

(Effective until October 1, 2020)

WAC 296-155-53400 General requirements. (1) All cranes and derricks covered under this part, except for those exempted in WAC 296-155-52900(3), must be certified annually by an accredited certifier recognized by the department, for detailed information about this certification see WAC 296-155-532.

(2) All crane and derrick operators covered under this part, except for those exempted in WAC 296-155-52900(3), must be qualified as required by WAC 296-155-533.

(3)(a) Cranes must meet the requirements for design, construction, installation and testing as prescribed in the applicable ASME standard at the time the crane or derrick was manufactured.

(b) Where manufacturer's specifications are not available the limitations assigned to the crane must be based on the determinations of a registered professional engineer (RPE), competent in this field and such determinations must be appropriately documented and recorded.

(c) Attachments used with cranes must not exceed the capacity, rating, or scope recommended by the manufacturer or RPE.

(4) Unavailable operation procedures.

(a) Where the manufacturer procedures are unavailable, you must develop and ensure compliance with all procedures necessary for the safe operation of the crane/derrick and attachments.

(b) Procedures for the operational controls must be developed by a qualified person.

(c) Procedures related to the capacity of the crane/derrick must be developed and signed by a registered professional engineer familiar with this equipment.

(5) Warning decals and placards must be installed and legible as prescribed by this part and the crane manufacturer.

(6) The procedures applicable to the operation of the crane/derrick including a legible and applicable operator's manual and load rating chart, written in the English language with customary grammar and punctuation, must be in the operator's cab or station when the crane is in operation. Where rated capacities are available in the cab only in electronic form: In the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(7) Rated capacity and related information. The information available in the operator's cab or station (see WAC 296-155-53400(6)) regarding "rated capacity" and related information must include, at a minimum, the following information:

(a) A complete range of the manufacturer's rated capacities, as follows:

(i) At all manufacturer approved operating radii, boom angles, work areas, boom lengths and configurations, jib lengths and angles (or offset).

(ii) Alternate ratings for use and nonuse of optional equipment which affects rated capacities, such as outriggers, stabilizers, and extra counterweights.

(iii) When available from the manufacturer load ratings where structural competence governs lifting performance must be identified.

(b) A work area chart for which capacities are listed in the load chart.

Note: An example of this type of chart for mobile cranes is in WAC 296-155-56435.

(c) The work area figure and load chart must clearly indicate the areas where no load is to be handled.

(d) Recommended reeving for the hoist lines must be shown.

(e) Recommended parts of hoist reeving, size, and type of wire rope for various crane loads.

(f) Recommended boom hoist reeving diagram, where applicable; size, type, and length of wire rope.

(g) Tire pressure (where applicable).

(h) Caution or warnings relative to limitations on cranes and operating procedures, including an indication of the least stable direction.

(i) Position of the gantry and requirements for intermediate boom suspension (where applicable).

(j) Instructions for boom erection and conditions under which the boom, or boom and jib combinations, may be raised or lowered.

(k) Whether the hoist holding mechanism is automatically or manually controlled, whether free fall is available, or any combination of these.

(l) The maximum telescopic travel length of each boom telescopic section.

(m) Whether sections are telescoped manually or with power.

(n) The sequence and procedure for extending and retracting the telescopic boom section.

(o) Maximum loads permitted during the boom extending operation, and any limiting conditions or cautions.

(p) Hydraulic relief valve settings specified by the manufacturer.

(8) All manufacturer procedures applicable to the operational functions of cranes/derricks, including its use with attachments must be complied with.

(9) The operator must not engage in any practice or activity that diverts his/her attention while actually engaged in operating the crane/derrick, such as the use of cellular phones (other than when used for signal communications).

(10) A portable fire extinguisher, with a basic minimum extinguisher rating of 10 BC, must be installed in the cab or at the machinery housing. Additional requirements relating to portable fire extinguishers can be found in WAC 296-800-300.

(11) **Cabs.** Cranes/derricks with cabs must meet the following requirements:

(a) Cabs must be designed with a form of adjustable ventilation and method for clearing the windshield for maintaining visibility and air circulation. Examples of means for adjustable ventilation include air conditioner or window that can be opened (for ventilation and air circulation); examples of means for maintaining visibility include heater (for preventing windshield icing), defroster, fan, windshield wiper.

(b) Cab doors (swinging, sliding) must be designed to prevent inadvertent opening or closing while traveling or operating the machine. Swinging doors adjacent to the operator must open outward. Sliding operator doors must open rearward.

(c) **Windows.**

(i) The cab must have windows in front and on both sides of the operator. Forward vertical visibility must be sufficient to give the operator a view of the boom point at all times.

(ii) Windows may have sections designed to be opened or readily removed. Windows with sections designed to be opened must be designed so that they can be secured to prevent inadvertent closure.

(iii) Windows must be of safety glass or material with similar optical and safety properties that introduce no visible distortion or otherwise obscure visibility that interferes with the safe operation of the equipment.

(d) A clear passageway must be provided from the operator's station to an exit door on the operator's side.

(e) Areas of the cab roof that serve as a workstation for rigging, maintenance, or other equipment-related tasks must be capable of supporting 250 pounds without permanent distortion.

(12) Personal belongings must be stored in such a manner as to not interfere with access or operation of the crane.

(13) Rigging gear, tools, oil cans, waste, and other articles must be stored in the toolbox or another appropriate location, and must not be permitted to lie loose in or about the cab or operator's work station.

(14) Operating controls must be properly marked to indicate the function of the controls in each position.

(15) You must designate a competent person who must inspect the cranes and components daily when used, and periodically during use to make sure it is in safe operating condition. Any deficiencies that affect the safe operation of the crane must be repaired, or defective parts replaced, before continued use.

Note: For additional requirements relating to inspections see WAC 296-155-53405.

(16) Before starting the engine, the operator must verify that all controls are in the proper starting position and that all personnel are in the clear.

(17) While in operation, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment must be guarded if such parts are exposed to contact by employees, or otherwise create a hazard. Guarding must meet the requirements of chapter 296-806 WAC, Machine safety.

(18) Neither the load nor the boom is allowed to be lowered below the point where less than two full wraps of rope remain on their respective drums.

(19) All exhaust pipes, turbochargers, and charge air coolers must be guarded or insulated in areas where contact by employees is possible in the performance of normal duties and are discharged in a direction away from the operator.

