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 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, 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, just addressing 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 that was included in the scope of the 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 totally 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 the American National Standards Institute.

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 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 first edition of B30.3 Construction Tower Cranes was published in 1975 as a “partial revision” to B30.2-1943 (R1952) and was the first volume dedicated to tower cranes. New editions were published, in 1975, 1984, 1990, 1996, 2004, and 2009, with the 2009 edition revising the title of B30.3 to Tower Cranes and reflecting the revised scope that now included both construction and permanently mounted tower cranes (formerly addressed in B30.4). Responsibilities for members of the lifting team were also added in that edition. The 2012 edition was a complete rewrite of the 2009 edition and included many new subjects and requirements updated to reflect the changing work environment in which tower cranes operate. Major changes and additions were made to the scope of work for erecting, dismantling, and climbing, and takes into account wind zone regions across the United States. Strength and stability requirements have also been modified to align with the new European standard EN 14439. The inspection section now includes requirements for “Major Inspections” that are to be conducted at 60-month intervals. This 2016 edition includes minor revisions throughout the document including the addition of personnel competence.

The edition of the B30.3 Volume was approved by the B30 Committee and by ASME, and was approved by ANSI and designated as an American National Standard on December 21, 2012.
### Summary of Revisions
**B30.3 - Tower Cranes**

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Scope, Definitions, and References and Personnel Competence

SECTION 3-0.1: SCOPE OF B30.3

Within the general scope of the B30 Standard, as defined in Section I of the B30 Standard Introduction, the B30.3 Volume applies to “construction tower cranes” and “permanently mounted tower cranes” that are powered by electric motors or internal combustion engines and that adjust their operating radius by means of a luffing boom mechanism, a trolley traversing a horizontal jib, or a combination of the two. The cranes may be mounted on “fixed bases” or “traveling bases” and may have tower and supporting structure arrangements that permit the crane to climb in a structure being built or that permits increasing the crane’s tower height as the structure rises. Variations of the above physical characteristics that provide the same fundamental operating characteristics are included in the scope of this Volume; however, the requirements of this Volume are only applicable to the cranes within this scope when they are used in lifting operations. Mobile cranes configured with tower attachments (refer to ASME B30.5) and self-erecting tower cranes (refer to ASME B30.29) are not within the scope of this Volume.

SECTION 3-0.2: DEFINITIONS
3-0.2.1 Types of Cranes

3-0.2.1.1 By Type of Application

construction tower crane: a hammerhead, luffing, or other type of tower crane that is regularly assembled and disassembled for use at various sites. It is usually characterized by provisions to facilitate erection and dismantling, and may include features to permit climbing or telescoping.

permanently mounted tower crane: a hammerhead, luffing, or other type of tower crane that is erected for longer term use at one location (5 yr or more). The configuration of the crane usually remains unchanged during the entire installation period.

3-0.2.1.2 By Method of Load Positioning

hammerhead tower crane: a tower crane with a horizontal jib and a load trolley that traverses the jib to change load radius (see Figs. 3-0.2.1.2-1 and 3-0.2.1.2-2).
luffing boom tower crane: a crane with a boom pinned to the superstructure at its inner end and containing load hoisting tackle at its outer end, and with a hoist mechanism to raise or lower the boom in a vertical plane to change load radius (see Figs. 3-0.2.1.2-3 and 3-0.2.1.2-4).
3-0.2.1.3 By Support Arrangement

*braced or guyed tower crane*: a tower crane with tie-ins or guys attached to the tower to permit the crane to be erected or climbed to greater than the maximum free-standing height (see Figs. 3-0.2.1.2-2 and 3-0.2.1.2-4).

*freestanding tower crane*: a tower crane that is supported on a foundation or structural support without assistance from braces, guys, or other means (see Figs. 3-0.2.1.2-1 and 3-0.2.1.2-3).

*internal climbing tower crane*: a tower crane arranged to raise itself from floor to floor in a building as construction advances (see Fig. 3-0.2.1.3-1).

3-0.2.1.4 By Ability to Travel

*fixed-base tower crane*: a freestanding, braced, guyed, or ballasted platform tower crane that is mounted on a foundation or structural support and does not travel (see Figs. 3-0.2.1.2-1 and 3-0.2.1.2-3).

*traveling tower crane*: a freestanding tower crane mounted on a ballasted platform furnished with *trucks* bogies that ride along rails (see Fig. 3-0.2.1.4-1).

3-0.2.2 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 applicable governmental jurisdiction.

*appointed*: assigned specific responsibilities by the employer or the employer’s representative.

