

Great Western Painting

Rigging - Offshore

OFFSHORE CRANES

API RP 2D Operation and Maintenance of Offshore Cranes

Cranes, like all pieces of heavy equipment, if not properly operated, inspected and maintained have a potential for causing major bodily injury or property damage. Care must be taken in all facets of crane operation.

As with all items of machinery, only trained, qualified, and authorized persons may operate cranes.

Qualified Crane Operator:

Training:

A person who has appropriate offshore experience and training may be designated by our Safety Director as a Qualified Crane Operator.

Appropriate offshore experience and training would include classroom-type sessions and hands-on field training on cranes to be operated by the qualifying crane operator.

Classroom-type training would include a full review of the American Petroleum Institute Recommended Practice for Operation and Maintenance of Offshore Cranes, API RP 2D, which must be readily available for reference and use.

Classroom topics will include:

Types of Cranes Used Offshore:

1. Mechanical cranes.
2. Non-mechanical cranes.
3. Electric powered cranes.
4. Other crane types.

Crane Components and Lifting Capacities:

1. Components of a stationary mounted crane.
2. Boom Angle and Load Radius, reading a range diagram or load rating chart.
3. Number of parts of line and relationship to rated load.
4. Limitations of the size and type of wire ropes used in boom hoist lines, pendants, and load hoist line.
5. Lifting capacity of the auxiliary hook.

6. Lifting capacity of load and boom hoist drums.
7. Consideration of sea state on operating conditions.

Wire Rope Construction and Use:

1. Mechanics of wire rope.
2. Classes, designation and characteristics of wire rope.
3. Handling of wire rope.
4. Guidelines for replacement of wire rope.
- 6 Wire rope slings.

Mounting features of the Revolving Superstructure:

1. Hookrollers.
2. Ball ring.
3. King post.
4. Others.

Boom Structure:

1. Types of boom construction (lattices, box, etc.).
2. Wire rope guides.
3. Boom bolts.
4. Pin connections.

Limit Devices:

1. Boom-hoist limit.
2. Load hoist limit.
3. Boom stops.
4. All locking devices.
5. Anti-two block devices.

Additional Items:

1. Sheaves.
2. Hand signals.
3. Control markings.
4. Engine emergency stop.
5. Gauges and indicators.

Hands-on training will include:

1. Lubricating points.
2. Adjustments.
3. Principles of crane operations.
4. Load charts.
5. Hand signals.
6. Inspections.

Refresher training is required every four (4) years.

Fire extinguisher training will be included in both the hands on training as well as the classroom training **and** in the refresher training.

Having completed the above training the operator should be qualified to operate both non-mechanical cranes and/or mechanical cranes (those with free-fall capability).

Physical Qualifications:

Crane operators **must**:

1. Have vision of at least 20/30 Snellen in one eye and 20/50 in the other with or without glasses, and have depth perception as demonstrated by record of a recognized test administered by an authorized person.
2. Be able to distinguish red, green, and yellow, regardless of the position of colors, if color differentiation is required for crane operations.
3. Have hearing, with or without a hearing aid, adequate for the specific operation.
4. Have no history of a disabling medical condition which may be sufficient reason for disqualification.

Note: Follow-up qualification is required every four (4) years.

Additionally, prior to authorization to operate a crane, operators of cranes with a **boom length of 25 feet or more and a maximum rated load capacity of 15,000 pounds or more** must:

- a. have a valid certificate of competency issued by an Accredited Certifying Entity for the type or crane being used.
- b. pass a physical examination that meets the requirements of either ASME B30.5-2000 or US DOT standard 49 CFR 392.41 through 391.49.

- c. pass a written examination that covers, at least:
1. operational characterizes and controls for the crane type for which qualification is being sought.
 2. emergency control skills such as a response to fire, power line contact, loss of stability, and control malfunction.
 3. demonstration of basic arithmetic skills necessary for crane operation and the ability to read and comprehend the crane manufacturer's operation and maintenance instruction manuals, including load capacity information (**load charts**) for the crane for which certification is sought.
 4. pass a hands-on examination to demonstrate proficiency in operating the specific crane including pre-start and post-start inspection, maneuvering skills, shutdown, and securing procedures.

