

**WAC 296-32-24028 Base mounted hoists used for overhead material lifting and personnel lifting.** (1) This section provides minimum design and use criteria for hoist mechanisms used for overhead material lifting and personnel lifting during the construction and/or maintenance of communication structures. All hoist mechanisms shall meet applicable requirements for design, construction, installation, testing, inspection, maintenance and operations as prescribed by the manufacturer or the qualified person designing the system. At a minimum the hoist mechanism shall comply with this standard.

(2) Design. The following identifies the minimum design parameters for those hoists used for overhead lifting and for lifting personnel.

(a) Design for overhead lifting.

(i) The hoist used for overhead lifting shall meet the applicable requirements for design, construction, installation, testing, inspection, maintenance, modification, repair and operations as prescribed by the manufacturer.

(ii) Where manufacturers' specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a registered professional engineer.

(iii) The hoist mechanism may be designed to lift materials and also personnel with the same drum or drums.

(b) Design for personnel lifting.

(i) If the hoist has the ability to free spool, it must have a positive locking system to prevent free spooling during hoisting.

(ii) If the unit has the capability of exceeding two hundred feet per minute during operations, it must have a line speed indicator.

(iii) Hoists used for lifting personnel shall have a visible tag on the unit indicating the unit complies with the standard.

(c) Structural design for overhead and personnel lifting.

(i) During hoist assembly, the frame of the winch assembly and attached components shall be designed to resist at least two times the maximum attainable line pull.

(ii) Flatness of the mounting surface shall be held to tolerances specified by the hoist manufacturer.

(iii) The alignment of winch assembly components will be maintained within limits that shall prevent premature deterioration of gear teeth, bearings, splines, bushings and any other parts of the hoist mechanism.

(iv) All winch drums shall have a positive means of attaching the wire rope to the drum. The hoist drum shall be designed to raise and lower 125 percent of the rated load of the hoist.

(d) Brakes. Brakes for overhead lifting.

(i) Hoist brakes shall be capable of controlling the descent of a load.

(ii) Hoist brakes shall be capable of stopping the load and minimize inertia loading.

(iii) If the hoist mechanism has the ability to free spool, then it shall have a means of controlling the load during the raising and lowering of loads.

(iv) Brakes shall be provided to prevent the drum from rotating in the lowering direction and shall be capable of holding the load indefinitely without attention from the operator.

(v) Units that have no continuous mechanical linkage between the brake actuator and the brake shall have a means of holding the load when there is a loss of brake actuating power on the winch assemblies.

(vi) Static brakes shall be provided to hold the drum from rotating in the lowering direction and shall be capable of holding the load indefinitely without attention from the operator.

(vii) Brakes, which are applied on stopped hoist drums, shall have sufficient impact capacity to hold 1.5 times the rated torque of the hoist.

(viii) Brakes shall be provided with adjustments, where necessary, to compensate for wear and to maintain adequate force on springs where used.

(ix) Foot-operated pedals, where provided, shall be constructed so the operator's feet will not readily slip off, and the force necessary to move the pedals shall be easily accomplished.

(x) Foot-operated brakes shall be equipped with a locking device to maintain the brake in a loaded position.

(e) Brakes for lifting personnel.

(i) Winch assemblies shall be provided with a primary brake and at least one independent secondary brake, each capable of holding 125 percent of the lifting and lowering capacity of the hoist.

(ii) The primary and secondary brake shall be directly connected to the drive train of the winch assembly and shall not be connected through belts, chains, etc.

(iii) The primary and secondary brake, when actuated, shall decelerate, stop and hold the load in a controlled manner.

(iv) When the primary brake fails, the secondary brake shall actuate automatically and hold the load in a controlled manner.

(v) A means to set brakes automatically in the event the loss of brake actuating power shall be provided on winch assemblies that have no continuous mechanical linkage between the brake actuator and the brake.

(vi) Brakes shall be automatically applied upon return of the control lever to its center (neutral) position.

(f) Controls for overhead and personnel lifting.

(i) All controls used during the normal operation of the hoist mechanism shall be located within easy reach of the operator while at the operator's station.

(ii) There shall be means to start and stop the prime mover under emergency conditions from the operator's station.

(iii) All control levers shall be clearly marked and easily visible from the operator's station.

(iv) All hoist control levers that are designed to do so, must spring return to neutral when released or have a comparable system that allows the braking mechanism to set automatically.

(g) Hour meter. In order to comply with the inspection criteria, there shall be an hour meter used as a means of monitoring the operating time a hoist winch assembly operates.

(h) Machine guarding.

(i) Belts, pulleys, gears, shafts, sprockets, spindles, drums, fly wheels, chains or other rotating parts shall be fully guarded to prevent employee contact.

(ii) All exhaust pipes shall be guarded where exposed to employee contact.

(3) Inspection and maintenance. The following are the requirements for inspection and maintenance for all hoists:

(a) General guidelines.