(20) Hydraulic and pneumatic lines must be protected from damage to the extent feasible.

(21) **Friction mechanisms.** Where friction mechanisms (such as brakes and clutches) are used to control the boom hoist or load line hoist, they must be:

(a) Of a size and thermal capacity sufficient to control all rated loads with the minimum recommended reeving.

(b) Adjustable to permit compensation for lining wear to maintain proper operation.

(22) Hydraulic load hoists. Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent load hoist movement in the event of hydraulic failure.

(23) Whenever internal combustion engine powered crane/derrick exhausts in enclosed spaces, tests must be made and recorded to see

that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres. (See chapter 296-62 WAC, General occupational health standards and chapter 296-841 WAC, Airborne contaminants.)

(24) If access to the cab roof is necessary, a ladder or steps must be provided to give access to a cab roof.

(25) All steps, running boards, and ladders must be of substantial construction and in good repair at all times.

(26) Guardrails, handholds, and steps must be provided on cranes for easy access to the cab in accordance with Parts C-1 and J of this chapter.

(27) Platforms and walkways must have antiskid surfaces.

(28) Cranes/derricks fuel tank filler pipe must be located in such a position, or protected in such a manner, as to not allow spill or overflow to run onto the engine, exhaust, or electrical equipment of any crane being fueled. In addition, cranes/derricks must be refueled as follows:

(a) Make sure the engine is turned off before refueling.

(b) When refueling with gasoline using portable containers, make sure only an approved safety-type can with an automatic closing cap and flame arrester is used.

(c) Smoking or open flames is prohibited in the refueling area.

(29) **Crane hook ball assemblies and load blocks.**

(a) Load hooks (including latched and unlatched types), ball assemblies, and load blocks must be of sufficient weight to overhaul the line from the highest hook position for boom or boom and jib lengths and the number of parts of the line in use.

(b) Crane hooks must be equipped with latches or self-locking devices unless a qualified person determines that it is safer to hoist and place the load without latches (or with the latches removed/tied back or otherwise disabled) and routes for the loads are preplanned to ensure that no employee is required to work in the fall zone except for employees necessary for the hooking or unhooking of the load.

(c) The latch or self-locking device (when used) must bridge the throat opening of the hook for the purpose of retaining slings or other lifting devices under slack conditions.

(30) Repair or replace a hook when it shows:

(a) Any cracks, nicks, or gouges.

(b) Wear of more than 10% of the original sectional dimension, or as recommended by the manufacturer.

(c) Any visibly apparent bend or twist from the plane of the unbent hook.

(d) Any distortion causing an increase in the throat opening of 5%, not to exceed 1/4 inch or as recommended by the manufacturer.

(e) Repair or replace hook latches or self-locking devices when they become inoperative.

(31) A qualified person must determine if a damaged hook needs to be replaced or can be repaired.

(32) When repairing a hook, the requirements below must be followed:

(a) Unless otherwise recommended by the manufacturer, only a qualified person can repair cracks, nicks and gouges by grinding longitudinally, following the contour of the hook.

Note: The dimension of the hook cannot be reduced more than 10% of its original value, unless otherwise recommended by the manufacturer.

(b) All other repairs must be performed by the hook manufacturer or the qualified person.

(c) Weld repairs or reshaping must not be performed on hooks, unless approved by the manufacturer.

(33) Replacement parts, such as load pins for clevis hooks must be at least equal to the original manufacturer's specifications.

Note: For requirements relating to wedge sockets, see WAC 296-155-56115(2).

(34) Before traveling a crane with a load, it must be determined that this practice is not prohibited by the manufacturer. If not, a qualified person must be responsible for the operation. Decisions such as the necessity to reduce crane ratings, load position, boom location, ground support, travel route, and speed of movement must be in accordance with that person's determination. Specified tire pressure must be maintained. The boom should be carried in line with the direction of travel. Sudden starts and stops should be avoided.

(35) The crane/derrick must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent as determined by a competent person, so that, in conjunction (if necessary) with the use of supporting materials, the crane/derrick manufacturer's specifications for adequate support and degree of level of the crane/derrick are met. The requirement for the ground to be drained does not apply to marshes/wetlands. For additional requirements for self-erecting tower cranes, see WAC 296-155-54100.

(36) The controlling entity must:

(a) Ensure that ground preparations necessary to meet the requirements in subsection (35) of this section are provided.

(b) Inform the user of the crane/derrick and the operator of the location of hazards beneath the crane/derrick set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) if they are available to the controlling entity that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.

(37) If there is no controlling entity for the project, the requirement in subsection (36)(a) of this section must be met by the employer that has authority at the site to make or arrange for ground preparations needed to meet subsection (35) of this section.

(38) If the assembly/disassembly director or the operator determines that ground conditions do not meet the requirements in subsection (35) of this section, that person's employer must have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the requirements in subsection (35) of this section can be met.

(39) This section does not apply to cranes designed for use on railroad tracks when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 C.F.R. Part 213, and that comply with applicable Federal Railroad Administration requirements.

(40) Multiple crane/derrick coordination. Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

(41) **Multiple crane or multiple load line lifts.**

(a) **Plan development.** Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load or

multiple load lines on one crane will be supporting the load, the operation must be planned. The planning must meet the following requirements:

(i) The plan must be developed by a qualified person.

(ii) The plan must be designed to ensure that the requirements of this part are met.

(iii) Where the qualified person determines that engineering expertise is needed for the planning, you must ensure that it is provided.

(b) **Plan implementation.**

(i) The multiple-crane/derrick lift or multiple load line lifts must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (lift director).

(ii) The lift director must review the plan in a meeting with all workers who will be involved with the operation.

(42) **Work area control.** Swing radius hazards.

(a) The requirements in (b) of this subsection apply where there are accessible areas in which the crane's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

(i) Striking and injuring an employee; or

(ii) Pinching/crushing an employee against another part of the crane or another object.

(b) To prevent employees from entering these hazard areas, you must:

(i) Train each employee assigned to work on or near the crane (authorized personnel) in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.

(ii) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas.

Exception: When you can demonstrate that it is neither feasible to erect such barriers on the ground nor on the crane, the hazard areas must be clearly marked by a combination of warning signs (such as Danger-Swing/Crush Zone) and high visibility markings on the crane that identify the hazard areas. In addition, you must train each employee to understand what these markings signify.

