

A. Introduction

These guidelines cover hoisting employees from cranes, derricks and other hoisting equipment to work on communication towers during all phases of work including construction, maintenance, inspection and demolition. Telecommunication work is covered in Title 8 by the Telecommunication Safety Orders (sections 8600-8618). Section 8611 covers hoisting operations for work on telecommunications equipment including telecommunication towers. 8611 references 2940.7(c) which in turn references general industry safety orders Article 91 through 101. Therefore general industry safety orders Article 91 through 101 cover hoisting operations in telecommunications including construction operations. The Construction Safety Orders apply to hoisting employees during the construction or demolition of communication towers only where those orders cover operations or conditions not specifically covered by Article 91 through 101.

B. Definitions: (Taken from Federal CPL-02-01-056 and Title 8)

1. **Anti-Two Block Device:** A device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component) shall be used. The device(s) shall prevent such damage/failure at all points where two-blocking could occur.
 2. **Maximum Intended Load:** The total load of all employees, tools, materials, load lines and other loads reasonably anticipated to be applied to the hoist apparatus when an employee is hoisted.
 3. **Competent Person:** One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the hazard(s).
 4. **Controlled load lowering:** Lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.
 5. **Qualified Person:** A person designated by the employer who by reason of training, experience or instruction has demonstrated the ability to safely perform all assigned duties and, when required, is properly licensed in accordance with federal, state, or local laws and regulations.
 6. **Gin Pole:** A device attached to the tower that is used to raise sections of tower steel or equipment into position. Not to be used for hoisting employees.
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7. Gin Pole Derrick: A derrick without a boom. Its guys are so arranged from its top to permit leaning the mast in any direction. The load is raised and lowered by ropes reeved through sheaves or blocks at the top of the mast. Not to be used for hoisting employees.
8. Engineered Hoist System: A hoist system is the complete system for hoisting, including: the frame, mounts and/or anchorages, prime mover (winch assembly), motors, drums, truck chassis (if used as the base for the hoist), wheel chocks, wire rope, hour meter, foot blocks, gin pole (if used), and rooster head or cat head, as applicable.

C. Hoisting Personnel

1. Employees may only be hoisted on the hoist line to reach or depart from workstations in accord with the guidelines set forth in this procedure.

D. Training

1. Before allowing an employee to perform any job related to hoisting employees aloft for tower work, ensure that the employee receives effective training on the fall protection equipment used and how to safely access and depart from communication towers. The operator of the hoist needs to have a thorough understanding of the guidelines in this procedure that pertain to hoisting employees on the hoist line. Ensure that the operator is effectively trained on the entire engineered hoist system and its capabilities, safe operating procedures, and emergency procedures.

E. Equipment

1. Use an anti-two block device on all hoists. See T8CCR 5004 Hard wired anti-two block devices are preferred.

F. Engineered Hoist Systems

1. Have a registered professional engineer approve/stamp the engineered hoist system design. Engineered system specifications are to include the size and type of rope to be used, the ratio of rope diameter to sheave size, and inspection and maintenance procedures and schedules.
2. Ensure that the rigging, hoist line and slings have a safety factor of at least 7 against failure during personnel lift(s) except that where rotation resistant rope is used; the lines shall be capable of supporting without failure, at least ten times the maximum intended load. If available ensure that the hoist line used to raise or lower employees is equipped with a swivel to prevent any rotation of the employees.
3. When hoisting personnel (versus material), de-rate the hoist's specified rated capacity by a factor of 2 (reduced by half). (This is referred to herein as the "personnel load capacity.") Provide all employees with, and require employees to use, the proper personal protective equipment (including fall protection equipment). Inspect the protective equipment before each lift.
4. Use a guide line (tag line) to prevent the employees or the platform from contacting the tower during hoisting, except where it can be demonstrated that specific circumstances or conditions preclude its use.
5. Use a foot block and ensure that the specifications of the foot block (including its construction, it's rating for personnel and/or materials hoisting, and its placement) are in accord with the specifications of the engineered hoist system as prescribed by a registered professional engineer.
6. **Gin poles shall not be used for hoisting employees.**

7. Post the personnel load capacity and specified rated capacity of the lifting system in use at the site near the location of the hoist operator. If the system is changed, update the posted capacity accordingly.