The above operator certificates are valid for five (5) years after which recertification is required.

All crawler, truck, or locomotive cranes will meet the applicable requirements for design, inspection, construction, testing, maintenance and operations as prescribed in ANSI B30.5-1968. A crane inspection certification record will be maintained which shows the date, the items inspected, the serial number of the crane and the signature of the inspector.

The operator will ensure that a 5BC (or greater) fire extinguisher is readily accessible during operation.

Qualified Rigger

A rigger is anyone who attaches or detaches lifting equipment to loads of lifting devices. Crane load rigging will only be performed by a qualified rigger, a qualified crane operator, and/or a qualified inspector who has completed the requirements to be a qualified crane operator.

Training for Qualified Riggers:

Training includes classroom-type, hands-on training, and examination. Hand-on training should include proper inspection, use, selection, and maintenance of rigging gear (slings, shackles, hooks, etc.). Rigger qualifications should be maintained at a minimum every 4 years through requalification. Additionally, the individual should have no history of a disabling medical condition which may be sufficient reason for disqualifications.

A training outline for riggers is found in Appendix A3 API Recommended Practice 2D, *Rigger Training*, which includes:

- a. Rigging Hardware:
 - 1. Sheaves, blocks.
 - 2. Hooks, latches.
 - 3. Rings, links, swivels.
 - 4. Shackles.
 - 5. Turnbuckles.
 - 6. Spreader and equalizer beams.
 - 7. Cable clips.
 - 8. Pad eyes, eyebolts, and other attachment points.
- b. Slings:
 - 1. Sling configuration.
 - 2. Sling angle.
 - 3. Rated Load.
 - 4. Sling types (synthetic, wire, chain, etc.)
 - 5. Cargo nets, personnel baskets, and other basket types.
- c. Procedures and Precautions:
 - 1. Load control/taglines.
 - 2. Lift planning (load weight, center of gravity, etc.).
 - 3. Sling Inspection/rejection criteria.
 - 4. Unbinding loads.
 - 5. Personnel transfer.
 - 6. Sling handling and storage.
- d. Rigging Basics:
 - 1. Pinch points/body position.
 - 2. Personal Protective Equipment (PPE).
 - 3. Signals/communications.
 - 4. Load stability.

Crane Usage Categories and Inspections:

Infrequent usage (10 hours or less per month based on average use over a quarter):

Requires pre-use inspection performed by the operator; Annual Inspection performed by a qualified crane inspector.

Moderate usage (more than 10, less than 50 hours per month):

Requires pre-use inspection performed by the operator; quarterly and annual inspections performed by a qualified crane inspector.

Heavy usage (50 hours or more per month)

Required pre-use inspection performed by the operator; monthly, quarterly, and annual inspections performed by a qualified crane inspector.,

Note: While the pre-use inspection is performed by the operator, it may also be performed by a qualified inspector.

Note: A pre-use inspection form is found in our project manual.

Minimum crane inspection guidelines are found in Appendix C to API RP 2D, Usage, Inspection, Testing, and Maintenance.

All rated load capacities, recommended operating speeds, special hazard warnings or instructions must be readily visible to the operator while operating the crane. At all times, the manufacturer's specifications and limitations will be adhered to. Attachments will not exceed the capacity, rating, or scope recommended by the manufacturer.

Any modifications to crane equipment which might affect safety may only be done with written approval from the manufacturer.

While cranes easily have the lifting ability to hoist employees on a personnel platform, this is absolutely prohibited except in cases when the erection, use, and dismantling of conventional means of reaching the worksite would be more hazardous or is not possible because of structural design or worksite conditions. A conventional means would include: a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold.

Dangers associated with cranes include numerous moving parts. These dangers can be minimized or eliminated by ensuring that all guards are in place and not tampered with.

Care must be taken to ensure that areas within the swing radius of the rear of the rotating superstructure of the crane are barricaded to prevent a person from being struck or crushed.

All employees must keep clear of loads that are about to be lifted as well as suspended loads.

Slings:

Minimum inspection requirements for wire rope and slings are found in Appendix G to API RP 2D, Wire Rope and Sling Inspection, Replacement and Maintenance.