(c) **Protecting employees in the hazard area.**

(i) Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

(ii) Where the operator knows that an employee went to a location covered by subsection (43)(c)(i) of this section, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

(d) Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

(43) **Keeping clear of the load.**

(a) Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used to the extent consistent with public safety.

(b) While the operator is not moving a suspended load, no employee is allowed to be within the fall zone, except for employees:

(i) Engaged in hooking, unhooking or guiding a load; or

(ii) Engaged in the initial attachment of the load to a component structure; or

(iii) Operating a concrete hopper or concrete bucket.

(c) When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure, and are within the fall zone, all of the following criteria must be met:

(i) The materials being hoisted must be rigged to prevent unintentional displacement.

(ii) Hooks with self-closing latches or their equivalent must be used, see subsection (29)(b) of this section. "J" hooks are permitted to be used for setting wooden trusses.

(iii) The materials must be rigged by a qualified rigger.

(d) Receiving a load. Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

(e) During a tilt-up or tilt-down operation:

(i) Employees are not allowed to be directly under the load.

(ii) Only employees' essential to the operation are allowed to be in the fall zone (but not directly under the suspended load).

Note: An employee is essential to the operation if the employee is conducting one of the following operations and you can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:

- Physically guide the load;
- Closely monitor and give instructions regarding the load's movement; or
- Either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).

(f) Boom free fall is prohibited when an employee is in the fall zone of the boom or load, and load line free fall is prohibited when an employee is directly under the load. See subsections (44) through (47) of this section.

(44) Boom free fall prohibitions.

(a) The use of cranes in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:

(i) An employee is in the fall zone of the boom or load.

(ii) An employee is being hoisted.

(iii) The load or boom is directly over a power line, or over any part of the area listed in Table 4 located in WAC 296-155-53408, clearance distance to each side of the power line; or any part of the area extending the Table 4 clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.

(iv) The load is over a shaft, except where there are no employees in the shaft.

(v) The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.

(vi) Lifting operations are taking place in a refinery or tank farm.

(b) The use of cranes in which the boom is designed to free fall (live boom) is permitted only where none of the circumstances listed in (a) of this subsection are present and:

(i) The crane was manufactured prior to October 31, 1984; or

(ii) The crane is a floating crane or a land crane on a vessel/flotation device.

(45) Preventing boom free fall. Where the use of a crane with a boom that is designed to free fall (live boom) is prohibited (see subsection (44)(a) of this section), the boom hoist must have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:

(a) Friction drums must have:

(i) A friction clutch and, in addition, a braking device, to allow for controlled boom lowering.

(ii) A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device).

(b) Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.

(c) Neither clutches nor hydraulic motors must be considered brake or locking devices for purposes of this part.

(d) Hydraulic boom cylinders must have an integrally mounted holding device.

(46) **Preventing uncontrolled retraction.** Hydraulic telescoping booms must have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.

(47) **Load line free fall.** In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

(a) **An employee is directly under the load.**

(b) **An employee is being hoisted.**

(c) The load is directly over a power line, or over any part of the area listed in Table 4, located in WAC 296-155-53408, clearance distance to each side of the power line; or any part of the area extending the Table 4 of WAC 296-155-53408, clearance distance to each side of the power line is within the radius of vertical travel of the load.

(d) **The load is over a shaft.**

(e) The load is over a cofferdam, except where there are no employees in the fall zone of the load.

(48) You must not allow employees must not be allowed to ride on the hook or load.

(49) The hoist rope must not be wrapped around the load.

(50) All loads must be attached to the hook by means of suitable slings or other devices of sufficient lifting capacity.

(51) When moving a load it must be well secured and balanced in the sling or lifting device before it is lifted more than a few inches.

(52) **Leaving the crane/derrick unattended.** The operator must not leave the controls while the load is suspended, except where all of the following are met:

(a) The operator remains adjacent to the crane/derrick and is not engaged in any other duties.

(b) The load is to be held suspended for a period of time exceeding normal lifting operations.

(c) The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.

(d) Barricades or caution lines, and notices, are erected to prevent all employees from entering the fall zone. No employees, including those listed in subsection (43)(b), (d), and (e) of this section, are permitted in the fall zone.

Exemption: The provisions in this section do not apply to working gear (such as slings, spreader bars, ladders, and welding machines) where the weight of the working gear is negligible relative to the lifting capacity of the equipment as positioned, and the working gear is suspended over an area other than an entrance or exit.

Note: For additional requirements relating to leaving the crane unattended for tower, self-erecting, overhead/bridge and derricks see:
• WAC 296-155-53915, Tower cranes—Operations;

- WAC 296-155-54115, Self-erecting tower cranes—Operations;
- WAC 296-155-54215, Overhead/bridge cranes and gantry cranes—Operations;
- WAC 296-155-54320, Derricks—Operations.

(53) While moving the load the lift and swing path must be clear of obstructions.

(54) Before starting to lift the following conditions must be met:

- (a) The hoist rope must not be kinked.
- (b) Multiple-part lines must not be twisted around each other.
- (c) The hook must be brought over the load in such a manner as to minimize swinging.

(d) If the competent person determines that there is slack rope condition requiring respooling of the rope, it must be verified (before starting the lift) that the rope is seated on the drum and in the sheaves as the slack is removed.

(e) The competent person must adjust the crane/derrick and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.

(f) If possible, the load must be free to be lifted; it is neither caught nor attached to other objects.

(55) During lifting operations, care must be taken that there is no sudden acceleration or deceleration of the moving load and that the load boom or other parts of the crane do not contact any obstruction. Rotational speed of the crane/derrick must be such that the load does not swing out beyond the radius at which it can be controlled.

(56) Side loading of booms (jibs) must be limited to freely suspended loads. Cranes must not be used for dragging loads sideways.

(57) The operator must test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90% or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.

(58) Modifications or additions which affect the capacity or safe operation of the crane/derrick are prohibited except where the requirements of (a) or (b) of this subsection are met. For recertification requirements see WAC 296-155-53214 (1)(c).

(a) Manufacturer review and approval.

(i) The manufacturer approves the modifications/additions in writing.

(ii) The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

(iii) The original safety factor of the crane/derrick is not reduced.

(b) Where manufacturer is unavailable or has refused to review a request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:

(i) A registered professional engineer who is a qualified person with respect to the crane/derrick involved:

(A) Approves the modification/addition and specifies the crane/derrick configurations to which that approval applies; and

(B) Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.

