

Training for Offshore Pedestal-Mounted Crane Riggers, Operators, and Inspectors

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Introduction

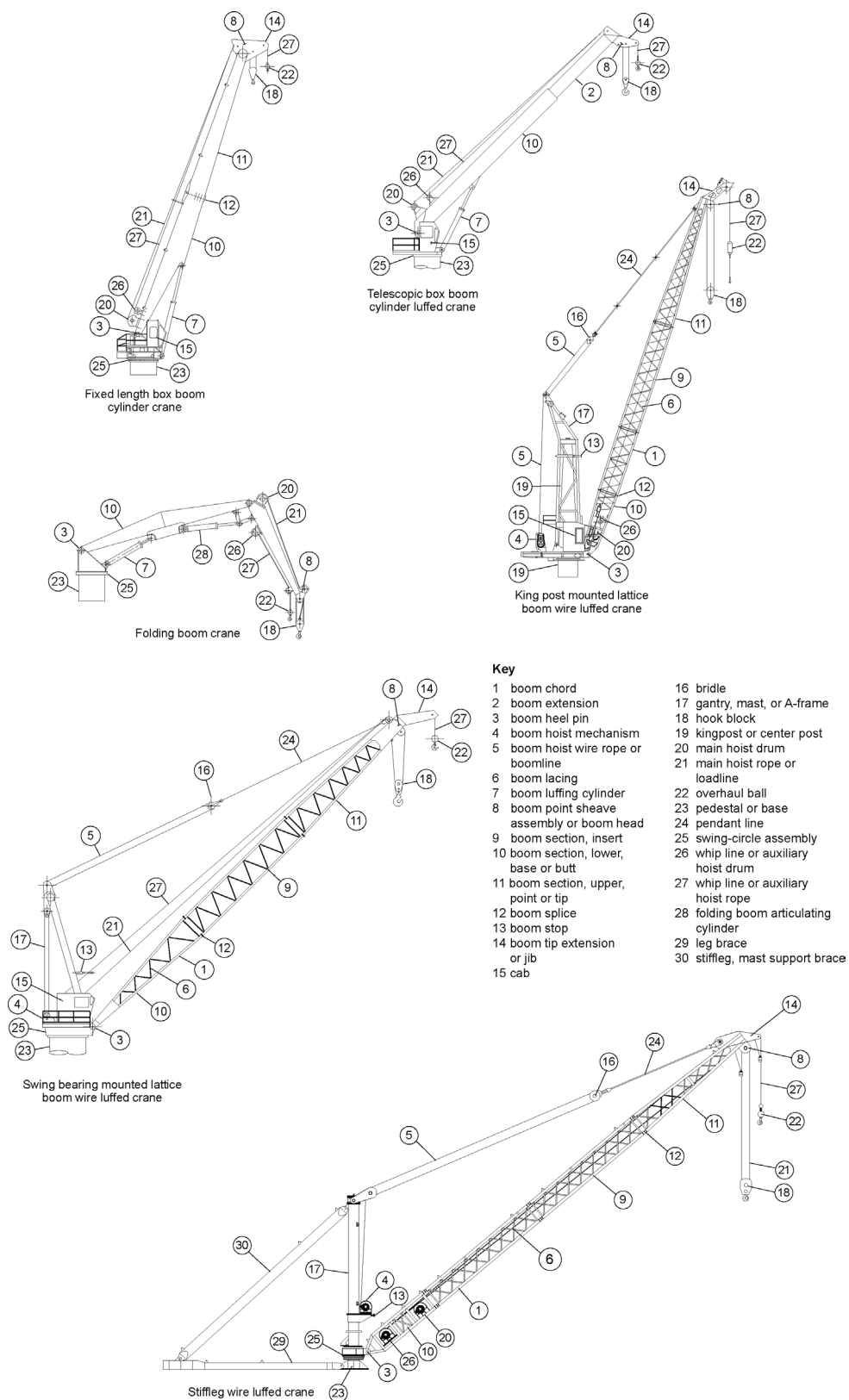
The API crane standards provide the design basis and construction, operations and maintenance, and training guidelines and requirements for pedestal-mounted cranes intended for use in offshore oil and gas applications on fixed and floating structures or vessels. They are intended to be used together, as appropriate, to better serve the product manufacturers and users—these include:

