ASME B30.29-2018
(Revision of ASME B30.29-2012)

Self-Erecting Tower Cranes

Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

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The next edition of this Standard is scheduled for publication in 2023. This Standard will become effective 1 year after the Date of Issuance.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME website under the Committee Pages at http://cstools.asme.org/ as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at http://cstools.asme.org/. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting “Errata” in the “Publication Information” section.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

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FOREWORD

This American National Standard, Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings, has been developed under the procedures accredited by the American National Standards Institute (ANSI). This Standard had its beginning in December 1916, when an eight-page Code of Safety Standards for Cranes, prepared by an American Society of Mechanical Engineers (ASME) Committee on the Protection of Industrial Workers, was presented at the annual meeting of the ASME.

Meetings and discussions regarding safety on cranes, derricks, and hoists were held from 1920 to 1925, involving the ASME Safety Code Correlating Committee, the Association of Iron and Steel Electrical Engineers, the American Museum of Safety, the American Engineering Standards Committee (AESC) [later changed to American Standards Association (ASA), then to the United States of America Standards Institute (USASI), and finally to ANSI], Department of Labor — State of New Jersey, Department of Labor and Industry — State of Pennsylvania, and the Locomotive Crane Manufacturers Association. On June 11, 1925, the AESC approved the ASME Safety Code Correlating Committee's recommendation and authorized the project with the U.S. Department of the Navy, Bureau of Yards and Docks, and ASME as sponsors.

In March 1926, invitations were issued to 50 organizations to appoint representatives to a Sectional Committee. The call for organization of this Sectional Committee was sent out October 2, 1926, and the Committee organized November 4, 1926, with 57 members representing 29 national organizations.

Commencing June 1, 1927, and using the eight-page code published by ASME in 1916 as a basis, the Sectional Committee developed the Safety Code for Cranes, Derricks, and Hoists. The early drafts of this safety code included requirements for jacks, but due to inputs and comments on those drafts, the Sectional Committee decided in 1938 to make the requirements for jacks a separate code. In January 1943, ASA B30.2-1943 was published, addressing a multitude of equipment types, and in August 1943, ASA B30.1-1943 was published, addressing only jacks. Both documents were reaffirmed in 1952 and widely accepted as safety standards.

Due to changes in design, advancement in techniques, and general interest of labor and industry in safety, the Sectional Committee, under the joint sponsorship of ASME and the Bureau of Yards and Docks (now the Naval Facilities Engineering Command), was reorganized on January 31, 1962 with 39 members representing 27 national organizations.

The new Committee changed the format of ASA B30.2-1943 so that the multitude of equipment types it addressed could be published in separate volumes that could completely cover the construction, installation, inspection, testing, maintenance, and operation of each type of equipment included in the scope of ASA B30.2. This format change resulted in the initial publication of B30.3, B30.5, B30.6, B30.11, and B30.16 being designated as "Revisions" of B30.2, with the remainder of the B30 volumes being published as new volumes. ASA changed its name to USASI in 1966, and to ANSI in 1969, which resulted in B30 volumes from 1943 to 1968 being designated as either "ASA B30," "USAS B30," or "ANSI B30," depending on their date of publication.

In 1982, the Committee was reorganized as an Accredited Organization Committee, operating under procedures developed by ASME and accredited by ANSI.

This Standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment falling within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees.

In case of practical difficulties, new developments, or unnecessary hardship, the administrative or regulatory authority may grant variances from the literal requirements or permit the use of other devices or methods, but only when it is clearly evident that an equivalent degree of protection is thereby secured. To secure uniform application and interpretation of this Standard, administrative or regulatory authorities are urged to consult the B30 Committee, in accordance with the format described in Section IX of the B30 Standard Introduction, before rendering decisions on disputed points.

Safety codes and standards are intended to enhance public safety. Revisions result from committee consideration of factors such as technological advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

The ASME B30 Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings has not included cranes referred to as self-erecting tower cranes in the past. Self-erecting tower cranes have distinct operating, erecting, and transporting characteristics that do not allow them to be included in ASME B30.3 or ASME B30.5. The use of these

machines has increased rapidly in the United States of America in recent years. In 2007, the ASME B30 Committee voted to form a subcommittee to write a volume for the B30 Safety Standard covering self-erecting tower cranes.

The first edition of the ASME B30.29 volume was approved by ANSI and designated as an American National Standard on November 27, 2012.