(ii) The original safety factor of the crane/derrick is not reduced.

(c) Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the requirements of subsection (58)(b)(i) and (ii) of this section are met.

(d) Multiple manufacturers of equipment designed for use on marine worksites. The equipment is designed for marine worksites, contains major structural components from more than one manufacturer, and the requirements of subsection (58)(b)(i) and (ii) of this section are met.

(59) You must not make any modifications or additions which affect the capacity or safe operation of the crane without the manufacturers' written approval. If components of more than one crane manufacturer are being combined, you must obtain written approval from all manufacturers prior to use. If the manufacturer(s) is/are not available a registered professional structural engineer's (RPSE) written approval must be obtained. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, must be changed accordingly. In no case must the original safety factor of the crane be reduced.

Note: The provisions in subsections (58) and (59) of this section do not apply to modifications made or approved by the U.S. military.

(60) All applicable controls must be tested by the operator at the start of a new shift, if possible. If any controls fail to operate properly, they must be adjusted or repaired before operations are initiated.

(61) Except for proof load testing required under WAC 296-155-53202 through 296-155-53212, no crane/derrick is permitted to be loaded beyond the specifications of the load rating chart, unless authorized by the crane manufacturer. The operator must not be required to operate the crane/derrick in a manner that would violate this requirement.

(62) **Load weight.** The operator must verify that the load is within the rated capacity of the crane/derrick by at least one of the following methods:

(a) The weight of the load must be determined from a reliable source recognized by the industry (such as the load's manufacturer), or by a reliable calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. In addition, when requested by the operator, this information must be provided to the operator prior to the lift; or

(b) The operator must begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter. If the load exceeds 75% of the maximum rated capacity at the longest radius that will be used during the lift operation, the operator must not proceed with the lift until it is verified that the weight of the load is in accordance with (a) of this subsection.

(63) Tag lines or restraint lines must be used when rotation or swinging of the load is hazardous or if the load needs guidance. Tag lines are not required when all of the following criteria are met:

- The suspended load can be expected to remain still when in a static (nonmoving) condition or does not swing or rotate in a hazardous manner;

- The movement of the crane or boom cannot be expected to cause the load to swing or rotate in an uncontrolled manner that may create a hazard;

- The operator is in control of the movement of the load and a hazardous condition is not created.

(64) All brakes must be adjusted in accordance with manufacturer procedures to prevent unintended movement.

(65) Safety devices and/or operational aids must not be used as a substitute for the exercise of professional judgment by the operator.

(66) **Storm warning.** When a local storm warning has been issued, the competent person must determine whether it is necessary to implement manufacturer recommendations for securing the crane/derrick.

(67) Whenever there is a concern as to safety, the operator has the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.

(68) **Tag-out.**

(a) Tagging out of service. Where you have taken the crane/derrick out of service, a tag must be placed in the cab or at the operator station stating that the equipment is out of service and is not to be used. Where you have taken a function(s) out of service, a tag must be placed in a conspicuous position stating that the function is out of service and is not to be used.

(b) **Response to do not operate/tag-out signs.**

(i) If there is a warning (tag-out or maintenance/do not operate) sign on the crane/derrick or starting control, the operator must not activate the switch or start the crane/derrick until the sign has been removed by a person authorized to remove it, or until the operator has verified that:

(A) No one is servicing, working on or otherwise in a dangerous position around the machine.

(B) The crane/derrick has been repaired and is working properly.

(ii) If there is a warning (tag-out or maintenance/do not operate) sign on any other switch or control, the operator must not activate that switch or control until the sign has been removed by a person authorized to remove it, or until the operator has verified that the requirements in (b)(i)(A) and (B) of this subsection have been met.

Note: For additional lockout/tagout procedures for electrical circuits, see WAC 296-155-429.

(69) If crane/derrick adjustments or repairs are necessary:

(a) The operator must, in writing, promptly inform the person designated by you to receive such information and, where there are successive shifts, to the next operator; and

(b) You must notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and all alternative measures.

(70) All cranes and derricks mounted on barges or other floating structures must meet the requirements as outlined in ASME B30.8-2004 for construction, installation, inspection, maintenance and operation.

(71) **Swinging locomotive cranes.** A locomotive crane must not be swung into a position where railway cars on an adjacent track could strike it, until it is determined that cars are not being moved on the adjacent track and that proper flag protection has been established.

(72) **Remote control cranes/derricks.** Before an operator leaves the crane/derrick to operate remotely, the operator must ensure that the crane/derrick will be used in accordance with the manufacturer's recommendations. Provisions must be made to prevent simultaneous activation of controls when more than one control station (remote control) is provided.

(73) Remote-operated cranes/derricks must function so that if the control signal for any crane/derrick motion becomes ineffective, the crane/derrick motion must stop.

(74) Remote-operated cranes/derricks must be equipped with an "emergency stop" system, located at the operator's remote station to provide the means to remove power from the crane in the event of a malfunction.

(75) A preventative maintenance program must be established based on the recommendation of the crane/derrick manufacturer. If manufacturer's recommendations are not available, then those of a qualified person must be followed. Dated records must be kept available.

(76) **Working with a diver.** You must meet the following additional requirements when working with a diver in the water:

(a) If a crane/derrick is used to get a diver into and out of the water, it must not be used for any other purpose until the diver is removed from the water. When used for more than one diver, it must not be used for any other purpose until all divers are all out of the water.

(b) The operator must remain at the controls of the crane/derrick at all times.

(c) In addition to the requirements in WAC 296-155-53406, Signals, either:

(i) A clear line of sight must be maintained between the operator and dive tender; or

(ii) The signals between the operator and dive tender must be transmitted electronically.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060. WSR 16-09-085, § 296-155-53400, filed 4/19/16, effective 5/20/16. Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060 and chapter 49.17 RCW, and 29 C.F.R. 1926, Subpart CC. WSR 13-02-068, § 296-155-53400, filed 12/31/12, effective 2/1/13. Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.440, 49.17.060, and 29 C.F.R. 1926, Subpart CC. WSR 12-01-086, § 296-155-53400, filed 12/20/11, effective 2/1/12.]