*authorized*: approved as satisfactory by a duly constituted administrative or regulatory authority.

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

*balance*: the condition of the superstructure of a tower crane necessary for climbing; the load or the luffing boom is positioned at that radius which causes the vertical moment of the superstructure about the balance point to go to zero.

*ballast*: weight added to a crane base to create additional stability; it does not rotate when the crane swings.

*base, anchor bolt*: a crane base that is bolted to a footing [see Fig. 3-0.2.2-1, illustration (a)].

*base, expendable*: for static-mounted cranes, a style of bottom tower section or member that is cast into a concrete footing block; all or part of this component is lost to future installations [see Fig. 3-0.2.2-1, illustration (b)].

*base, fixed ballasted*: a crane base that is a ballasted platform that does not travel.

*base, knee-braced*: a crane base that uses diagonal members to spread the loading [see Fig. 3-0.2.2-1, illustration (c)].

*base tower*: a mounting accessory to secure the bottom of the tower to a foundation, structural support, travel, or ballasted base.

*base, traveling*: a crane base that is a ballasted platform mounted on *trucks* bogies that ride along rails (see Fig. 3-0.2.1.4-1).

*bogie*: an assembly of two or more axles arranged to permit both vertical wheel displacement and an equalization of loading on the wheels.

*brace, tower*: a structural attachment placed between a crane tower and an adjacent structure to pass loads to the adjacent structure and permit the crane to be erected to greater than freestanding height (see Fig. 3-0.2.1.2-4).

*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 stop- ping 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.

climbing: for freestanding, braced, or guyed cranes, the process whereby the height of the tower is increased by adding sections at the top (see Fig. 3-0.2.1.2-4); for internal climbing cranes, the process whereby the entire crane is raised or lowered on or within a structure which is under construction as the height of that structure increases (see Fig. 3-0.2.1.3-1).

climbing frame: for freestanding, braced, or guyed cranes, a structural frame supporting the superstructure which surrounds the tower and contains arrangements to raise the frame and superstructure of the crane for insertion of an additional tower section; for internal climbing cranes, a frame used to transmit operational and climb- ing reactions to the host building frame.

Climbing cross-member: a structural member attached to the end of the hydraulic cylinder used to engage the climbing ladders or lugs via pawls to raise or lower the crane structure.

climbing ladder: a steel member with crossbars (used in pairs) suspended from a climbing frame and used as jacking support points when some cranes climb.

clutch: a means for engagement or disengagement of power.

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

counterjib (counterweight jib): a horizontal member of a crane on which the counterweights and usually the hoisting machinery are mounted.

counterweight: weights added to a crane superstructure to create additional stability or to counter the effects of the lifted load; they rotate with the crane as it swings.

crane: in this Volume, the use of the word crane refers to tower cranes, which are lifting machines consisting of a tower with a superstructure that rotates and includes a load, luffing boom, or jib, and, on some cranes, a counterjib extending in the opposite direction to the load, luffing boom, or jib.

crane, standby: a crane that is not in regular service but that is used occasionally or intermittently as required.

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

designated person: a person selected or assigned by the employer or the employer’s representative as being competent to perform specific duties.

documentation: The organized collection of information that describes the structure, design, purpose, operation, maintenance, and safety requirements for the crane and includes the stickers, placards, and labels that provide operational or safety-related information.

drum: the cylindrical member around which rope is wound for lifting or lowering a load.

dynamic loading: loads introduced into the machine or its components by forces in motion.

equalizer: a device that compensates for unequal length or stretch of a rope.

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

freestanding height: that height of a crane which is supported by the tower alone without assistance from braces, guys, or other means.

gage, track: the horizontal distance between two rails, measured perpendicular to the direction of travel.

guy rope: a fixed-length supporting rope intended to maintain a nominally fixed distance between the two points of attachment; may also be called a stay rope, standing rope, or pendant (see Fig. 3-0.2.1.2-2).

high strength bolts: high strength tensile bolts used in the assembly of crane sections. The bolts are installed in tension, by torquing or other means, at a level greater than that produced by in- or out-of-service loads, for the purpose of reducing the likelihood of bolt fatigue failure.
in-service: the condition of a crane ready for or engaged in work; an operator is at the controls.
jib: the horizontal structural member attached to the rotating superstructure of a crane on which the load trolley travels when changing load radius.
jib point: the outward end of the load-bearing jib.
limiting device: a device that is operated by some part of a power-driven machine or equipment to restrict loads, or motions of the machine or equipment.
load: the total superimposed weight on the hook.
load block: the assembly of hook, swivel, sheaves, pins, and frame suspended by the hoisting rope.
luffing boom: a member hinged to the rotating superstructure that raises and lowers to change load radius and is used for supporting the hoisting tackle.
luffing boom stop: a device used to limit the angle of the luffing boom at the highest recommended position.