This 2018 edition contains the addition of signalperson and rigger responsibilities as well as other revisions throughout the document to maintain consistency between the B30 volumes. This edition was approved by the B30 Standards Committee and by ASME. It was also approved by ANSI and designated as an American National Standard on January 17, 2018.

ASME B30 COMMITTEE
Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

(The following is the roster of the Committee at the time of approval of this Standard.)

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B30 STANDARD INTRODUCTION

SECTION I: SCOPE

The ASME B30 Standard contains provisions that apply to the construction, installation, operation, inspection, testing, maintenance, and use of cranes and other lifting and material-movement-related equipment. For the convenience of the reader, the Standard has been divided into separate volumes. Each volume has been written under the direction of the ASME B30 Standards Committee and has successfully completed a consensus approval process under the general auspices of the American National Standards Institute (ANSI).

As of the date of issuance of this Volume, the B30 Standard comprises the following volumes:

B30.1 Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries

B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

B30.3 Tower Cranes

B30.4 Portal and Pedestal Cranes

B30.5 Mobile and Locomotive Cranes

B30.6 Derricks

B30.7 Winches

B30.8 Floating Cranes and Floating Derricks

B30.9 Slings

B30.10 Hooks

B30.11 Monorails and Underhung Cranes (withdrawn 2018 — requirements found in B30.17)

B30.12 Handling Loads Suspended From Rotorcraft

B30.13 Storage/Retrieval (S/R) Machines and Associated Equipment

B30.14 Side Boom Tractors

B30.15 Mobile Hydraulic Cranes (withdrawn 1982 — requirements found in latest revision of B30.5)

B30.16 Overhead Underhung and Stationary Hoists

B30.17 Cranes and Monorails (With Underhung Trolley or Bridge)

B30.18 Stacker Cranes (Top or Under Running Bridge, Multiple Girder With Top or Under Running Trolley Hoist)

B30.19 Cableways

B30.20 Below-the-Hook Lifting Devices

B30.21 Lever Hoists

B30.22 Articulating Boom Cranes

B30.23 Personnel Lifting Systems

B30.24 Container Cranes

B30.25 Scrap and Material Handlers

B30.26 Rigging Hardware

B30.27 Material Placement Systems

B30.28 Balance Lifting Units

B30.29 Self-Erecting Tower Cranes

B30.30 Ropes[1]

B30.31 Self-Propelled, Towed, or Remote-Controlled Hydraulic Platform Transporters[1]

B30.32 Unmanned Aircraft Systems (UAS) Used in Inspection, Testing, Maintenance, and Lifting Operations[1]

SECTION II: SCOPE EXCLUSIONS

Any exclusion of, or limitations applicable to, the equipment, requirements, recommendations, or operations contained in this Standard are established in the affected volume's scope.

SECTION III: PURPOSE

The B30 Standard is intended to

(a) prevent or minimize injury to workers, and otherwise provide for the protection of life, limb, and property by prescribing safety requirements

(b) provide direction to manufacturers, owners, employers, users, and others concerned with, or responsible for, its application

(c) guide governments and other regulatory bodies in the development, promulgation, and enforcement of appropriate safety directives

SECTION IV: USE BY REGULATORY AGENCIES

These volumes may be adopted in whole or in part for governmental or regulatory use. If adopted for governmental use, the references to other national codes and standards in the specific volumes may be changed to refer to the corresponding regulations of the governmental authorities.

[1] This volume is currently in the development process.

SECTION V: EFFECTIVE DATE

(a) Effective Date. The effective date of this Volume of the B30 Standard shall be 1 yr after its date of issuance. Construction, installation, inspection, testing, maintenance, and operation of equipment manufactured and facilities constructed after the effective date of this Volume shall conform to the mandatory requirements of this Volume.

(b) Existing Installations. Equipment manufactured and facilities constructed prior to the effective date of this Volume of the B30 Standard shall be subject to the inspection, testing, maintenance, and operation requirements of this Standard after the effective date.

It is not the intent of this Volume of the B30 Standard to require retrofitting of existing equipment. However, when an item is being modified, its performance requirements shall be reviewed relative to the requirements within the current volume. The need to meet the current requirements shall be evaluated by a qualified person selected by the owner (user). Recommended changes shall be made by the owner (user) within 1 yr.

SECTION VI: REQUIREMENTS AND RECOMMENDATIONS

Requirements of this Standard are characterized by use of the word *shall*. Recommendations of this Standard are characterized by the word *should*.