(Effective October 1, 2020)

WAC 296-155-53400 General requirements. (1) All cranes and derricks covered under this part, except for those exempted in WAC 296-155-52900(3), must be certified annually by an accredited certifier recognized by the department, for detailed information about this certification see WAC 296-155-532.

(2) All crane and derrick operators covered under this part, except for those exempted in WAC 296-155-52900(3), must be qualified as required by WAC 296-155-533.

(3)(a) Cranes must meet the requirements for design, construction, installation and testing as prescribed in the applicable ASME standard at the time the crane or derrick was manufactured.

(b) Where manufacturer's specifications are not available the limitations assigned to the crane must be based on the determinations of a registered professional engineer (RPE), competent in this field and such determinations must be appropriately documented and recorded.

(c) Attachments used with cranes must not exceed the capacity, rating, or scope recommended by the manufacturer or RPE.

(4) Unavailable operation procedures.

(a) Where the manufacturer procedures are unavailable, you must develop and ensure compliance with all procedures necessary for the safe operation of the crane/derrick and attachments.

(b) Procedures for the operational controls must be developed by a qualified person.

(c) Procedures related to the capacity of the crane/derrick must be developed and signed by a registered professional engineer familiar with this equipment.

(5) Warning decals and placards must be installed and legible as prescribed by this part and the crane manufacturer.

(6) The procedures applicable to the operation of the crane/derrick including a legible and applicable operator's manual and load rating chart, written in the English language with customary grammar and punctuation, must be in the operator's cab or station when the crane is in operation. Where rated capacities are available in the cab only in electronic form: In the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(7) Rated capacity and related information. The information available in the operator's cab or station (see WAC 296-155-53400(6)) regarding "rated capacity" and related information must include, at a minimum, the following information:

(a) A complete range of the manufacturer's rated capacities, as follows:

(i) At all manufacturer approved operating radii, boom angles, work areas, boom lengths and configurations, jib lengths and angles (or offset).

(ii) Alternate ratings for use and nonuse of optional equipment which affects rated capacities, such as outriggers, stabilizers, and extra counterweights.

(iii) When available from the manufacturer load ratings where structural competence governs lifting performance must be identified.

(b) A work area chart for which capacities are listed in the load chart.

Note: An example of this type of chart for mobile cranes is in WAC 296-155-56435.

(c) The work area figure and load chart must clearly indicate the areas where no load is to be handled.

(d) Recommended reeving for the hoist lines must be shown.

(e) Recommended parts of hoist reeving, size, and type of wire rope for various crane loads.

(f) Recommended boom hoist reeving diagram, where applicable; size, type, and length of wire rope.

(g) Tire pressure (where applicable).

(h) Caution or warnings relative to limitations on cranes and operating procedures, including an indication of the least stable direction.

(i) Position of the gantry and requirements for intermediate boom suspension (where applicable).

- (j) Instructions for boom erection and conditions under which the boom, or boom and jib combinations, may be raised or lowered.
 - (k) Whether the hoist holding mechanism is automatically or manually controlled, whether free fall is available, or any combination of these.
 - (l) The maximum telescopic travel length of each boom telescopic section.
 - (m) Whether sections are telescoped manually or with power.
 - (n) The sequence and procedure for extending and retracting the telescopic boom section.
 - (o) Maximum loads permitted during the boom extending operation, and any limiting conditions or cautions.
 - (p) Hydraulic relief valve settings specified by the manufacturer.
- (8) All manufacturer procedures applicable to the operational functions of cranes/derricks, including its use with attachments must be complied with.
- (9) The operator must not engage in any practice or activity that diverts his/her attention while actually engaged in operating the crane/derrick, such as the use of cellular phones (other than when used for signal communications).
- (10) A portable fire extinguisher, with a basic minimum extinguisher rating of 10 BC, must be installed in the cab or at the machinery housing. Additional requirements relating to portable fire extinguishers can be found in WAC 296-800-300.
- (11) **Cabs.** Cranes/derricks with cabs must meet the following requirements:
- (a) Cabs must be designed with a form of adjustable ventilation and method for clearing the windshield for maintaining visibility and air circulation. Examples of means for adjustable ventilation include air conditioner or window that can be opened (for ventilation and air circulation); examples of means for maintaining visibility include heater (for preventing windshield icing), defroster, fan, windshield wiper.
 - (b) Cab doors (swinging, sliding) must be designed to prevent inadvertent opening or closing while traveling or operating the machine. Swinging doors adjacent to the operator must open outward. Sliding operator doors must open rearward.
 - (c) **Windows.**
 - (i) The cab must have windows in front and on both sides of the operator. Forward vertical visibility must be sufficient to give the operator a view of the boom point at all times.
 - (ii) Windows may have sections designed to be opened or readily removed. Windows with sections designed to be opened must be designed so that they can be secured to prevent inadvertent closure.
 - (iii) Windows must be of safety glass or material with similar optical and safety properties that introduce no visible distortion or otherwise obscure visibility that interferes with the safe operation of the equipment.
 - (d) A clear passageway must be provided from the operator's station to an exit door on the operator's side.
 - (e) Areas of the cab roof that serve as a workstation for rigging, maintenance, or other equipment-related tasks must be capable of supporting 250 pounds without permanent distortion.
- (12) Personal belongings must be stored in such a manner as to not interfere with access or operation of the crane.

(13) Rigging gear, tools, oil cans, waste, and other articles must be stored in the toolbox or another appropriate location, and must not be permitted to lie loose in or about the cab or operator's work station.

(14) Operating controls must be properly marked to indicate the function of the controls in each position.

(15) You must designate a competent person who must inspect the cranes and components daily when used, and periodically during use to make sure it is in safe operating condition. Any deficiencies that affect the safe operation of the crane must be repaired, or defective parts replaced, before continued use.

Note: For additional requirements relating to inspections see WAC 296-155-53405.

(16) Before starting the engine, the operator must verify that all controls are in the proper starting position and that all personnel are in the clear.

(17) While in operation, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment must be guarded if such parts are exposed to contact by employees, or otherwise create a hazard. Guarding must meet the requirements of chapter 296-806 WAC, Machine safety.

(18) Neither the load nor the boom is allowed to be lowered below the point where less than two full wraps of rope remain on their respective drums.

(19) All exhaust pipes, turbochargers, and charge air coolers must be guarded or insulated in areas where contact by employees is possible in the performance of normal duties and are discharged in a direction away from the operator.