normal operating condition: a condition during which a crane is performing functions within the manufacturer's operating recommendations. Under these conditions, the operator is at the operating controls, and no persons other than those appointed are on the crane.

operational aid: a device that provides information to facilitate operation of a crane. Examples of such devices include, but are not limited to, the following: luffing boom angle or trolley radius indicator, load moment indicator, and wind velocity device.
out-of-service: the condition of a crane when unloaded, without power, with the controls unattended, and prepared to endure winds above the in-service level.
overturning moment: the summation of the individual moments that add to the tipping tendency of a crane about its fulcrum.
parking track: for rail-mounted cranes, a section of track supported so that it is capable of sustained 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 rope.
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 a projection of the axis of rotation to the base of the crane, before loading, 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 load (load rating): the maximum allowable working load designated by the manufacturer; rated loads are expressed in pounds, kilograms, short tons, or metric tons.
reconfigure: the addition or deletion of jib, luffing boom, or counterjib sections while the crane is erected.
remote control: a radio or cable control device used to activate the crane control functions.
rope: refers to wire rope unless otherwise specified.
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; this has the effect of counteracting torque by reducing the tendency of the finished rope to rotate.
running ropes: rope that spools on/off drums.
shall: this word indicates that the rule is mandatory and must be followed.
sheave: a grooved wheel or pulley used with a rope to change the direction and point of application of a pulling force

should: this word indicates that the rule is a recommendation, the advisability of which depends on the facts in each situation.

slewing moment: moment acting in a horizontal plane about the centerline of rotation, induced by the slewing and brake mechanisms of the crane.

structural competence: the ability of the machine and its components to withstand imposed stresses.

superstructure: that portion of the crane that rotates.

swing (slew): rotation of the superstructure for movement of loads in a horizontal direction about the axis of rotation.

tie-in: a structural support consisting of a collar that surrounds the tower that utilizes bracing to attach to the host structure.

tower: a vertical structural frame consisting of columns and bracing capable of supporting a superstructure with its working and dynamic loads and transmitting them to the supporting surface or structure.

trolley (load): the component of the crane that moves along the jib of a hammerhead tower crane and positions the load radially.

trolleying: the motion of the trolley on the jib to locate the load at a working radius.

track, travel: the assembly that includes a pivot, frame axle(s), and wheel(s) on which a crane rides on rails; see also bogie.

two-blocking: the condition when the load block or hook assembly comes in contact with the trolley or luffing boom tip sheave.

unattended: a condition in which the operator of a crane is not at the operating controls.

weathervaning: releasing of the swing brakes to allow wind-induced rotation of a crane superstructure, when out-of-service, to expose minimal surface area to the wind.

wedge: a tapered device used to provide stability.

SECTION 3-0.3: REFERENCES

The following is a list of standards and specifications listed in this Standard, showing the year of approval:

Publisher: American Ladder Institute (ALS), 401 North Michigan Avenue, Chicago, IL 60611 (www.americannadderinstitute.org)

ANSI/ASSE A1264.1-2007, Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace, Floor, Wall and Roof Openings; Stairs and Guardrails Systems
Publisher: American Society of Safety Engineers (ASSE), 1800 East Oakton Street, Des Plaines, IL 60018 (www.asse.org)

ANSI/NEMA Publication ICS-18-2001, Motor Control Centers
Publisher: National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Rosslyn, VA 22209 (www.nema.org)

ANSI/NFPA 70-2011, National Electrical Code
Publisher: National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169 (www.nfpa.org)
SECTION 3-0.4 Personnel Competence
Persons performing the functions identified in this volume shall meet the applicable qualifying criteria stated in this volume and shall, through education, training, experience, skill, and physical fitness, as necessary, be competent and capable to perform the functions as determined by the employer or employer’s representative.

Item 1 – Rationale
To comply with global directives and to clean up wording and definitions
3-1.5(i) Embedded concrete support anchors shall not be excavated and reused. Cranes can be re-erected on existing embedded concrete support anchors when approved by the manufacturer or a qualified person.

3-1.5(j)(1)(c) rails shall be level and straight in accordance with the manufacturer’s or a qualified person’s specifications, unless designed for curves or grades. Rails shall be spaced for the crane trucks bogies in accordance with the manufacturer’s or a qualified person’s specifications.