SECTION VII: USE OF MEASUREMENT UNITS

This Standard contains SI (metric) units as well as U.S. Customary units. The values stated in U.S. Customary units are to be regarded as the standard. The SI units are a direct (soft) conversion from the U.S. Customary units.

SECTION VIII: REQUESTS FOR REVISION

The B30 Standards Committee will consider requests for revision of any of the volumes within the B30 Standard. Such requests should be directed to

Secretary, B30 Standards Committee
ASME Codes and Standards
Two Park Avenue
New York, NY 10016-5990

Requests should be in the following format:

Volume:	Cite the designation and title of the volume.
Edition:	Cite the applicable edition of the volume.
Subject:	Cite the applicable paragraph number(s) and the relevant heading(s).
Request:	Indicate the suggested revision.
Rationale:	State the rationale for the suggested revision.

Upon receipt by the Secretary, the request will be forwarded to the relevant B30 Subcommittee for consideration and action. Correspondence will be provided to the requester defining the actions undertaken by the B30 Standards Committee.

SECTION IX: REQUESTS FOR INTERPRETATION

The B30 Standards Committee will render an interpretation of the provisions of the B30 Standard. An Interpretation Submittal Form is available on ASME's website at http://cstools.asme.org/Interpretation/InterpretationForm.cfm.

Phrase the question as a request for an interpretation of a specific provision suitable for general understanding and use, not as a request for approval of a proprietary design or situation. Plans or drawings that explain the question may be submitted to clarify the question. However, they should not contain any proprietary names or information. Read carefully the note addressing the types of requests that the B30 Standards Committee can and cannot consider.

Upon submittal, the request will be forwarded to the relevant B30 Subcommittee for a draft response, which will then be subject to approval by the B30 Standards Committee prior to its formal issuance. The B30 Standards Committee may rewrite the question for the sake of clarity.

Interpretations to the B30 Standard will be available online at https://cstools.asme.org/Interpretation/SearchInterpretation.cfm.

SECTION X: ADDITIONAL GUIDANCE

The equipment covered by the B30 Standard is subject to hazards that cannot be abated by mechanical means, but only by the exercise of intelligence, care, and common sense. It is therefore essential to have personnel involved in the use and operation of equipment who are competent, careful, physically and mentally qualified, and trained in the proper operation of the equipment and the handling of loads. Serious hazards include, but are not limited to, improper or inadequate maintenance, overloading, dropping or slipping of the load, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed.

The B30 Standards Committee fully realizes the importance of proper design factors, minimum or maximum dimensions, and other limiting criteria of wire rope or chain and their fastenings, sheaves, sprockets, drums, and similar equipment covered by the Standard, all of which are closely connected with safety. Sizes, strengths, and similar criteria are dependent on many different factors, often varying with the installation and uses. These factors depend on

(a) the condition of the equipment or material
(b) the loads

(c) the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums

(d) the type of attachments

(e) the number, size, and arrangement of sheaves or other parts

(f) environmental conditions causing corrosion or wear

(g) many variables that must be considered in each individual case

The requirements and recommendations provided in the volumes must be interpreted accordingly, and judgment used in determining their application.

ASME B30.29-2018
SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.29-2018 was approved by the American National Standards Institute on January 17, 2018.

Throughout this Volume, "self-erect tower cranes" has been editorially corrected to "self-erecting tower cranes."

ASME B30.29-2018 includes the following changes identified by a margin note, **(18)**.

Page	*Location*	*Change*
ix	B30 Standard Introduction	Revised
1	Chapter 29-0	Title revised
1	29-0.2.2	(1) Definitions of *appointed*; *authorized*; *designated person*; *dynamic loading*; *folding jib*; *folding mast*; *gage, track*; *rated capacity indicator*; *telescoping jib*; *telescoping mast*; and *working rope* deleted (2) Definitions of *shall* and *should* revised (3) Definition of *original language(s)* added
5	29-0.3	Added
5	29-0.4	Updated
9	29-1.4	Revised in its entirety
16	29-2.1.1	Revised
16	29-2.1.3	Subparagraph (b)(4) added and subsequent subparagraphs redesignated
18	29-2.4.1	Revised
20	29-3.1.1	Subparagraph (a)(2) revised
21	29-3.1.3	Subparagraphs (f) and (g) added
24	29-3.1.3.4	Added
24	29-3.1.3.5	Added
25	29-3.1.4.1	Subparagraph (a)(5)(-a) revised
26	29-3.3.1	Added and subsequent paragraphs redesignated

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Chapter 29-0
Scope, Definitions, Personnel Competence, and References

SECTION 29-0.1: SCOPE OF B30.29

Volume B30.29 includes provisions that apply to the construction, operation, inspection, testing, and maintenance of powered self-erecting tower cranes that adjust operating radius by means of a trolley traversing a jib. These may be horizontal, elevated, articulating, or telescoping, and used for vertical lifting and lowering of freely suspended, unguided loads that consist of equipment and materials.