(20) Hydraulic and pneumatic lines must be protected from damage to the extent feasible.

(21) **Friction mechanisms.** Where friction mechanisms (such as brakes and clutches) are used to control the boom hoist or load line hoist, they must be:

(a) Of a size and thermal capacity sufficient to control all rated loads with the minimum recommended reeving.

(b) Adjustable to permit compensation for lining wear to maintain proper operation.

(22) Hydraulic load hoists. Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent load hoist movement in the event of hydraulic failure.

(23) Whenever internal combustion engine powered crane/derrick exhausts in enclosed spaces, tests must be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres. (See chapter 296-62 WAC, General occupational health standards and chapter 296-841 WAC, Airborne contaminants.)

(24) If access to the cab roof is necessary, a ladder or steps must be provided to give access to a cab roof.

(25) All steps, running boards, and ladders must be of substantial construction and in good repair at all times.

(26) Guardrails, handholds, and steps must be provided on cranes for easy access to the cab in accordance with chapter 296-880, Unified safety standards for fall protection Part J of this chapter.

(27) Platforms and walkways must have antiskid surfaces.

(28) Cranes/derricks fuel tank filler pipe must be located in such a position, or protected in such a manner, as to not allow spill

or overflow to run onto the engine, exhaust, or electrical equipment of any crane being fueled. In addition, cranes/derricks must be refueled as follows:

(a) Make sure the engine is turned off before refueling.

(b) When refueling with gasoline using portable containers, make sure only an approved safety-type can with an automatic closing cap and flame arrester is used.

(c) Smoking or open flames is prohibited in the refueling area.

(29) **Crane hook ball assemblies and load blocks.**

(a) Load hooks (including latched and unlatched types), ball assemblies, and load blocks must be of sufficient weight to overhaul the line from the highest hook position for boom or boom and jib lengths and the number of parts of the line in use.

(b) Crane hooks must be equipped with latches or self-locking devices unless a qualified person determines that it is safer to hoist and place the load without latches (or with the latches removed/tied back or otherwise disabled) and routes for the loads are preplanned to ensure that no employee is required to work in the fall zone except for employees necessary for the hooking or unhooking of the load.

(c) The latch or self-locking device (when used) must bridge the throat opening of the hook for the purpose of retaining slings or other lifting devices under slack conditions.

(30) Repair or replace a hook when it shows:

(a) Any cracks, nicks, or gouges.

(b) Wear of more than 10% of the original sectional dimension, or as recommended by the manufacturer.

(c) Any visibly apparent bend or twist from the plane of the unbent hook.

(d) Any distortion causing an increase in the throat opening of 5%, not to exceed 1/4 inch or as recommended by the manufacturer.

(e) Repair or replace hook latches or self-locking devices when they become inoperative.

(31) A qualified person must determine if a damaged hook needs to be replaced or can be repaired.

(32) When repairing a hook, the requirements below must be followed:

(a) Unless otherwise recommended by the manufacturer, only a qualified person can repair cracks, nicks and gouges by grinding longitudinally, following the contour of the hook.

Note: The dimension of the hook cannot be reduced more than 10% of its original value, unless otherwise recommended by the manufacturer.

(b) All other repairs must be performed by the hook manufacturer or the qualified person.

(c) Weld repairs or reshaping must not be performed on hooks, unless approved by the manufacturer.

(33) Replacement parts, such as load pins for clevis hooks must be at least equal to the original manufacturer's specifications.

Note: For requirements relating to wedge sockets, see WAC 296-155-56115(2).

(34) Before traveling a crane with a load, it must be determined that this practice is not prohibited by the manufacturer. If not, a qualified person must be responsible for the operation. Decisions such as the necessity to reduce crane ratings, load position, boom location, ground support, travel route, and speed of movement must be in accordance with that person's determination. Specified tire pressure must be maintained. The boom should be carried in line with the direction of travel. Sudden starts and stops should be avoided.

(35) The crane/derrick must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent as determined by a competent person, so that, in conjunction (if necessary) with the use of supporting materials, the crane/derrick manufacturer's specifications for adequate support and degree of level of the crane/derrick are met. The requirement for the ground to be drained does not apply to marshes/wetlands. For additional requirements for self-erecting tower cranes, see WAC 296-155-54100.

(36) The controlling entity must:

(a) Ensure that ground preparations necessary to meet the requirements in subsection (35) of this section are provided.

(b) Inform the user of the crane/derrick and the operator of the location of hazards beneath the crane/derrick set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) if they are available to the controlling entity that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.

(37) If there is no controlling entity for the project, the requirement in subsection (36)(a) of this section must be met by the employer that has authority at the site to make or arrange for ground preparations needed to meet subsection (35) of this section.

(38) If the assembly/disassembly director or the operator determines that ground conditions do not meet the requirements in subsection (35) of this section, that person's employer must have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the requirements in subsection (35) of this section can be met.

(39) This section does not apply to cranes designed for use on railroad tracks when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 C.F.R. Part 213, and that comply with applicable Federal Railroad Administration requirements.

(40) Multiple crane/derrick coordination. Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

(41) **Multiple crane or multiple load line lifts.**

(a) **Plan development.** Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load or multiple load lines on one crane will be supporting the load, the operation must be planned. The planning must meet the following requirements:

(i) The plan must be developed by a qualified person.

(ii) The plan must be designed to ensure that the requirements of this part are met.

(iii) Where the qualified person determines that engineering expertise is needed for the planning, you must ensure that it is provided.

(b) **Plan implementation.**

(i) The multiple-crane/derrick lift or multiple load line lifts must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (lift director).

(ii) The lift director must review the plan in a meeting with all workers who will be involved with the operation.

(42) **Work area control.** Swing radius hazards.

(a) The requirements in (b) of this subsection apply where there are accessible areas in which the crane's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

(i) Striking and injuring an employee; or

(ii) Pinching/crushing an employee against another part of the crane or another object.

(b) To prevent employees from entering these hazard areas, you must:

(i) Train each employee assigned to work on or near the crane (authorized personnel) in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.

(ii) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas.

Exception: When you can demonstrate that it is neither feasible to erect such barriers on the ground nor on the crane, the hazard areas must be clearly marked by a combination of warning signs (such as Danger-Swing/Crush Zone) and high visibility markings on the crane that identify the hazard areas. In addition, you must train each employee to understand what these markings signify.