(f) both ends of all rail runways shall be provided with stops or buffers adjusted to ensure simultaneous contact with both rail travel trucks bogies. Stops attached to rails shall be in accordance with the manufacturer's or a qualified person’s specifications.

3-1.13.2 Travel Trucks Bogies
(a) Crane trucks bogies shall be fitted with sweeps placed at each end of the truck-bogie and extending below the top of the rail, unless the construction of the rail foundation prohibits such extension.
(b) Truck Bogie wheels shall be guarded.
(c) Means shall be provided to limit the drop of truck-bogie frames to a distance that will not cause the crane to overturn in case of wheel or axle breakage.

3-1.5(i) To make the intent of this paragraph clearer.
3-1.5(j)(1)(c),(f) and 3-1.13.2 To remove the word “truck” and replace with “bogies” as “trucks” is not commonly used in the tower crane industry.
3-3.1.1 Operators

(a) Cranes shall be operated only by the following qualified personnel:

1. designated persons

2. trainees under the direct supervision of a designated person. Trainees shall be under the supervision of a designated person. The number of trainees permitted to be supervised by a single designated person, the physical location of the designated person while supervising, and the type of communication required between the designated person and the trainee shall be determined by a qualified person.

3-3.1.3 Conduct of Operators

(c) The operator shall respond to signals from the person who is directing the lift Lift Director, or an appointed signal person. When a signal person is not required as part of the crane operation, the operator is then responsible for the lifts. However, the operator shall obey a stop signal at all times, no matter who gives it.

(m) Cranes shall not be raised (climbed) to a new operating level when wind speed at the top of the crane exceeds 20 mph (9 m/s) or as recommended by the manufacturer or a qualified person.

(n) The crane operator should be present during climbing operations.

(o) Climbing operations shall not be commenced until all support provisions required at the new support level are in place and as specified by a qualified person.

(q) For night operations, lighting shall be adequate to illuminate the working areas while not interfering with the operator’s vision.

3-3.1.4.2 User’s Responsibilities. User’s responsibilities shall include

(k) ensuring cranes are not climbed when wind speed at the top of the crane exceeds 20 mph (9 m/s) or as recommended by the manufacturer or a qualified person.

(l) ensuring the crane operator is present during climbing operations.

(m) ensuring climbing operations are not commenced until all support provisions required at the new support level are in place and as specified by a qualified person.

(n) ensuring night operation lighting is adequate to illuminate the working areas while not interfering with the view of the operator.

3-3.1.4.2.1 Site Supervisor’s Responsibilities. Site supervisor’s responsibilities shall include

(j) Determining if any energized conductors in the proximity of the site create a hazard and allowing crane operation near electric power lines only when the requirements of para. 3-3.4.3 have been met.

3-3.1.4.3 Responsibilities of The Operator.
3-3.2.1 Handling the Load

(a) Size of Load
(3) For lifts where the load weight is not accurately known, the person responsible for the lift, the Lift Director shall ascertain that the weight of the load does not exceed the crane ratings at the radius at which the load is to be lifted.

(b) Operator Aids
(4) When a load limit device, luffing boom angle, or load or radius indicator is not functioning, the crane may be kept in service while awaiting repair, provided all of the following conditions are adhered to. No operations shall be conducted if more than one of the indicating or limiting devices are not functioning.

(a) All crane operations are conducted under the direct supervision of a qualified person other than the signal person.

(e) Moving the Load
(1) The person directing the lift, Lift Director shall see that...
SECTION 3-3.3: SIGNALS

3-3.3.1 General

(a) Continuous communication between the crane operator and the signal person shall be maintained continuously during all crane operations. If at any time communication is disrupted, the operator shall stop all crane operations until communication is restored and a proper signal is given and understood.

3-3.3.5 Standard Voice Signals

Prior to beginning lifting operations using voice signals, the signals shall be discussed and agreed upon by the person directing lifting operations, Lift Director, the crane operator, and the designated signal person.

Modify wording so communication is maintained continuously as required during lifting operations.
Item 1 – Revisions of Illustrations

Revisions to section 3.0 illustrations

Item 1 – Rationale

To update illustrations, make corrections, and clarify points of interest.