- Specification 2C, *Offshore Pedestal-Mounted Cranes*
- Recommended Practice 2D, *Operation and Maintenance of Offshore Cranes*
- Recommended Practice 2D-2, *Training for Offshore Pedestal-Mounted Crane Riggers, Operators, and Inspectors*

The requirements, procedures, and guidance provided are based on internationally recognized industry standards and global best practices, as well as the collective knowledge and experiences of those that participated in developing these standards. As such, the material in these standards represent the contribution from industry representatives of crane users, crane manufacturers, wire rope manufacturers, and ancillary crane device or component manufacturers. Conformance to the intent of the practices herein is intended to result in cranes that operate safely and efficiently between inspection periods and in accordance with a company's safety and environmental management system (see API 75).

It should be understood that the crane operating, and maintenance practices cover a wide range of crane types and configurations. Not all practices are applicable to all cranes. When applying this standard, care should be taken to review each item as stated and use those items specifically applicable to the crane's type, usage, and duty-cycle. It may be necessary to modify a procedure due to a particular crane requirement. This modification would be wholly acceptable as long as the original intent of the practice or procedure is met.

See Figure 1 below for general illustrations of the various types of cranes.



NOTE Stiffleg designs differ depending on application. All components shown are not required for all designs.

Figure 1—General Crane Illustrations

Training for Offshore Pedestal-Mounted Crane Riggers, Operators, and Inspectors

1 Scope

This standard establishes general principles for the training of personnel for safe operations and maintenance of offshore pedestal-mounted cranes, as a companion to API 2D and API 2C. This standard also provides requirements and recommendations for personnel seeking qualification as a crane rigger, operator, or inspector.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda or errata) applies.

API Recommended Practice 2D, *Operation and Maintenance of Offshore Cranes*

API Specification 2C, *Offshore Pedestal-Mounted Cranes*

3 Terms, Definitions, and Abbreviations

3.1 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

A-frame

gantry

mast

A structural frame, extending above the machinery deck or upper structure to which the boom support ropes are reeved.

3.1.2

articulating boom

folding boom

knuckle boom

A type of crane boom where the boom tip can change its angle relative to the base section of the boom.

3.1.3

anti-two-blocking

A means to protect hoist ropes, structural components, and machinery from damage that can occur when two sheave groups (e.g. load block and boom tip) come into contact as the hoist cable is drawn in.

3.1.4

auxiliary hook

A supplemental load block of lighter capacity and usually higher speed than provided for the main load block.

3.1.5

axis of rotation

The vertical axis around which the crane upper structure rotates.

3.1.6**base (mounting)****pedestal (base)**

The supporting substructure upon which the revolving upper structure is mounted.

3.1.7**basket hitch**

A sling configuration whereby the sling is passed under the load and has both ends, end attachments, eyes or handles on the hook or a single master link.

3.1.8**blind lift**

Lifts where the load is made out of the view of the crane operator.

3.1.9**boom**

A member hinged to the revolving upper structure and used for supporting the hoist tackle.

3.1.10**boom angle**

The angle above or below horizontal of the longitudinal axis of the base boom section.

3.1.11**boom angle indicator**

An accessory that indicates the angle of the boom above horizontal.

3.1.12**boom hoist****boom hoist mechanism**

A mechanism responsible for raising and lowering the boom.

3.1.13**boom hoist wire rope**

Wire rope that operates on a drum controlling the angle positioning of the boom.

3.1.14**boom length**

The straight-line distance from the centerline of boom heel-pin to the centerline of the boom-point main load hoist sheave pin, measured along the longitudinal axis of the boom.

3.1.15**boom stop**

A device used to prevent the boom from falling backward in the case of high winds or a sudden release of load.