(c) **Protecting employees in the hazard area.**

(i) Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

(ii) Where the operator knows that an employee went to a location covered by subsection (43)(c)(i) of this section, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

(d) Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

(43) **Keeping clear of the load.**

(a) Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used to the extent consistent with public safety.

(b) While the operator is not moving a suspended load, no employee is allowed to be within the fall zone, except for employees:

(i) Engaged in hooking, unhooking or guiding a load; or

(ii) Engaged in the initial attachment of the load to a component structure; or

(iii) Operating a concrete hopper or concrete bucket.

(c) When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure, and are within the fall zone, all of the following criteria must be met:

(i) The materials being hoisted must be rigged to prevent unintentional displacement.

(ii) Hooks with self-closing latches or their equivalent must be used, see subsection (29)(b) of this section. "J" hooks are permitted to be used for setting wooden trusses.

(iii) The materials must be rigged by a qualified rigger.

(d) Receiving a load. Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

- (e) During a tilt-up or tilt-down operation:
 - (i) Employees are not allowed to be directly under the load.
 - (ii) Only employees' essential to the operation are allowed to be in the fall zone (but not directly under the suspended load).

Note: An employee is essential to the operation if the employee is conducting one of the following operations and you can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:

- Physically guide the load;
- Closely monitor and give instructions regarding the load's movement; or
- Either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).

(f) Boom free fall is prohibited when an employee is in the fall zone of the boom or load, and load line free fall is prohibited when an employee is directly under the load. See subsections (44) through (47) of this section.

(44) Boom free fall prohibitions.

(a) The use of cranes in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:

- (i) An employee is in the fall zone of the boom or load.
- (ii) An employee is being hoisted.
- (iii) The load or boom is directly over a power line, or over any part of the area listed in Table 4 located in WAC 296-155-53408, clearance distance to each side of the power line; or any part of the area extending the Table 4 clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.

(iv) The load is over a shaft, except where there are no employees in the shaft.

(v) The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.

(vi) Lifting operations are taking place in a refinery or tank farm.

(b) The use of cranes in which the boom is designed to free fall (live boom) is permitted only where none of the circumstances listed in (a) of this subsection are present and:

- (i) The crane was manufactured prior to October 31, 1984; or
- (ii) The crane is a floating crane or a land crane on a vessel/flotation device.

(45) Preventing boom free fall. Where the use of a crane with a boom that is designed to free fall (live boom) is prohibited (see subsection (44)(a) of this section), the boom hoist must have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:

(a) Friction drums must have:

(i) A friction clutch and, in addition, a braking device, to allow for controlled boom lowering.

(ii) A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device).

(b) Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.

(c) Neither clutches nor hydraulic motors must be considered brake or locking devices for purposes of this part.

(d) Hydraulic boom cylinders must have an integrally mounted holding device.

(46) **Preventing uncontrolled retraction.** Hydraulic telescoping booms must have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.

(47) **Load line free fall.** In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

(a) **An employee is directly under the load.**

(b) **An employee is being hoisted.**

(c) The load is directly over a power line, or over any part of the area listed in Table 4, located in WAC 296-155-53408, clearance distance to each side of the power line; or any part of the area extending the Table 4 of WAC 296-155-53408, clearance distance to each side of the power line is within the radius of vertical travel of the load.

(d) **The load is over a shaft.**

(e) The load is over a cofferdam, except where there are no employees in the fall zone of the load.

(48) You must not allow employees to ride on the hook or load.

(49) The hoist rope must not be wrapped around the load.

(50) All loads must be attached to the hook by means of suitable slings or other devices of sufficient lifting capacity.

(51) When moving a load it must be well secured and balanced in the sling or lifting device before it is lifted more than a few inches.

(52) **Leaving the crane/derrick unattended.** The operator must not leave the controls while the load is suspended, except where all of the following are met:

(a) The operator remains adjacent to the crane/derrick and is not engaged in any other duties.

(b) The load is to be held suspended for a period of time exceeding normal lifting operations.

(c) The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.

(d) Barricades or caution lines, and notices, are erected to prevent all employees from entering the fall zone. No employees, including those listed in subsection (43)(b), (d), and (e) of this section, are permitted in the fall zone.

Exemption: The provisions in this section do not apply to working gear (such as slings, spreader bars, ladders, and welding machines) where the weight of the working gear is negligible relative to the lifting capacity of the equipment as positioned, and the working gear is suspended over an area other than an entrance or exit.

Note: For additional requirements relating to leaving the crane unattended for tower, self-erecting, overhead/bridge and derricks see:

- WAC 296-155-53915, Tower cranes—Operations;
- WAC 296-155-54115, Self-erecting tower cranes—Operations;
- WAC 296-155-54215, Overhead/bridge cranes and gantry cranes—Operations;
- WAC 296-155-54320, Derricks—Operations.

(53) While moving the load the lift and swing path must be clear of obstructions.

(54) Before starting to lift the following conditions must be met:

(a) The hoist rope must not be kinked.

(b) Multiple-part lines must not be twisted around each other.

(c) The hook must be brought over the load in such a manner as to minimize swinging.

(d) If the competent person determines that there is slack rope condition requiring respooling of the rope, it must be verified (before starting the lift) that the rope is seated on the drum and in the sheaves as the slack is removed.

(e) The competent person must adjust the crane/derrick and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.

(f) If possible, the load must be free to be lifted; it is neither caught nor attached to other objects.

(55) During lifting operations, care must be taken that there is no sudden acceleration or deceleration of the moving load and that the load boom or other parts of the crane do not contact any obstruction. Rotational speed of the crane/derrick must be such that the load does not swing out beyond the radius at which it can be controlled.

(56) Side loading of booms (jibs) must be limited to freely suspended loads. Cranes must not be used for dragging loads sideways.

(57) The operator must test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90% or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.

(58) Modifications or additions which affect the capacity or safe operation of the crane/derrick are prohibited except where the requirements of (a) or (b) of this subsection are met. For recertification requirements see WAC 296-155-53214 (1)(c).

(a) Manufacturer review and approval.

(i) The manufacturer approves the modifications/additions in writing.

(ii) The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

(iii) The original safety factor of the crane/derrick is not reduced.

(b) Where manufacturer is unavailable or has refused to review a request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:

(i) A registered professional engineer who is a qualified person with respect to the crane/derrick involved:

(A) Approves the modification/addition and specifies the crane/derrick configurations to which that approval applies; and

(B) Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.