Self-erecting tower cranes have vertical or nearly vertical masts that are bottom slewing and mounted on fixed, traveling, or mobile bases. The cranes are capable of moving or being moved from job site to job site fully assembled or nearly fully assembled.

This Volume does not apply to cranes used for nonvertical lifting service or lifting a guided load, or to truck-mounted material delivery cranes with a tubular boom and trolley traversing the boom. Tower cranes (refer to ASME B30.3) and mobile crane tower attachments (refer to ASME B30.5) are not within the scope of this Volume.

SECTION 29-0.2: DEFINITIONS

29-0.2.1 Types of Self-Erecting Tower Cranes

See Figures 29-0.2.1-1 and 29-0.2.1-2.

(18) 29-0.2.2 General

accessory: a secondary part or assembly of parts that contributes to the overall function and usefulness of a machine.

administrative or regulatory authority: governmental agency, or the employer in the absence of governmental jurisdiction.

axis of rotation: the vertical line about which a crane swings.

axle: the shaft or spindle with which or about which a wheel rotates. On wheel-mounted cranes, it refers to a type of axle assembly including housings, gearing, differential, bearings, and mounting appurtenances.

balanced: the condition of the superstructure of a self-erecting crane necessary for telescoping the mast; the load is positioned at that radius that causes the vertical moment of the superstructure about the balance point to go to zero.

ballast: weights added to the fixed frame to create additional stability or to counter the effects of the lifted load.

bogie: the assembly that includes a pivot, frame, axle(s), and wheel(s) on which a crane rides on rails, and includes an assembly of two or more axles arranged to permit both vertical wheel displacement and an equalization of loading on the wheels.

brake: a device other than a motor used for retarding or stopping motion by friction or power means.

braking means: a method or device for retarding or stopping motion.

buffer: an energy-absorbing device for reducing impact when a moving crane or trolley reaches the end of its permitted travel.

cab: a housing provided for the operator and containing the crane controls.

control station: the location of the crane function controls, either cab-mounted or by remote control.

counterweight: weights added to the rotating frame to create additional stability or to counter the effects of the lifted load.

crane: in this Volume, the use of the word “crane” refers to self-erecting cranes, which are lifting machines, mounted on a base, with a superstructure consisting of a mast, rotating frame, and a jib.

crossover points: points of rope contact where one layer of rope on a rope drum crosses over the previous layer.

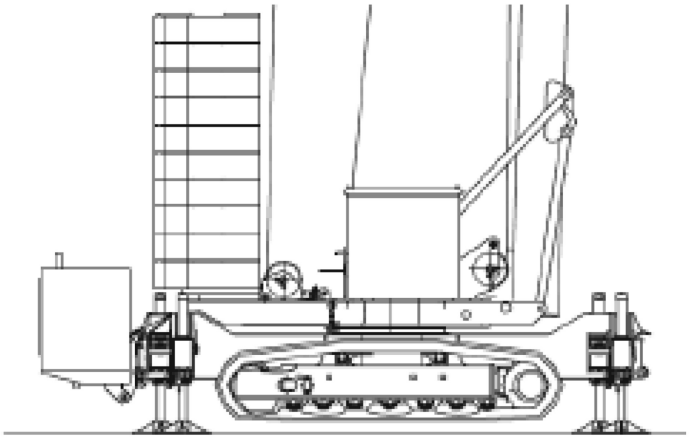
direct supervision: a designated operator in the immediate area of the trainee, within visual sighting distance, and able to effectively communicate with the trainee. The designated operator shall have no duties other than observing the operation of the crane by the trainee.

dismantle: to fold/retract and disassemble crane for removal or relocation.

