ASME B30.17-2003
(Revision of ASME B30.17-1998)

OVERHEAD AND GANTRY CRANES (TOP RUNNING BRIDGE, SINGLE GIRDER, UNDERHUNG HOIST)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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SAFETY STANDARD FOR CABLEWAYS, CRANES, DERRICKS, HOISTS, HOOKS, JACKS, AND SLINGS

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The next edition of this Standard is scheduled for publication in 2006. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued, and will also be published within the next edition of the Standard.

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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 (formerly the United States of America Standards Institute). This Standard began 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 to 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 (later changed to American Standards Association and subsequently to the USA Standards Institute), 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 American Engineering Standards Committee 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. The Safety Code for Cranes, Derricks, and Hoists, ASA B30.2-1943, was created from the eight-page document referred to in the first paragraph. This document was reaffirmed in 1952 and widely accepted as a safety standard.

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 Naval Facilities Engineering Command, U.S. Department of the Navy, was reorganized as an American National Standards Committee on January 31, 1962, with 39 members representing 27 national organizations.

The format of the previous code was changed so that separate standards (each complete as to construction and installation; inspection, testing, and maintenance; and operation) would cover the different types of equipment included in the scope of B30.

In 1982, the Committee was reorganized as an Accredited Organization Committee, operating under procedures developed by the 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 III, before rendering decisions on disputed points.

This volume of the Standard, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated as an American National Standard on April 11, 2003.

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.

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Safety Standards 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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SAFETY STANDARD FOR CABLEWAYS, CRANES, DERRICKS, HOISTS, HOOKS, JACKS, AND SLINGS

B30 SERIES INTRODUCTION

(03)

GENERAL

This Standard is one of a series of safety standards on various subjects that have been formulated under the general auspices of the American National Standards Institute. One purpose of the Standard is to serve as a guide to governmental authorities having jurisdiction over subjects within the scope of the Standard. It is expected, however, that the Standard will find a major application in industry, serving as a guide to manufacturers, purchasers, and users of the equipment.

For the convenience of the user, the Standard has been divided into separate volumes.

B30.1 Jacks
B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.3 Construction Tower Cranes
B30.4 Portal, Tower, and Pedestal Cranes
B30.5 Mobile and Locomotive Cranes
B30.6 Derricks
B30.7 Base Mounted Drum Hoists
B30.8 Floating Cranes and Floating Derricks
B30.9 Slings
B30.10 Hooks
B30.11 Monorails and Underhung Cranes
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
Note: B30.15-1973 has been withdrawn. The revision of B30.15 is included in the latest edition of B30.5.
B30.16 Overhead Hoists (Underhung)
B30.17 Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
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 Manually Lever Operated 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[1]
B30.27 Material Placement Systems[1]
B30.28 Balance-Lifting Units[1]

If these standards are 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.

The use of cableways, cranes, derricks, hoists, hooks, jacks, and slings is subject to certain hazards that cannot be met 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 safe operation of the equipment and the handling of the loads. Serious hazards are overloading, dropping or slipping of the load caused by improper hitching or slinging, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed.

The Standards Committee fully realizes the importance of proper design factors, minimum or maximum sizes, and other limiting dimensions 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 depend on many different factors, often varying with the installation and uses. These factors depend on the condition of the equipment or material; the loads; the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums; the type of attachments; the number, size, and arrangement of sheaves or other parts; environmental conditions causing corrosion or wear; and many variables that must be considered in each individual case. The rules given in the Standard must be interpreted accordingly, and judgment must be used in determining their application.

The Standards Committee will be glad to receive criticisms of this Standard's requirements and suggestions

[1] B30.26, B30.27, and B30.28 are in the developmental stage.

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for its improvement, especially those based on actual experience in application of the rules.

Suggestions for changes to the Standard should be submitted to the Secretary of the B30 Committee, ASME, Three Park Avenue, New York, NY 10016-5990, and should be in accordance with the following format:

(a) Cite the specific paragraph designation of the pertinent volume.

(b) Indicate the suggested change (addition, deletion, revision, etc.).

(c) Briefly state the reason and/or evidence for the suggested change.

(d) Submit suggested changes to more than one paragraph in the order that the paragraphs appear in the volume.

The B30 Committee will consider each suggested change in a timely manner in accordance with its procedures.