3.1.16**boomline**

Boom hoist rope that reels on drums or passes over sheaves.

NOTE See 3.1.13 for boom hoist wire rope.

3.1.17**brake**

A device used for holding, retarding, or stopping motion.

3.1.18**bridle sling**

A multi-leg sling attached to a single point ring.

3.1.19**cab**

An enclosure for the operator and the machine operation controls.

3.1.20**center of gravity**

Point at which the total mass of a body may be regarded as being concentrated, or about which the parts of a body exactly balance each other.

3.1.21**check valve**

A mechanical device that normally allows fluid to flow through it in only one direction.

3.1.22**choker hitch**

A sling configuration with one end of the sling passing under the load and through an end attachment, handle or eye on the other end of the sling.

3.1.23**clutch**

A means for engagement or disengagement of power.

3.1.24**counterweight**

Weight used to supplement the weight of the machine in providing stability for lifting working loads and usually attached to the rear of the revolving upper structure.

3.1.25**crane**

A pedestal-mounted elevating and rotating lift devices for transfer of materials and/or personnel to or from marine vessels, barges, and structures, including the sea, or the seabed.

3.1.26**crane owner**

The individual, partnership, firm, or corporation who owns the crane.

NOTE For the purposes of this standard, a crane owner can be the lease operator (i.e. oil company), drilling or well service contractor, vessel owner, or company that provides temporary crane service.

3.1.27**critical component**

Any component of the crane assembly devoid of redundancy and/or auxiliary restraining devices whose failure would result in an uncontrolled descent of the load or uncontrolled rotation of the upper structure.

3.1.28**critical rigging component**

Any component of the rigging equipment devoid of redundancy and/or auxiliary restraining devices whose failure would result in an uncontrolled descent of the load.

3.1.29**designated representative**

Selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

3.1.30**emergency load lowering**

A means of lowering in the event of power failure or control-system failures.

3.1.31**enclosure**

A structure that provides environmental protection for the machine.

3.1.32**gross overload protection system****GOPS**

A system or device used to protect the crane operator's cabin in the event of an unbounded overload applied to the crane hook.

3.1.33**hitch**

A sling configuration whereby the sling is fastened to an object or load, either directly to it or around it.

3.1.34**hoist**

A device used for lifting, lowering, and supporting "dead weight".

NOTE Hoisting is the process of lifting.

3.1.35**hoist mechanism**

A hoist drum and rope reeving system used for lifting and lowering loads.

3.1.36**hoist rope**

Wire rope involved in the process of lifting.

3.1.37**hoist tackle**

Assembly of ropes and sheaves arranged for pulling.

3.1.38**hook block**

Block with a hook attached used in lifting service.

NOTE A hook block can have a single sheave for double or triple line, or multiple sheaves for four or more parts of line.

3.1.39**hook rollers**

A means to connect the upper structure to the foundation or pedestal by using rollers to prevent the revolving upper structure from toppling.

3.1.40**inspection**

Critical examination, measurement, testing, gauging, and comparison of the lifting equipment and materials by an appropriately qualified person.

NOTE In determining the suitability, scope, and periodicity of the inspection, reference the manufacturer's instructions and relevant industry standards as a good practice.

3.1.41**king post**

A fixed tubular member that acts as a centerline of rotation for the revolving upper structure and as the connective member to the platform.

3.1.42**lift plan**

A plan or set of plans which is created for use in crane lifting operations and it consists of all the important information to be considered in a lifting operation thus ensuring that the lifting operation is performed safely.

NOTE It is an important planning process that will identify hazardous situations that may be encountered during lifting.

3.1.43**load block**

The assembly of hook or shackle, swivel, sheaves, pins, and frame suspended by the hoisting ropes.

3.1.44**load chart**

A document at the operator's station that contains rated capacity at multiple radii (radius), along with other crane specific information.

3.1.45**load indicator system (LIS)**

A device that tells the operator the load on the hook.

3.1.46**load line****hoist line**

The main hoist rope.

3.1.47**load rating**

Crane rating in pounds (kilograms) established by the manufacturer.