G. Trial Lift and Proof Testing

1. Conduct a trial lift of the Maximum Intended Load from ground level to the location to which personnel are to be hoisted.
 - a. Conduct the trial lift immediately prior to placing personnel on the hoist line.
 - b. Have the hoist operator determine that all systems, controls and safety devices are activated and functioning properly.
 - c. A single trial lift may be performed for all locations that are to be reached from a single set-up position.
 - d. Have the hoist operator determine that no interference exists and that all configurations necessary to reach the work locations remain under the limit of the hoist's specified rated capacity, and ensure that the hoist operator maintains a 7:1 factor of safety against failure.
 - e. Whenever the hoist is moved and set up in a new location or returned to a previously used position, repeat the trial lift prior to hoisting employees.
 - f. Do not lift employees after the trial lift unless the following conditions are met:
 - (1) Hoist wire ropes are determined to be free of damage (see T8CCR 1613.10, 4980 and 5031 for guidance);
 - (2) Multiple part lines are not twisted around each other; and,
 - (3) Proof testing was completed successfully.
 - g. If the hoist wire rope is slack, inspect the hoisting system to ensure that all wire ropes are properly seated on drums and in sheaves.
 - h. Have a competent person do a visual inspection of the hoist, rigging, base support and foundation immediately after the trial lift to determine whether testing has exposed any defect or adverse effect upon any component of the structure. Correct any defects found during the inspection that may create a safety hazard, and then perform another trial lift before hoisting personnel.
2. Prior to hoisting employees, and after any repair or modification, proof test the personnel rigging to 125% of the specified rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed (this may be done concurrently with the trial lift). Use a test weight.
 - a. After proof testing, have a competent person inspect the rigging. Correct any deficiencies found, and then conduct another proof test.

H. Pre-Lift Meeting

1. Hold a pre-lift meeting prior to the trial lifts at each location. Ensure that the hoist operator and employees to be lifted are in attendance at the meeting. At the meeting, review the procedures to be followed and all appropriate guidelines from this Appendix. Repeat the meeting for any employee newly assigned to the operation.

I. Documentation

1. Document all trial lifts, inspections, proof tests, and pre-lift meetings, and keep the documentation on site at a readily accessible location during the entire length of the project.

J. Hoisting Employees To or From the Workstation

1. For hoisting one employee, use a personnel platform, as prescribed by the platform manufacturer or a registered professional engineer.

2. The use of boatswain chair or boatswain chair-type full body harness in lieu of a personnel platform is prohibited.
3. For hoisting two or more employees at a time, use a personnel platform, as prescribed by the platform manufacturer or a registered professional engineer, unless the employer can demonstrate that specific circumstances or conditions preclude its use. (Note that it is important to follow any guidelines from the platform manufacturer regarding the maximum number of employees that can be hoisted at any one time.)
4. The personnel platform should satisfy the criteria at T8CCR 5004.

K. Hoisting personnel and materials concurrently

1. When using a personnel platform, small, incidental materials and personal tools may be hoisted concurrently with personnel in a manner consistent with T8CCR 5004.
2. The use of boatswain chairs and boatswain type body harnesses in lieu of a personnel platform is prohibited.

L. Hoisting Guidelines

- 1 Line speed, free-spooling, and hoisting materials.
 - a. Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or derrick, or the platform.
 - b. Do not use free-spooling (friction lowering).
 - c. When the hoist line is being used to raise or lower personnel, ensure that there is no other load attached to any hoist line, and that no other load is raised or lowered at the same time on the same hoist.
2. 100% Tie Off:
 - a. Ensure that employees maintain 100 percent tie-off while moving between the hoist line and the tower.

M. Communication Between the Hoist Operator and Hoisted Employees

1. Except as provided below, ensure that employees being hoisted remain in continuous sight of the operator or signal person.
 - a. In situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard for the person being hoisted, direct communication alone (such as by radio) may be used.
 - b. When radios are used, ensure that they are non-trunking, closed, 2-way selective frequency radio systems that comply with T8CCR 1617.2. When hand signals are used, have the employees use industry standardized hand signals as illustrated in T8CCR 5001.

N. Falling Object Hazards

1. Take all necessary precautions to avoid falling object hazards, including, but not limited to, securing tools and materials to prevent them from falling to the ground. Some examples of such methods are: using tethers for tools, or exclusion zones or barricades to control unnecessary work in hazard zones.

O. Weather Conditions

1. Do not hoist employees during adverse weather conditions (high winds, electrical storms, snow, ice, sleet) or other impending danger, except in the case of emergency employee rescue. Pursuant to T8CCR 5004(k)(5), hoisting of employees shall be promptly discontinued upon indication of any dangerous weather conditions or other impending danger.