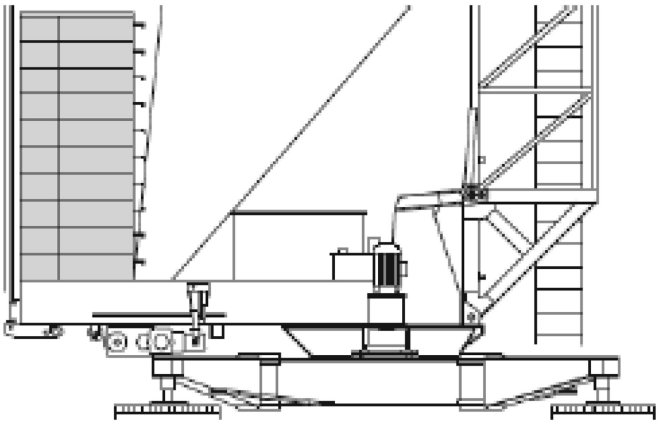
dog everything: apply or engage all brakes, locks, and pawls.

drum: the cylindrical member around which rope is wound; used for multiple functions on the crane.

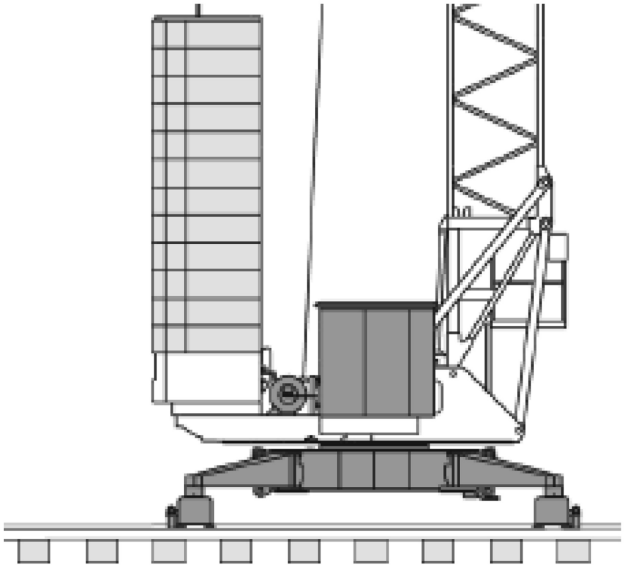
Figure 29-0.2.1-1 Types of Self-Erecting Tower Cranes by Base Type



