

**WAC 296-155-53412 Operational aids.** (1) The devices listed in this section (listed operational aids) are required on all cranes/derricks, except tower cranes and self-erecting tower cranes, covered by this part, unless otherwise specified. For requirements relating to operational aids and safety devices for tower cranes, see WAC 296-155-53900 (60) and (61), for self-erecting tower cranes see WAC 296-155-54100 (42) and (43).

**Notes:** The requirements in subsection (3)(e), (f) and (g) of this section do not apply to articulating cranes.  
The requirements in subsection (3)(d), (e) and (h) of this section only apply to those digger derricks manufactured after the effective date of this section.

(2) Operations must not begin unless the listed operational aids are in proper working order, except where an operational aid is being repaired you use the specified temporary alternative measures. More protective alternative measures specified by the crane/derrick manufacturer, if any, must be followed.

(3) When operational aids are inoperative or malfunctioning, the crane and/or device manufacturer's recommendations for continued operation or shutdown of the crane must be followed until the problems are corrected. Without such recommendations and any prohibitions from the manufacturer against further operation, the following requirements apply:

**Note:** If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification under WAC 296-155-53400 (58) and (59) (crane/derrick modifications).

(a) Recalibration or repair of the operational aid must be accomplished as soon as is reasonably possible, as determined by a qualified person.

(b) Boom hoist limiting device (except for derricks with base mounted drums).

(i) For cranes manufactured after December 16, 1969, a boom hoist limiting device is required. Temporary alternative measures: One or more of the following methods must be used:

(A) Use a boom angle indicator.

(B) Clearly mark the boom hoist rope (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

(C) Clearly mark the boom hoist rope (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.

(ii) If the crane was manufactured on or before December 16, 1969, and is not equipped with a boom hoist limiting device, at least one of the measures in (b)(i)(A) through (C) of this subsection must be used.

(c) Luffing jib limiting device. Cranes with a luffing jib must have a luffing jib limiting device. Temporary alternative measures are the same as in (b)(i) of this subsection, except to limit the movement of the luffing jib rather than the boom hoist.

(d) Anti two-blocking device. (This does not apply to dedicated pile drivers.)

(i) Telescopic boom cranes manufactured after February 28, 1992, must be equipped with a device which automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur.

(A) Temporary alternative measures: Clearly mark the hoist rope (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking; and

(B) Use a spotter when extending the boom.

(ii) Lattice boom cranes.

(A) Lattice boom cranes manufactured after February 28, 1992, must be equipped with a device that either automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component), or warns the operator in time for the operator to prevent two-blocking. The device(s) must prevent such damage/failure or provide adequate warning for all points where two-blocking could occur.

(B) Lattice boom cranes, and derricks, manufactured after the effective date of this standard must be equipped with a device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage/failure at all points where two-blocking could occur.

**Exception:** The requirements in subsection (3)(d)(ii)(A) and (B) of this section do not apply to such lattice boom cranes when used for dragline, clamshell (grapple), magnet, drop ball (wrecking ball), container handling, concrete bucket, marine operations that do not involve hoisting personnel, and pile driving work.

(C) Temporary alternative measures: Clearly mark the hoist rope (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter.

(iii) Articulating cranes manufactured after December 31, 1999, that are equipped with a load hoist must be equipped with a device that automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device must prevent such damage at all points where two-blocking could occur. Temporary alternative measures: When two-blocking could only occur with movement of the load hoist, clearly mark the hoist rope (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter. When two-blocking could occur without movement of the load hoist, clearly mark the hoist rope (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

(e) Boom angle or radius indicator (except for derricks with base mounted drum hoists). The crane must have a boom angle or radius indicator readable from the operator's station. Temporary alternative measures: Radii or boom angle must be determined by measuring the radii or boom angle with a measuring device.

(f) Jib angle indicator if the crane has a luffing jib. Temporary alternative measures: Radii or jib angle must be determined by ascertaining the main boom angle and then measuring the radii or jib angle with a measuring device.

(g) Boom length indicator if the crane has a telescopic boom, except where the rated capacity is independent of the boom length. Temporary alternative measures: One or more of the following methods must be used:

(i) Mark the boom with measured marks to calculate boom length;  
or

(ii) Calculate boom length from boom angle and radius measurements; or

(iii) Measure the boom with a measuring device.

(h) Load weighing and similar devices (this also applies to dedicated pile drivers manufactured more than one year after the effective date of this section). Cranes (other than derricks and articulating cranes) manufactured after March 29, 2003, with a rated capacity over 6,000 pounds must have at least one of the following: Load weighing device, load moment (or rated capacity) indicator, or load moment (or rated capacity) limiter.

(i) Temporary alternative measures: The weight of the load must be determined from a reliable source (such as the load's manufacturer), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information must be provided to the operator prior to the lift.

(ii) Articulating cranes manufactured after the effective date of this section must have at least one of the following: Automatic overload prevention device, load weighing device, load moment (or rated capacity) indicator, or load moment (rated capacity) limiter. Temporary alternative measures: The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight). This information must be provided to the operator prior to the lift.

(i) Reserved.

(j) The following devices are required on cranes manufactured after the effective date of this section:

(i) Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the crane has outriggers or stabilizers. Temporary alternative measures: The operator must verify that the position of the outriggers or stabilizers is correct (in accordance with manufacturer procedures) before beginning operations requiring outrigger or stabilizer deployment.

(ii) Hoist drum rotation indicator if the crane/derrick has a hoist drum is not visible from the operator's station. Temporary alternative measures: Mark the drum to indicate the rotation of the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060. WSR 16-09-085, § 296-155-53412, filed 4/19/16, effective 5/20/16. 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, § 296-155-53412, filed 12/20/11, effective 2/1/12.]