(03) SECTION I: SCOPE

This Standard applies to the construction, installation, operation, inspection, maintenance, and safe use of lifting equipment used in construction and industrial settings. This includes, but is not limited to: articluating-boom, container, gantry, mobile, pedestal, portal, tower and stacker cranes; balance-lifting units; below-the-hook lifting devices; cableways; derricks; jacks; hoists; hooks; loads suspended from rotorcraft; material placement systems; monorails; rigging hardware; and scrap and material handlers.

This Standard does not apply to track and automotive jacks, railway or automobile wrecking cranes, shipboard cranes, shipboard cargo-handling equipment, well-drilling derricks, skip hoists, mine hoists, truck body hoists, car or barge pullers, conveyors, excavating equipment, or equipment falling within the scope of the following Committees: A10, A17, A90, A92, A120, B20, B56, and B77.

SECTION II: PURPOSE

This Standard is designed to

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

(b) provide direction to owners, employers, supervisors, 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 III: INTERPRETATIONS

Upon request, the B30 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B30 Committee, ASME, Three Park Avenue, New York, NY 10016-5990.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request utilizing the following format.

Subject: Cite the applicable paragraph number(s) and provide a concise description.

Edition: Cite the applicable edition of the pertinent volume for which the interpretation is being requested.

Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain any proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which could change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

SECTION IV: NEW AND EXISTING INSTALLATIONS

(a) Effective Date. The effective date of this volume for the purpose of defining new and existing installations shall be 1 year after its date of issuance.

(b) New Installations. 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.

(c) Existing Installations. Inspection, testing, maintenance, and operation of equipment manufactured and facilities constructed prior to the effective date of this volume shall be done, as applicable, in accordance with the requirements of this volume.

It is not the intent of this volume to require retrofitting of existing equipment. However, when an item is being modified, its performance requirement shall be reviewed relative to the current volume. If the performance differs substantially, the need to meet the current requirement shall be evaluated by a qualified person selected by the

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owner (user). Recommended changes shall be made by the owner (user) within 1 year.

SECTION V: MANDATORY AND ADVISORY RULES

Mandatory rules of this volume are characterized by use of the word *shall*. If a provision is of an advisory nature, it is indicated by use of the word *should* and is a recommendation to be considered, the advisability of which depends on the facts in each situation.

SECTION VI: METRIC CONVERSIONS

The values stated in U.S. Customary units are to be regarded as the standard.

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ASME B30.17-2003
SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.17-2003 was approved by the American National Standards Institute on April 11, 2003.

ASME B30.17-2003 includes editorial changes, revisions, and corrections introduced in ASME B30.17a-1999, and B30.17b-2001, as well as the following changes identified by a margin note, **(03)**.

Page	*Location*	*Change*
viii	General	Updated
ix	Section I	Revised
1	Section 17-0.1	Revised
1	Section 17-0.2	Revised
8	Subparagraph 17-1.1.5(c)	Revised
9	Subparagraph 17-1.3.2(b)	Revised
19	Subparagraph 17-2.3.1(a)	Revised

SPECIAL NOTE:

The interpretations to ASME B30.17 are included in this edition as a separate section for the user's convenience.

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OVERHEAD AND GANTRY CRANES (TOP RUNNING BRIDGE, SINGLE GIRDER, UNDERHUNG HOIST)

Chapter 17-0
Scope, Definitions, and References

(03) Section 17-0.1: SCOPE OF B30.17

Volume B30.17 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of hand-operated and power-driven overhead and gantry cranes that have a top-running single-girder bridge, with one or more underhung hoists (see B30.16 Volume) operating on the lower flange of the bridge girder, used for vertical lifting and lowering of freely suspended, unguided loads (see Figs. 1 through 5). The requirements included in this volume also apply to cranes having the same fundamental characteristics such as polar gantry cranes, cantilever gantry cranes, semi-gantry cranes, and wall cranes.

Requirements for a crane used for a special purpose such as, but not limited to, non-vertical lifting service, lifting a guided load, or lifting personnel are not included in this volume.

(03) Section 17-0.2: DEFINITIONS

abnormal operating conditions: environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a crane, such as excessively high or low ambient temperatures, exposure to adverse weather, corrosive fumes, dust-laden or moisture-laden atmospheres, and hazardous locations.

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

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

authorized: appointed by a duly constituted administrative or regulatory authority.