3.1.48**load tension**

The force that is transmitted through a string, rope, cable, or wire when it is pulled tight by forces acting from opposite ends.

3.1.49**load test**

Test wherein a load is applied in excess of rated capacity under controlled and monitored conditions to verify the serviceability of equipment, without resulting in permanent deformation or other defects.

NOTE 1 Refer to the appropriate manufacturer, industrial or regulatory standard for the required test load, periodicity and guidelines for performing the load test.

NOTE 2 This is not the same as a pull test; see 3.1.64.

3.1.50**load-moment indicator system (LMIS)**

A device that tells the operator the load on the hook, the distance from the axis of rotation to the center of the load, and the rated capacity at that distance.

3.1.51**log**

A means to record activities conducted.

NOTE Some example types are a record book, log book, computerized database, or electronic data collector.

3.1.52**luffing**

The operation of changing boom angle in a vertical plane (in effect changing the working radius).

3.1.53**luffing cylinder**

A hydraulic actuator used to change the boom angle.

3.1.54**motion compensation system**

A system used to control hoist rope tension or relative hook position to counteract vessel motion.

3.1.55**offboard lift****dynamic lift**

The operation of raising a load (cargo or personnel) off of or landing a load onto a deck where relative motion exists between the load and the crane.

3.1.56**onboard lift****static lift**

The operation of raising a load (cargo or personnel) off of or landing a load onto a deck where no relative motion exists between the cargo and the crane.

3.1.57**overhaul ball**

The weight on a single part line used to pull the wire rope off the drum with gravitational assistance.

3.1.58**overload**

A condition where the applied load exceeds the designated rated capacity of the crane or rigging equipment.

NOTE Overload does not include shockload, and this standard does not define shockload.

3.1.59**pawl****dog**

A mechanical device that prevents motion in one or more directions.

3.1.60**pendant line**

A standing (not running) rope of specified length with fixed end connections.

3.1.61**person in charge****PIC**

If you are in charge in a particular situation, you are the most senior person and have control over something or someone.

NOTE May also be the offshore installation manager (OIM), ultimate work authority (UWA), or other recognized equivalent.

3.1.62**power plant**

The power plant comprises the prime mover and its auxiliary systems, including the power take-off means and the starting system.

3.1.63**practical exercise
hands-on**

A technique used during a training session that permits students to acquire and practice the knowledge, skills, and behavior necessary to successfully perform one or more training objectives.

3.1.64**pull test**

A load that is applied to the crane structure that will not exceed 100% of the crane's onboard rated capacity as identified on the crane's load chart.

NOTE This is not the same as a load test; see 3.1.49.

3.1.65**qualified**

A person who, by possession of a recognized degree, certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

3.1.66**qualified crane operator**

A person who is qualified to perform the act or process of raising, lowering, or slewing a load using a mechanical or non-mechanical crane.

3.1.67**qualified crane inspector**

A person is qualified to conduct the necessary inspection of cranes based on usage, condition, and performance to ensure conformance with manufacturer's specifications, regulatory requirements (as applicable), any other pertinent criteria, and the provisions of this standard.

3.1.68**qualified crane rigger**

A person who is qualified to attach or detach loads or loose gear for crane lifts.

3.1.69**radial load**

A load applied perpendicular to an object.

3.1.70**radius****radii**

The horizontal distance between the axis of rotation of the lifting appliance (crane) and the vertical center line passing through the boom head sheave and load hook.

3.1.71**rated capacity****safe working load (SWL)**

The rated load or SWL at specified radii (radius) as established by the manufacturer which are the maximum loads at those radii for the conditions specified.

NOTE Items considered are, for example, boom configuration, reeving arrangement, offlead/sidelead, heel/trim, radius, wave height, and so forth.

3.1.72**reeving**

A rope system where the rope travels around drums and sheaves.

3.1.73**revolving upper structure**

The rotating upper frame structure where the operating machinery is mounted.

3.1.74**rigging**

The process used to secure materials to be moved by cranes.

