

Special Provisions for Tower Cranes

Tower Crane Erection:

- (1) Every tower crane used in construction shall be erected in accordance with the manufacturer's recommendations and under the supervision of a competent, designated person experienced in tower crane erection.
- (2) Prior to the erection of any tower crane the ability of the supporting system, including slabs, foundations and the underlying soil to support the loads intended to be imposed thereon shall be certified by a professional engineer.
- (3) Prior to installing a climbing tower crane within an existing building or new construction, a structural engineer shall certify that the building is designed to withstand the torque and floor loading created by the crane to be installed.
- (4) Tower cranes erected on a new foundation shall be tested in accordance with ANSI B30.3.
 - (i) The test shall consist of suspending a load of not less than 110% of the rated capacity for 15 minutes. The load shall be suspended from the furthest point of the length of boom (jib) to be used. The results of this test shall be within the manufacturer's recommendations and/or specifications.
 - (ii) A record of each test shall be made and signed by the person responsible for conducting the test. Such records shall be maintained on the construction site for the duration of the construction work for which it was erected and subsequently made a part of the firm's permanent equipment records. Records shall be made available to authorized representatives of the department, upon request.
- (5) Tower cranes shall be erected so that the jibs and counterweights can swing 360 degrees without striking any building, structure or any other object.
- (6) Prior to initial use, a newly erected tower crane shall undergo a static overload test in the direction of least stability.
 - (i) Such test shall consist of suspending a load at the rated load and at the maximum radius for a period of at least one hour.
 - (ii) Subsequent to such test, settlement of the equipment and load-bearing foundation shall be within the limits specified by the tower crane manufacturer.
 - (iii) A written report of such test shall be kept on the job site available for examination by inspectors.
- (7) Operating controls shall be properly marked to indicate the function of the controls in each position.
- (8) An operating and maintenance manual written in the English language shall be provided with each tower crane.

Tower Crane Capacity Chart:

- (1) Every tower crane shall be provided with a capacity chart which shall be posted and maintained legible in the cab of the crane clearly visible to the operator from his operating position.
- (2) Where a remote control stand is used a duplicate of such capacity chart shall be affixed to such control stand.
- (3) Such capacity chart shall be furnished by the manufacturer of the crane and shall include a full and complete range of crane load ratings at all stated operating radii for each allowable speed and for each recommended counterweight loading.

Tower Crane Construction:

- (1) Limit switches. Limit switches which shall be sealed against unauthorized tampering shall be provided as follows:
 - (i) To limit trolley travel at either end of the jib.
 - (ii) To limit load block upward motion to prevent two-blocking.

- (iii) To limit the load being lifted to no more than 110 percent of the rated load upon completion of the static overload test shall be completed.
- (2) Cabs and remote control stations:
 - (i) Tower crane cabs and remote control stations for such cranes shall be protected from falling objects and material and from the elements.
 - (ii) Cab windows shall be constructed of transparent safety glazing material and shall provide clear visibility in all directions.
 - (iii) Cabs and remote control stations for tower cranes shall be heated to a temperature of at least 60 degrees Fahrenheit during cold weather whenever occupied.
 - (iv) Cabs and remote control stations for tower cranes shall be adequately ventilated.
- (3) Accessibility.
 - (i) Adequate and safe means of access to and egress from the cabs and machinery platforms of tower cranes shall be provided.
 - (ii) Where it is necessary to inspect the jib attachments located on the jib of any tower crane, a footwalk with suitable handrails shall be provided for such inspections.
 - (iii) Access ladders inside the telescoping sections of tower cranes are exempt from those sections of the safety standards pertaining to cleat length and cleat spacing, but shall conform to manufacturer's recommendations and specifications.
- (4) Brakes. In addition to the hoisting brakes, tower cranes shall be provided with the following:
 - (i) Slewing brake. Every tower crane shall be provided with a brake having adequate holding power in either direction to prevent movement of the jib when desired during normal crane operation. Such brake shall be capable of being set in the holding position and kept there without attention from the operator.
 - (ii) Trolley brake. The trolley of every tower crane shall be provided with an automatic brake or device capable of stopping movement of the trolley in case of trolley rope breakage.
 - (iii) When the crane is out of operation, the jib or boom shall be pointed downwind and the slewing brake shall be released so as to permit the jib or boom to weathervane, providing the jib or boom has a clear 360 degree rotation.
 - (iv) Where a 360 degree rotation is not provided, the jib or boom shall be pointed downwind from the prevailing wind and the slewing brake set.
- (5) Electrical equipment:
 - (i) All electrical equipment of tower cranes shall be grounded.
 - (ii) All tower cranes shall be provided with lightning protection.
 - (iii) All controls of tower cranes shall be of the deadman type.
 - (iv) In the event of power failure, all tower crane brakes shall be set automatically.
- (6) Climbing jacks:
 - (i) Where climbing jacks are provided for tower cranes such jacks shall be equipped with over-pressure relief valves, pressure gages and check valves designed to retain pressure in case of hydraulic line failure.
- (7) Wind velocity device:
 - (i) Every tower crane shall be provided with a device for measuring wind velocity.
 - (ii) The sensing portion of every such device shall be mounted on the highest point of the crane while the readout of every such device shall be located in the cab or remote control station of the tower crane.
 - (iii) Good safety practices shall be mutually agreed upon by the operator and the person in charge of the construction job, with due consideration given to manufacturer's specifications and recommendations.
- (8) Counterweights:
 - (i) Counterweights used on tower cranes shall be in accordance with the manufacturers' recommendations.
 - (ii) Counterweights shall be securely fastened to the counter jib to prevent pieces from being accidentally dislodged.
- (9) Tower cranes shall be positioned whereby they can swing 360° without either the counterweight or jib striking any building, structure or other object, except:

- (i) If the crane can strike an object or another crane, suitable limit switches shall be installed which will prohibit contact with such objects, or;
- (ii) Direct voice communications shall be established between any operator of the tower crane(s) involved and a signalperson so stationed where the boom and/or counterweight movement, and the object with which it may contact can be observed so that the operator(s) can be warned of imminent danger.
- (iii) A secondary means of positive communications shall be established as a back-up for possible direct voice communication failure.
- (iv) Radio communication systems without tone coded squelch are prohibited. Citizens band radios shall not be used as a means of communications for tower cranes.

Inspection and Maintenance:

- (1) Tower cranes shall be inspected and maintained in accordance with the manufacturers' recommendations, ASME B30.3, and HIOSH requirements.
- (2) More frequent inspections shall be conducted if there is reason to suspect a possible defect or weakening of any portion of the structure or equipment.
- (3) Guy wires, wedges, braces or other supports shall be inspected at the beginning and at midpoint of each working shift to ascertain that they are functioning as intended.
- (4) All modifications shall be approved by the manufacturer and engineered by a professional engineer.
- (5) The safety factors shall not be reduced by any modifications.
- (6) The crane plates and charts shall be changed to reflect any modifications made.
- (7) Where the mast of any tower crane runs through floor openings in the building or other structure in which the crane is mounted and the mast is secured by wedges or braces, such wedges or braces shall be inspected for tightness and dislocation at least twice each working day.
- (8) Employees required to perform duties on the horizontal boom of hammerhead tower cranes shall be protected against falling by guardrails or by a full body harness and lanyards attached to crane or to lifelines.

Operation of Tower Cranes:

- (1) Operators. Tower cranes shall be operated only by persons who are qualified in accordance with the manufacturer, provisions of ASME B30.3 and HIOSH.
- (2) Operation in windy conditions:
 - (i) Tower cranes shall not be operated when the wind speed is at any time greater than 30 miles per hour.
 - (ii) Tower cranes shall not be raised to new operating levels when the wind speed exceeds 20 miles per hour.
- (3) Operation without counterweight prohibited:
 - (i) No tower crane shall be operated without the full amount of ballast or counterweight in place as specified by the manufacturer or builder of the crane or by a professional engineer.
- (4) The crane shall not be used to pull vehicles of any type, remove piling, loosen form work, pull away loads which are attached to the ground or walls, or for any operation other than the proper handling of freely suspended loads.
- (5) An approved method must be instituted for transmitting signals to the operator. Standard hand signals for crane operations must be used, whenever possible; however, if conditions are such that hand signals are ineffective, radio-controlled or electric-whistle signal or two-way voice communication must be used.

Tower Crane Training:

- (1) Tower crane operators shall be trained and experienced in tower crane operations; however, for gaining experience, persons may operate the tower crane if under the immediate supervision of an experienced operator.