(ii) The original safety factor of the crane/derrick is not reduced.

(c) Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the requirements of subsection (58)(b)(i) and (ii) of this section are met.

(d) Multiple manufacturers of equipment designed for use on marine worksites. The equipment is designed for marine worksites, contains major structural components from more than one manufacturer, and the requirements of subsection (58)(b)(i) and (ii) of this section are met.

(59) You must not make any modifications or additions which affect the capacity or safe operation of the crane without the manufacturers' written approval. If components of more than one crane manufacturer are being combined, you must obtain written approval from all manufacturers prior to use. If the manufacturer(s) is/are not available a registered professional structural engineer's (RPSE) written approval must be obtained. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, must be changed accordingly. In no case must the original safety factor of the crane be reduced.

Note: The provisions in subsections (58) and (59) of this section do not apply to modifications made or approved by the U.S. military.

(60) All applicable controls must be tested by the operator at the start of a new shift, if possible. If any controls fail to operate properly, they must be adjusted or repaired before operations are initiated.

(61) Except for proof load testing required under WAC 296-155-53202 through 296-155-53212, no crane/derrick is permitted to be loaded beyond the specifications of the load rating chart, unless authorized by the crane manufacturer. The operator must not be required to operate the crane/derrick in a manner that would violate this requirement.

(62) **Load weight.** The operator must verify that the load is within the rated capacity of the crane/derrick by at least one of the following methods:

(a) The weight of the load must be determined from a reliable source recognized by the industry (such as the load's manufacturer), or by a reliable calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. In addition, when requested by the operator, this information must be provided to the operator prior to the lift; or

(b) The operator must begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter. If the load exceeds 75% of the maximum rated capacity at the longest radius that will be used during the lift operation, the operator must not proceed with the lift until it is verified that the weight of the load is in accordance with (a) of this subsection.

(63) Tag lines or restraint lines must be used when rotation or swinging of the load is hazardous or if the load needs guidance. Tag lines are not required when all of the following criteria are met:

- The suspended load can be expected to remain still when in a static (nonmoving) condition or does not swing or rotate in a hazardous manner;

- The movement of the crane or boom cannot be expected to cause the load to swing or rotate in an uncontrolled manner that may create a hazard;

- The operator is in control of the movement of the load and a hazardous condition is not created.

(64) All brakes must be adjusted in accordance with manufacturer procedures to prevent unintended movement.

(65) Safety devices and/or operational aids must not be used as a substitute for the exercise of professional judgment by the operator.

(66) **Storm warning.** When a local storm warning has been issued, the competent person must determine whether it is necessary to implement manufacturer recommendations for securing the crane/derrick.

(67) Whenever there is a concern as to safety, the operator has the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.

(68) **Tag-out.**

(a) Tagging out of service. Where you have taken the crane/derrick out of service, a tag must be placed in the cab or at the operator station stating that the equipment is out of service and is not to be used. Where you have taken a function(s) out of service, a tag must be placed in a conspicuous position stating that the function is out of service and is not to be used.

(b) **Response to do not operate/tag-out signs.**

(i) If there is a warning (tag-out or maintenance/do not operate) sign on the crane/derrick or starting control, the operator must not activate the switch or start the crane/derrick until the sign has been removed by a person authorized to remove it, or until the operator has verified that:

(A) No one is servicing, working on or otherwise in a dangerous position around the machine.

(B) The crane/derrick has been repaired and is working properly.

(ii) If there is a warning (tag-out or maintenance/do not operate) sign on any other switch or control, the operator must not activate that switch or control until the sign has been removed by a person authorized to remove it, or until the operator has verified that the requirements in (b)(i)(A) and (B) of this subsection have been met.

Note: For additional lockout/tagout procedures for electrical circuits, see WAC 296-155-429.

(69) If crane/derrick adjustments or repairs are necessary:

(a) The operator must, in writing, promptly inform the person designated by you to receive such information and, where there are successive shifts, to the next operator; and

(b) You must notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and all alternative measures.

(70) All cranes and derricks mounted on barges or other floating structures must meet the requirements as outlined in ASME B30.8-2004 for construction, installation, inspection, maintenance and operation.

(71) **Swinging locomotive cranes.** A locomotive crane must not be swung into a position where railway cars on an adjacent track could strike it, until it is determined that cars are not being moved on the adjacent track and that proper flag protection has been established.

(72) **Remote control cranes/derricks.** Before an operator leaves the crane/derrick to operate remotely, the operator must ensure that the crane/derrick will be used in accordance with the manufacturer's recommendations. Provisions must be made to prevent simultaneous activation of controls when more than one control station (remote control) is provided.

(73) Remote-operated cranes/derricks must function so that if the control signal for any crane/derrick motion becomes ineffective, the crane/derrick motion must stop.

(74) Remote-operated cranes/derricks must be equipped with an "emergency stop" system, located at the operator's remote station to provide the means to remove power from the crane in the event of a malfunction.

(75) A preventative maintenance program must be established based on the recommendation of the crane/derrick manufacturer. If manufac-

turer's recommendations are not available, then those of a qualified person must be followed. Dated records must be kept available.

(76) **Working with a diver.** You must meet the following additional requirements when working with a diver in the water:

(a) If a crane/derrick is used to get a diver into and out of the water, it must not be used for any other purpose until the diver is removed from the water. When used for more than one diver, it must not be used for any other purpose until all divers are all out of the water.

(b) The operator must remain at the controls of the crane/derrick at all times.

(c) In addition to the requirements in WAC 296-155-53406, Signals, either:

(i) A clear line of sight must be maintained between the operator and dive tender; or

(ii) The signals between the operator and dive tender must be transmitted electronically.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060, and chapter 49.17 RCW. WSR 20-12-091, § 296-155-53400, filed 6/2/20, effective 10/1/20. Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060. WSR 16-09-085, § 296-155-53400, filed 4/19/16, effective 5/20/16. Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060 and chapter 49.17 RCW, and 29 C.F.R. 1926, Subpart CC. WSR 13-02-068, § 296-155-53400, filed 12/31/12, effective 2/1/13. Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.440, 49.17.060, and 29 C.F.R. 1926, Subpart CC. WSR 12-01-086, § 296-155-53400, filed 12/20/11, effective 2/1/12.]