3.1.75**rigging equipment**

The equipment such as shackles, master links, slings, wire rope, turnbuckles, clevis, and pad eyes used with cranes in material handling and structure relocation.

3.1.76**roller path**

The surface upon which the rollers that support the revolving upper structure bear.

NOTE A roller path can accommodate cone rollers, cylindrical rollers, or live rollers.

3.1.77**rolling element**

The balls or rollers contained between the rings of the swing bearing.

3.1.78**rope**

Wire rope, unless otherwise specified.

NOTE See 3.1.99 for wire rope.

3.1.79**sea state**

The general condition of the free surface on a large body of water—with respect to wind waves and swell—at a certain location and moment.

3.1.80**sheave**

A round object with a groove to retain/support wire rope that is used to change the direction of the rope.

3.1.81**sideload****sideloading**

A load applied at the boom tip perpendicular to the boom and parallel to the horizontal plane.

3.1.82**signalman**

A designated representative who directs the operation of a crane from the point near where loads are attached and detached.

NOTE May also be referred to as banksman.

3.1.83**simulator**

A machine with a similar set of controls designed to provide a realistic imitation of the operation of a crane, used for training purposes.

NOTE See 6.2.2 for additional information.

3.1.84**sling**

An assembly that connects the load to the material handling equipment.

3.1.85**stop work authority (SWA)**

A program to provide employees and contract workers with the responsibility and obligation to stop work when a perceived unsafe condition or behavior may result in an unwanted event.

3.1.86**subsea lift**

A lift in which the load is submerged in or below the surface waterline.

3.1.87**swing****slew**

Rotation of the upper structure for movement of loads in a horizontal direction about the axis of rotation.

3.1.88**swing bearing****slew bearing****swing-circle**

A combination of rings with balls or rollers capable of sustaining radial, axial, and moment loads of the revolving upper structure with boom and load.

3.1.89**swing-circle assembly**

The swing-circle assembly is the connecting component between the crane revolving upper structure and the pedestal for cranes of certain types.

NOTE The swing-circle assembly allows crane rotation and sustains the moment, axial, and radial loads imposed by crane operation.

3.1.90**swing gear****ring gear**

External or internal gear with which the swing pinion on the revolving upper structure meshes to provide swing motion.

3.1.91**swing mechanism**

The machinery involved in rotating the revolving upper structure about the axis of rotation in both directions.

3.1.92**swivel**

A load-carrying member with thrust bearings that allows the load to rotate.

3.1.93**tagline**

Manila/fiber rope or other aids attached to loads to aid in their orientation during lifting.

3.1.94**telescoping boom**

Consists of a base boom from which one or more boom sections are moved axially in relation to each other to increase the boom length.

3.1.95**temporary installation crane (TIC)**

A crane that is purposefully designed to be repeatedly mounted, unmounted, and moved to different locations, i.e. not “permanently” installed.

NOTE A rental crane is an example of a temporary installation crane.

3.1.96**two-block**

The condition when the lower load block or hook assembly contacts the upper load block or boom-point sheave assembly.

3.1.97**vertical hitch**

A method of supporting a load by a single, vertical part or leg of the sling.

3.1.98**wind load**

A load applied by air movement at a certain velocity passing over the crane structure.

3.1.99**wire rope**

A flexible, multi-wired member usually consisting of a core member around which several multi-wired strands are “laid” or helically wound.

NOTE See 3.1.78 for rope.

3.1.100**working load**

The external load in pounds (kilograms), applied to the crane including the weight of load-attaching equipment such as load block, shackles, and slings.

NOTE The maximum allowable working load for a given condition is the crane rated capacity or working load limit for rigging equipment.

3.1.101**working load limit****WLL**

The maximum allowable working load established by the sling manufacturer.

NOTE The terms *rated capacity* and *working load limit* are commonly used to describe rated load.

3.2 Abbreviations

GOPS	gross overload protection center
JSA	job safety analysis
JSEA	job safety environment analysis
PIC	person in charge
PPE	personal protective equipment
WLL	working load limit