P. Energized Power Lines

1. Do not use the hoist system to raise and lower employees on the hoist line unless the following clearance distances pursuant to Article 37 High Voltage Safety Orders are maintained at all times during the lift:

Power line voltage phase to phase (kV)	Minimum safe clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 550	27
Above 550 to 1,000	45
Over 1,000	* See note below

*NOTE: (as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Q. Hydraulic Hoists (Drum Hoists)

1. Ensure that the hoist used for personnel lifting meets the applicable provisions for design, construction, installation, testing, inspection, maintenance, modification, repair and operations in this Appendix and as prescribed by the manufacturer or engineered hoist system specifications.
 - a. Ensure that hoist systems meet all applicable requirements for the design, construction, installation, testing, inspection, maintenance, and operation of hoists as prescribed by the manufacturer or a registered professional engineer. A hoist system is the complete system for hoisting, including: the frame, mounts and/or anchorages, prime mover (winch assembly), motors, drums, truck chassis (if used as the base for the hoist), wheel chocks, wire rope, hour meter, foot blocks, and rooster head or cat head, as applicable.
Whether the hoist system is designed by a manufacturer or a registered professional engineer, ensure that an operating manual is developed that includes system capacity, maintenance requirements, and inspection criteria. Where individual components have such manuals, they are to be incorporated into the system manual. Maintain all documentation and manuals at the work site.
 - b. Where manufacturers' specifications are not available, base the limitations assigned to the equipment on the determinations of a registered professional engineer.
 - c. Position the hoist so that it is level and the distance between the drum and the foot block at the base of the tower will allow proper spooling of wire rope. Anchor the foot block to prevent displacement and support the foot block to maintain proper alignment.
 - d. Ensure that the hoist is designed to lift materials and personnel with the same drum or drums. Proof test any hoist that has been modified or repaired to 125 percent of its specified rated capacity. See paragraph G, Trial Lift and Proof Testing for more information.
 - e. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions are to be conspicuously posted on all hoists.
 - f. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains or other rotating parts, where exposed, are to be totally enclosed.
 - (1) Ensure that the hoist has an hour meter and a line speed limiter and that the hoist is designed for and uses powered lowering.
 - (2) Maintain the alignment of hoist components within manufacturer's or engineered hoist system specifications' limits that prevent premature deterioration of gear teeth, bearings, splines, bushings, and any other parts of the hoist mechanism.
 - g. Guard all exhaust pipes where they are exposed. Ensure that an accessible fire extinguisher of 5BC rating or higher is available at the operator's station.

- h. Service and maintain the hoist as per the manufacturers or registered professional engineer's recommendations.
 - (1) The operating manual developed by the manufacturer or registered professional engineer for the specific make and model hoist being used is to be maintained at the site at all times.
 - (2) Use a hoist log to record all hoist inspections, tests, maintenance, and repair. Update the log daily as the hoist is being used and have the operator and/or crew chief sign the log. Have service mechanics sign the log after conducting maintenance and repair. Maintain the log at the site.

R. Hoist Mounting

1. Ensure that the hoist is installed following the mounting specifications of the manufacturer or the engineered hoist system specifications to prevent excessive distortion of the hoist base as it is attached to the mounting surface.
2. Make sure that the flatness of the mounting surface is held to tolerances specified by the hoist manufacturer or engineered hoist system specifications.
3. Anchor the hoist so that it resists at least two times the force or weight of any reaction induced at the maximum attainable line pull and so that the hoist will not twist or turn.
4. If the hoist is mounted to a truck chassis, ensure that it is properly aligned and anchored in at least two corners to prevent movement, and that the wheels are properly chocked.

S. Drums

1. The hoist drum is to be capable of raising or lowering 125 percent of the specified rated capacity of the hoist.
2. Ensure that the hoist drum has a positive means of attaching the wire rope to the drum.
3. Ensure that there are always at least three full wraps of wire rope on the hoist drum when personnel are being hoisted.
4. During operation, the flange is to be two times the wire rope diameter higher than the top layer of wire rope at all times.