Item 1 – Subcommittee Voting Results

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Per attached sheets of illustrations.
Fig. 3-0.2.1.2-3  Luffing Boom Tower Crane — Fixed-Base, Freestanding Crane

- Luffing Boom hoist rope
- Boom hoist ropes
- Pendant bars
- Luffing Boom pendants

A-frame (gantry)
Machine deck
Counterweight
Cab
Turntable
Boom
Tower
Concrete footing
Fig. 3-0.2.1.2-4  Braced Crane

Counterweight clearance

Climbing unit

Delete Column

Highest floor that can be placed

Maximum tower height above uppermost tie-in (brace)

Spacing between tie-in (braces) assemblies

Anchorages bolted through floor

Rigid collar

Edge of structure

Edge of floor

(b) Plan View at Brace Level

Plan view at tie-in (brace) level

(a) Elevation

Elevation view

Tie-in (Braces)
Fig. 3-0.2.1.3-1  Internal Climbing Crane

- Tower section
- Climbing ladder suspension
- Climbing frame
- Support beam
- Wedges
- Climbing ladders
- Structure floor
- Upper climbing pawls
- Hydraulic cylinder
- Hydraulic unit
- Climbing section
- Climbing cross-member
- Support pawls
- Climbing frame
- Connection plate
- Support beam

Support beams (as required)
Climbing tower section
Support beams (as required)
**Fig. 3-0.2.1.4-1** Travel Base for Freestanding Crane

- **Balance:** the condition of the superstructure of a tower crane necessary for climbing; the load or the luffing boom is positioned at that radius which causes the vertical moment of the superstructure about the balance point to go to zero.

- **Ballast:** weight added to a crane base to create additional stability; it does not rotate when the crane swings.

- **Base, anchor bolt:** a crane base that is bolted to a footing [see Fig. 3-0.2.2-1, illustration (a)].

- **Base, expendable:** for static-mounted cranes, a style of bottom tower section or member that is cast into a concrete footing block; all or part of this component is lost to future installations [see Fig. 3-0.2.2-1, illustration (b)].

- **Base, fixed ballasted:** a crane base that is a ballasted platform that does not travel.

- **Base, knee-braced:** a crane base that uses diagonal members to spread the loading [see Fig. 3-0.2.2-1, illustration (c)].

- **Base tower:** a mounting accessory to secure the bottom of the tower to a foundation, structural support, travel, or ballasted base.

- **Base, travel:** a crane base that is a ballasted platform mounted on trucks that ride along rails (see Fig. 3-0.2.1.4-1).

- **Bogie:** an assembly of two or more axles arranged to permit both vertical wheel displacement and an equalization of loading on the wheels.

- **Brace, tower:** a structural attachment placed between a crane tower and an adjacent structure to pass loads to the adjacent structure and permit the crane to be erected to greater than freestanding height (see Fig. 3-0.2.1.2-4).

- **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.

- **Climbing:** for freestanding, braced, or guyed cranes, the process whereby the height of the tower is increased by adding sections at the top (see Fig. 3-0.2.1.2-4); for internal climbing cranes, the process whereby the entire crane is raised on or within a structure which is under construction as the height of that structure increases (see Fig. 3-0.2.1.3-1).

- **Climbing frame:** for freestanding, braced, or guyed cranes, a structural frame supporting the superstructure which
Fig. 3-0.2.2-1 Types of Fixed Bases

(a) Anchor Bolt Base
- Anchor bolt
- Base plate
- Reusable base plate
- Grout
- Expendable anchor plate
- Expendable foundation anchors
- Expendable anchorage members

(b) Expendable Base
- Anchor plate

(c) Knee-Braced Base (Ballast May Also Be Used)
- Tower
- Knee brace
- Cross beams
- Tie down (when required)
- Footing block
- Concrete footing

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3-3.1.4.1.1 Owner’s Responsibilities. Owner’s responsibilities shall include (a) providing a crane that meets the requirements of Chapter 3-1 of the applicable appropriate edition of this Volume, as well as specific job requirements defined by the user.

Item 1 – Rationale

This statement was too broad based and is a commercial item, not a safety requirement.
3-0.2.2 General

operational aid: a device that provides information to facilitate operation of a crane. Examples of such devices include, but are not limited to, the following: luffing boom angle or hook radius indicator, or trolley radius indicator, load moment indicator, and wind velocity device.

SECTION 3-1.17: OPERATOR AIDS

(a) Indicating devices shall be provided to
(1) display the weight of the load on the hook
(2) display the luffing boom angle, hook radius, or trolley operating radius, as appropriate

Currently many manufacturers do not publish the boom angle and list the hook radius instead. Authorities have insisted that boom angle indicators be installed based on the way the current wording reads, even when the manufacturer’s load charts all show hook radius in feet.