(i) The hoist shall have a documented daily inspection by a competent person before use.

(ii) Prior to initial use, all new, altered or modified hoist mechanisms shall be inspected by a qualified person.

(iii) Inspection records shall be available and accessible for a minimum of two years.

(iv) The teardown inspection records shall be available until the next teardown inspection is completed.

(v) Any hoist that has been idle for a period of over six months shall be given an annual inspection prior to use.

(vi) Any hoist that has an unknown history of repair or maintenance shall have a tear down inspection prior to use.

(b) Inspection criteria. Before use, a competent person familiar with the applicable hoist shall visually inspect the hoist to verify that the following conditions are met:

(i) A documented daily inspection shall be performed which shall include at a minimum:

(A) Engine oil level shall be checked.

(B) Engine coolant levels shall be checked.

(C) Check for external oil leaks.

(D) Hydraulic oil reservoir level shall be checked.

(E) All safety devices and brakes shall be checked for wear and tear to assure they function properly.

(F) A visual inspection shall be conducted for loose or missing structural connections.

(ii) A documented semi-annual inspection shall include the daily inspection and the following:

(A) Winch oil level shall be checked.

(B) All safety devices and brakes shall be tested to assure they are functioning properly.

(C) A visual inspection shall be conducted for loose or missing structural connections.

(D) A complete oil analysis shall be conducted.

(E) The winch assembly shall be dynamically tested in both the hoisting and lowering directions while under a load of at least 30 percent of the hoist lifting capacity.

(F) The inspection shall be documented in writing and maintained for two years.

(iii) A documented annual inspection shall include the items in the daily and semi-annual along with the following:

(A) Lubricating oil and hydraulic fluids shall be tested according to the manufacturer's specification for contaminants and replaced if necessary.

(B) The annual inspection shall be documented and maintained for two years.

(c) Teardown criteria for overhead material lifting. A teardown inspection of the winch assembly shall be completed under the supervision of a qualified person using the manufacturer's specifications and includes at a minimum the following:

(i) A teardown inspection shall include the hoist being completely disassembled, cleaned and inspected, replacement of all worn, cracked, corroded or distorted parts such as pins, bearings, shafts, gears, brake rotors, brake plates, drum and/or base;

(ii) After a teardown inspection, a certificate shall be issued that includes the following:

(A) The effective date of the repair.

(B) The asset and serial numbers of the unit.

(C) The name of the repair shop.

(D) The name of the qualified person.

(d) Teardown criteria for lifting personnel.

(i) Those winch assemblies that adhere to the required daily, monthly, semi-annually and yearly inspection criteria shall conform to the following teardown inspection time frame:

(A) Severe duty every three years.

(B) Moderate duty every five years.

(C) Infrequent use every seven years.

(ii) Those winch assemblies that do not adhere to this documented inspection criteria, shall have a teardown inspection every three years.

(iii) During any inspection, items found that may affect the performance of the unit must be repaired before use.

(iv) Documentation of the inspection shall include, but not be limited to, winch model and serial number, name and employer of repair/inspection technician, date and description of findings, parts replaced and test results.

(4) Repair and modifications. The manufacturer's specifications and guidelines for repair and modification shall be used; however, when these are not available, the following minimum requirements shall be used:

(a) All repairs and modifications shall be made under the supervision of a qualified person.

(b) Repaired hoists shall be line pull tested to the maximum rated load and the winch assembly shall be rotated several times in both hoisting and lowering directions under maximum rated load while checking for smooth operation.

(c) Prior to initial use, all new, altered or modified hoist mechanisms shall be inspected by a competent person.

(d) Documentation of all modifications and repairs shall be maintained and available for review for a minimum of two years.

(e) If modifications alter the line pull or performance of the unit, then a revised load chart must be developed and installed to reflect the change.

(5) Training. All hoist operators shall be qualified in accordance to the complexities of the work and of the hoist they are operating. Hoist operators may attain qualification through a combination of classroom training; experience gained under the direct supervision of a qualified hoist operator, and demonstrated proficiency.

(a) During training or until the training requirements are met, the operator must not operate the hoist during personnel hoisting operations.

(b) An operator shall be trained in accordance to the class of machine they will be operating:

(i) Class A - 1,000 lbs. or less.

(ii) Class B - 1,000 lbs. to 5,000 lbs.

(iii) Class C - Greater than 5,000 lbs.

(c) The operator at a minimum shall have the following training:

(i) Ensure the hoist operator has classroom training in hoist operations; a minimum of forty hours as a hoist operator under the direct supervision of a qualified hoist operator, not less than eight hours in the operation of the class of hoist or one of the same type, and has demonstrated the ability to safely operate the hoist.