T. Brakes and Clutches

1. Brakes and clutches need to be capable of arresting any over-speed descent of the load.
 - a. Ensure that the hoist has a primary brake and at least one independent secondary brake, each capable of stopping and holding 125 percent of the specified rated capacity of the hoist.
 - b. The primary brake is to be directly connected to the drive train of the hoisting machine, and is not to be connected through belts, chains, clutches or screw-type devices.
 - c. The secondary brake is to be an automatic emergency-type brake that, if actuated during each stopping cycle, cannot engage before the hoist is stopped by the primary brake. When a secondary brake is actuated, it needs to stop and hold the load within a vertical distance of 24 inches.
 - d. Adjust brakes and clutches where necessary to compensate for wear and to maintain adequate force on springs where used. Always use powered lowering.
 - e. When power brakes having no continuous mechanical linkage between the actuating and braking mechanism are used for controlling loads, an automatic means is to be provided to set the brake to prevent the load from falling in the event of a loss of brake actuating power.
 - f. Provide static brakes to prevent the drum from rotating in the lowering direction and ensure that the static brakes are capable of holding the specified rated capacity indefinitely without attention from the operator. Brakes are to be automatically applied upon return of the control lever to its center (neutral) position.

- g. Brakes applied on stopped hoist drums need sufficient impact capacity to hold 1.5 times the rated torque of the hoist.

U. Hoist Controls

1. Ensure that power plant controls are within easy reach of the operator and includes a means to start and stop, a means to control the speed of internal combustion engines, a means to stop the prime mover under emergency conditions, and a means to shift selective transmissions.
2. All controls used during the normal operation of the hoist are to be located within easy reach of the operator at the operator's station.
3. Ensure that controls are clearly marked (or are part of a control arrangement diagram) and are easily visible from the operator's station. Foot-operated pedals, where provided, are to be constructed and maintained so that the operator's feet will not readily slip off and so the force necessary to move the pedals can be easily applied.
4. The controls are to be self-centering controls (i.e., "dead man" type) that will return the machine to neutral and engage the drum brakes if the control lever is released.

V. Wire Rope and Rigging

1. Inspect all wire rope and rigging daily before use.
2. Ensure that rope is of the size and type specified as part of the engineered hoist system.
3. Ensure that all eyes in wire rope slings are fabricated with thimbles.
4. Ensure that all eyes in wire rope slings are:
 - a. Made with swaged-type fittings; and,
 - b. field fabricated by a qualified person or factory made.

W. Hoist Operator

1. Operators of cranes and other hoisting equipment shall meet the qualification requirements of T8CCR 5006.1
 - a. Do not allow an employee to operate a hoist when that employee is physically or mentally unfit.
 - b. The hoist operator is responsible for those operations within the area of potential influence of the hoist system.
 - c. Whenever there is any doubt as to safety, the operator is to have the authority to stop and refuse to handle the load until safety has been assured.
 - d. The hoist operator is to remain at the controls at all times when personnel are on the hoist line.
 - e. Before starting the hoist, the operator needs to ensure that:
 - (1) All necessary inspections have been conducted;
 - (2) All controls are in the "off" position; and,
 - (3) All personnel are in the clear.

X. Hoist Inspections

1. Cranes and other Hoisting Equipment shall be inspected and maintained in accordance with General Industry Safety Order Article 100.
 - a. Ensure that a competent person thoroughly inspects all hoists at three-month intervals. Such inspection will include a hands-on operation of all moving parts to ensure that they are intact and will function properly.
 - b. Ensure that all hoists undergo a tear-down inspection annually unless conditions exist (as described below) that allow for less frequent tear-down inspections:
 - (1) A hoist that has been idle for more than six months is not to be used until it has a tear-down inspection, which includes completely disassembling, cleaning and inspecting the hoist. Before

the hoist is used, replace parts such as pins, bearings, shafts, gears, brake plates, etc. found worn, cracked, corroded, distorted or otherwise non-functional.

- (2) Hoists with infrequent to moderate usage (hoists that have been used for 50 hours or less per month and normally operate at considerably less than the specified rated capacity based on the average use over a month) may go up to 36 months between tear-down inspections if serviced under a preventive maintenance program (as directed by the manufacturer or engineered hoist system specifications) that includes annual hydraulic oil sample analysis. An oil sample analysis, meaning a laboratory analysis, is used to evaluate the mechanical integrity of the hoist. At a minimum, change oil in these hoists at least once a year, just after the oil analysis is performed. Hoists not subjected to an annual oil sample analysis need an annual tear-down inspection.
 - (3) Hoists that experience heavy usage (hoists that are used for more than 50 hours per month) may go up to 24 months between tear-down inspections if serviced under a preventive maintenance program as in X1b(2) above.
 - (4) Any rebuilt hoist assembly needs to be line pull tested to the specified rated capacity. The hoist drum needs to be rotated several times in both raising and lowering directions under full capacity load, while checking for smooth operation.
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