When using slings made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene), the following safe operating practices will be observed:

- a. All slings will be inspected prior to use by the crane operator. Additionally, the frequency for documenting crane inspections will be determined by the crane owner based on: 1.) frequency of use; 2) severity of service conditions; 3) nature or type of lifts being made; and, 4) experience based on service life of slings used in similar applications.
- b. Slings shall not be shortened with knots or bolts or other makeshift devices.
- c. Sling legs shall not be kinked.
- d. Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- e. Slings shall be padded or protected from the sharp edges of their loads.
- f. Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

Hand Signals:

Hand signals used to guide the crane operator will be consistent with the ANSI standard for the type of crane in use and an illustration of the signals must be posted at the job site. A copy of these hand signals is in our Project Manual.

Load Test Records:

Load test records will be furnished showing procedures outlined in Appendix E to API RP 2D, Load Testing.

Load testing should be done by a qualified inspector following the specific procedures listed on pages 1 through 3 of Appendix E to API RP 2D.

Know Your Hand Signals!

Basic Standard Hand Signals for Cranes and Hoisting Equipment



HOIST: With forearm vertical, and forefinger pointing up, move hand in small horizontal circle.



LOWER: With arm extended downward, forefinger pointing down, move hand in a small horizontal circle.



RAISE BOOM: Arm extended, fingers closed, thumb pointing upward.



LOWER BOOM: Arm extended, fingers closed, thumb pointing downward.



EXTEND BOOM: Both fists in front of body with thumbs pointing outward.



RETRACT BOOM: Both fists in front of body with thumbs pointing toward each other.



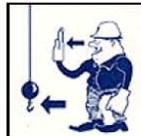
SWING: Arm extended, point with finger in direction of desired boom swing.



STOP DOG EVERYTHING: Clasp hands in front of body.



MOVE SLOWLY: Use one hand to give any motion signal and place the other hand motionless in front of the hand giving the signal.



TRAVEL: Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



USE MAIN HOIST: Tap fist on head; then use regular signals.



USE WHIP LINE (AUXILIARY HOIST): Tap elbow with one hand; then use regular signals.



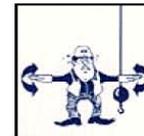
STOP: Arm extended, palm down, move arm back and forth horizontally.



RAISE THE BOOM AND LOWER THE LOAD: With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.



LOWER THE BOOM AND RAISE THE LOAD: With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.



EMERGENCY STOP: Both arms extended, palms down, move arms back and forth horizontally.

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Great Western Painting

Certification of Crane Pre-Use Inspection & Checklist

CRANE MODEL: _____

DATE: _____

CRANE SERIAL NUMBER: _____

FREQUENT	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Observation of defects as used Continual							
Functional Operating Mechanisms Daily							
Deterioration or leakage in:							
Lines Daily							
Tanks Daily							
Valves Daily							
Drain Pumps Daily							
Any Part of Air or Hydraulic System Daily							
Hooks							
Deformation Daily							
Cracks Daily							
Note: Repair or replace if more than 15 percent of normal throat opening or more than 10° twist from plane of unbent hook							
Hoists, Chains & End Connections							
Excessive Wear Daily							
Twisted Daily							
Distorted Daily							
Stretched Daily							
Rope reeving (See Mfg's Specifications) Daily							
All operating mechanisms for excessive wear Daily							
Rope reeving (See Mfg's Specifications) Daily							
Operator's Initials:							

Code: ✓ = OK X = Deficiency NA = Not Applicable

PERIODIC	
All THE ABOVE ITEMS	Certified Completion: _____
Deformed, Cracked or Corroded Members	
Loose Bolts or rivets	
Cracked or worn sheaves and drums	
Excessive Wear on:	
Brake System Parts	
Linings	
Pauls	
Ratchets	
Improper indicators	
Chains & Sprockets excessive wear	
Power Plant Safety Issues	
Distorted, worn, cracked pins, bearing, shafts, gears, rollers, locking and clamping devices	

All Items inspected in the Pre-Use Inspection must be certified as having been completed.
 I certify the items noted in the Pre-Inspection have been inspected.

 Robert Evans
 Safety Program Administrator

 (Date)