(ii) The operator shall have documented practical training on the safe operation of the applicable hoist by using the following:

(A) Operator's manual provided by the manufacturer;

(B) Company policy;

(C) Be familiar with hand signals being used;

- (D) Be familiar with the operations of two-way radios if they are being used;
- (E) Be familiar with the work being completed.
- (iii) The operator shall have a designated signal person and must take a stop signal from anyone.
- (6) Operator requirements and responsibilities. Operator and operator trainees shall meet the following physical qualifications unless it can be shown that failure to meet the qualifications will not affect the operation of the hoist. In such cases, specialized clinical or medical judgments and tests may be required.
  - (a) Vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses.
  - (b) Ability to distinguish colors, regardless of position, if color differentiation is required.
  - (c) Adequate hearing to meet operational demands, with or without hearing aid.
  - (d) Sufficient strength, endurance, agility, coordination, and speed of reaction to meet the operation demands.
  - (e) No tendencies to dizziness, seizures or similar characteristics.
  - (f) No evidence of having physical or emotional instability that could render a hazard to the operator or others.
  - (g) The operator shall have adequate eyesight for the operation.
  - (h) The operator shall not engage in any practice which will divert their attention while operating.
  - (i) The operator shall be responsible for those operations under their direct control.
  - (j) Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle the load until the situation is remedied.
  - (k) The operator shall not leave their position at the controls while a load is suspended.
  - (l) Before starting the hoist mechanism the operator shall ensure that:
    - (i) The daily inspection has been done;
    - (ii) All controls are in the off position; and
    - (iii) All personnel are in the clear.
- (7) Designated operators. The hoist mechanism can be operated by:
  - (a) Designated operators;
  - (b) Trainees under the direct supervision of a designated operator;
  - (c) Qualified maintenance and test personnel during repairs or testing; or
  - (d) Inspectors.
- (8) Operations. During operations, the hoist operator shall comply with the following:
  - (a) The drum flange will be a minimum of two times the wire rope diameter higher than the top layer of the wire rope.
  - (b) The hoist drum shall have a diameter or enough layers on the drum to maintain a minimum of an 18:1 pitch diameter ratio or the proper reduction based on the applicable D:d ratios.
  - (c) No less than three wraps of wire rope shall be maintained on the drum at all times.
  - (d) The hoist shall be positioned 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.

- (e) The foot block shall be anchored to prevent displacement and be supported to maintain proper alignment.
- (f) An accessible fire extinguisher of 5BC rating or higher shall be at the operator's station.
- (9) Operator's manual. There must be an operator's manual on-site and readily available for the applicable unit which was developed by the manufacturer, or registered professional engineer, for the specific make and model of hoist being used.
- (10) Load chart. The following postings shall be at the control station readily visible or available to the operator.
- (a) Where the rated capacities are inaccessible the operator must immediately cease operations or follow safe shutdown procedures until the rated capacities are available.
- (b) Rated load capacities, recommended operating speeds and special hazard warnings, or instructions shall be conspicuously posted on all hoists.
- (c) If a gin pole, derrick, pedestal crane or similar special lifting device is used with a base mounted hoist or winch to make lifts on a structure, the operator shall have a load chart on-site for the lifting mechanism and its use shall be included in the rigging plan for the job.
- (11) Hoist anchorage.
- (a) The hoist anchorage, at a minimum, shall have a working load limit (calculated with a minimum 2.0 safety factor) equal to or greater than the maximum anticipated hoist load. Alternately, a load test of 1.5 times the maximum anticipated hoist load under the expected site conditions during the lift may be used to verify the adequacy of the hoist anchorage.
- (b) Twisting, turning and sliding resistance shall be investigated.
- (c) When calculating allowable sliding resistance, the assumed coefficient of friction shall not exceed 0.20 and incorporate a minimum 2.0 safety factor unless the coefficient of friction is determined by a registered professional engineer.
- (d) The weight of the hoist shall be considered with the minimum load line remaining on the drum for the lift.
- (e) When personnel are lifted, the maximum anticipated hoist load shall not exceed 50 percent of the hoist anchorage capacity.
- (12) Communications.
- (a) Loads being hoisted shall remain in continuous sight of and/or in direct communication with the operator or signal person.
- (b) When hand signals are used, the employees must use standard hand signals.
- (c) In those situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard, direct communication alone, such as by radio, shall be used.
- (d) When radios are used, they shall be nontrunked closed 2-way selective frequency radio systems and the device(s) shall be tested on-site before beginning operations to ensure that the signal transmission is; effective, clear, reliable and the operator shall utilize a hands free system for receiving such signals.
- (13) Weather conditions. Loads shall not be hoisted during adverse weather conditions (high winds, electrical storms, snow, ice or sleet) or when there is other impending danger, except in the case of emergency or employee rescue.

(14) Rigging plans. All hoist operations shall be part of a rigging plan as applicable in this chapter. The hoist operator shall have knowledge and understanding of the rigging plan and a copy readily available.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060, and chapter 49.17 RCW. WSR 17-20-069, § 296-32-24028, filed 10/2/17, effective 1/1/18.]