(a) Crawler

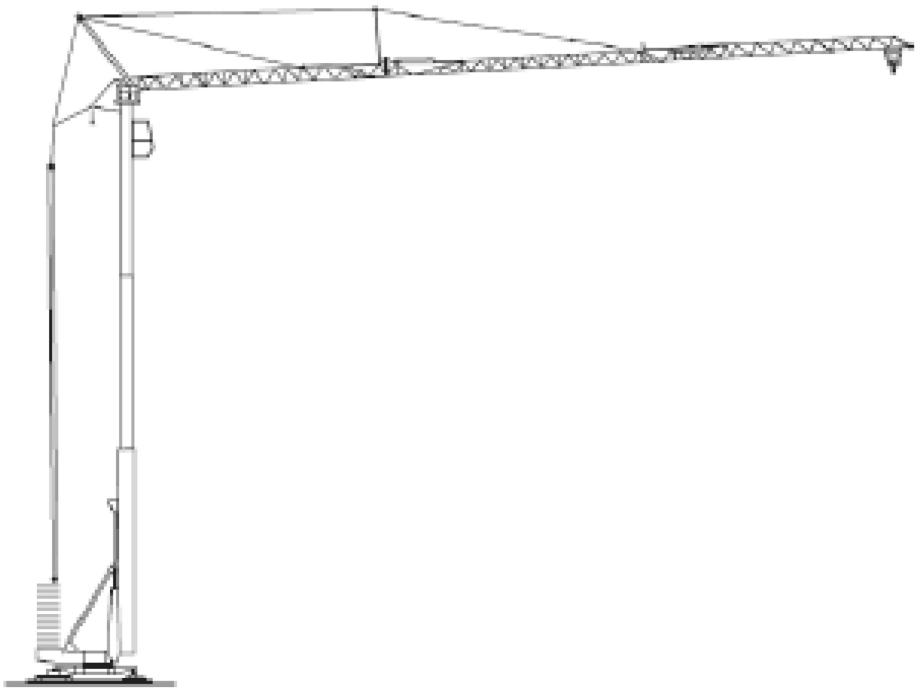


(b) Outrigger

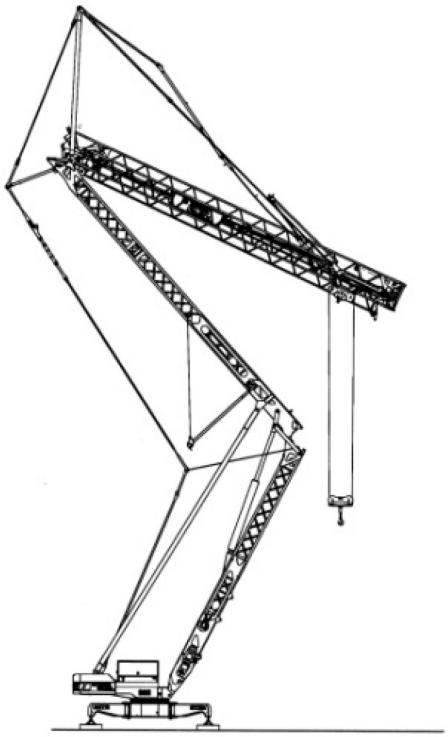


(c) Rail Traveling

Figure 29-0.2.1-2 Types of Self-Erecting Tower Cranes by Mast Type



(a) Telescoping



(b) Folding

ensure: the term used when the meaning "take steps to see that" or "make sure" is intended.

equalizer: a device that compensates for unequal length of two or more supporting components.

erection: assembly, setup, and initial configuration of the crane.

flange point: the point of contact between the rope and drum flange where the rope changes layers on a rope drum.

hoist mechanism: a hoist drum and rope reeving system; used for one or more functions on the crane.

in-service: the condition of a crane ready for or engaged in work; an operator is at the controls.

jib: the structural member attached to the mast of a crane on which the trolley travels when changing load radius.

job site: area within the boundaries of the project where the crane is to be operated.

limiting device: a mechanical or electrical device that interacts with some part of a power-driven machine or equipment to control loads or motions of the machine or equipment.

load: the total weight applied to the load block or hook.

load block, lower: the assembly of hook or shackle, swivel, sheaves, pins, and frame suspended by the hoisting rope.

load block, upper: the assembly of sheaves and pins mounted in the trolley.

load hoist: a hoist drum and rope reeving system used for hoisting and lowering loads.

load indicator: a device that measures the weight of the load.

mast: vertical or near vertical structure that allows for the support of the jib and the load.

minimum breaking force: the minimum load at which a new and unused wire rope will break when loaded to destruction in direct tension.

operational aid: an accessory that provides information to facilitate operation of a crane or that takes control of particular functions without action of the operator when a limiting condition is sensed.

original language(s): language used by the manufacturer to develop product instructions and manual(s).

out-of-operation: the condition of a crane during erection, dismantling, reconfiguration, or adjustment/repairs when not in lifting service.

out-of-service: the condition of a crane when unloaded, without power, and with the controls unattended, and prepared to endure winds above the in-service level.

outriggers: extendable or fixed members attached to the mounting base that rest on supports at the outer ends used to support the crane.

parking track: for rail-mounted cranes, a section of the track supported so that it is capable of sustaining storm-induced bogie loads; it is provided with storm anchorages when required.

pawl (dog): a device for positively holding a member against motion in one or more directions.

pendant: a rope or bar of specified length with fixed end connections.

pitch diameter: the diameter of a sheave or rope drum measured at the centerline of the lowest layer of rope.

qualified operator: an operator who has met the requirements of paras. 29-3.1.2(a) through 29-3.1.2(c).

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

radius (load): the horizontal distance from the crane's axis of rotation to the center of the vertical hoist line or tackle with load applied.

rail clamp: a device for fastening a traveling crane to its rails to limit wind-induced travel.

rated capacity (load) limiter: a device that automatically monitors radius, load weight, and load rating, and prevents movements of the crane that would result in an overload condition.

rated load (load rating): the maximum allowable load at each lifting radius, designated by the manufacturer; rated loads are expressed in pounds, kilograms, short tons, or metric tons.

reconfigure: to change the mast height, jib length, or jib angle.

remote control: a radio or cable control device used to activate the crane control functions.

rope: refers to wire rope unless otherwise specified.

rotating frame: a horizontal member of a crane on which the mast, counterweights, and usually the hoisting machinery are mounted.

rotation-resistant rope: wire rope consisting of an inner layer of strands laid in one direction covered by a layer of strands laid in the opposite direction.

running rope: a rope that travels around sheaves or drums.

shall: a word indicating a requirement.

sheave: a grooved wheel or pulley used with a rope to change the direction and point of application of a pulling force.

should: a word indicating a recommendation.

side loading: a load applied at an angle to the vertical plane of the jib.