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

braking, control: a method of controlling speed by removing energy from the moving body or by imparting energy in the opposite direction.

braking, countertorque (plugging): a method of controlling speed by reversing the motor line voltage polarity or phase sequence to develop torque in the direction opposite to the rotation of the motor.

braking, dynamic: a method of controlling speed by using the motor as a generator, with the energy being dissipated in resistors.

braking, eddy current: a method of controlling or reducing speed by means of an electrical induction load brake.

braking, emergency: a method of decelerating a drive when power is not available. The braking effort may be established as a result of action by the operator, or automatically when power to the drive is interrupted.

braking, hydraulic: a method of controlling or reducing speed by means of displacement of a liquid.

braking means: a method or device used for stopping/holding motion by friction or power.

braking, mechanical: a method of controlling or reducing speed by friction.

braking, pneumatic: a method of controlling or powering a drive or brake by means of compressed gas.

braking, regenerative: a method of controlling speed in which the electrical energy generated by the motor is fed back into the power system.

braking, service: a method to decelerate crane motion during normal operation.

bridge: the part of an overhead crane, consisting of one girder, trucks, and (if applicable) drive mechanism, that carries the trolley or trolleys.

bridge girder: a crane member on which carriers or trolleys travel horizontally, mounted between and supported by the end trucks.

bridge travel: the crane movement in a direction parallel to the crane runway.

bumper (buffer): a device for reducing impact when a moving crane or trolley reaches the end of its permitted travel, or when two moving cranes or trolleys come

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into contact. This device may be attached to the bridge, trolley, or runway stop.

cab: the operator's compartment on a crane.

cab, skeleton: the operator's compartment used for occasional cab operation of a normally floor- or remote-operated crane.

chain, hand: the chain grasped by the operator to apply force required for lifting, lowering, or traveling motions.[1]

chain, load: the load-bearing chain in a hoist.[1]

clearance: the distance from any part of the crane to the nearest obstruction.

collectors, current: contacting devices for conducting current from runway or bridge conductors.

conductors, bridge: the electrical conductors located along the bridge structure of a crane that transmit control signals and power to the trolley(s).

conductors, runway (main): the electrical conductors located along a crane runway that transmit control signals and power to the crane.

control panel: an assembly of components (magnetic, static, hydraulic, pneumatic, etc.) that governs the flow of power to or from a motor or other equipment in response to signals from a master switch, push button station, remote control, automatic program control, etc.

controller: a device or group of devices that serves to govern, in a predetermined manner, the power delivered directly to the apparatus to which it is connected.

controller, manual: a controller having all of its basic functions performed by devices that are operated by hand.

controller, spring-return: a controller that, when released, will return automatically to a neutral (OFF) position.

crane: a machine for lifting and lowering a load, and moving it horizontally. Cranes, whether fixed or mobile, are driven manually, by power, or by a combination of both.

crane, automatic: a crane that, when activated, operates through a preset cycle or cycles.

crane, cab-operated: a crane whose movements are controlled by an operator through the use of controllers located in a cab that is attached to the crane (refer to Fig. 1).

crane, cantilever gantry: a gantry or semigantry crane in which the bridge girders or trusses extend transversely beyond the crane runway on one or both sides (refer to Fig. 2).

crane, floor-operated: a crane whose movements are controlled by an operator through the use of controllers contained in a pendant station suspended from the crane (refer to Fig. 3).

crane, gantry: a crane similar to an overhead crane, except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway (refer to Fig. 4).

crane, hot molten material-handling: an overhead crane used for transporting or pouring molten material.

crane, manually operated: a crane whose hoist mechanism is driven by pulling an endless chain or whose travel mechanism is driven in the same manner or by manually moving the load.

crane, outdoor: an overhead or gantry crane that operates outdoors and for which provisions are not available for storage in an area that provides protection to the crane from weather conditions. An indoor crane that may operate outdoors on a periodic basis is not classified as an outdoor crane.

crane, overhead: a crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead, fixed runway structure (refer to Figs. 1 and 3 for the types covered by this volume).

crane, power-operated: a crane whose mechanism is driven by electric, pneumatic, hydraulic, or internal combustion means.

crane, pulpit-operated: a crane whose movements are controlled by an operator through the use of controllers located in a control room, a fixed or movable cab, or a platform that is independent of the crane.

crane, remote-operated: a crane whose movements are controlled by an operator through the use of controllers contained in a portable operating station not attached to the crane.

crane, semigantry: a gantry crane with one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway, the other end of the bridge being supported by an end truck running on an elevated rail or runway (refer to Fig. 5).

crane service, normal: service that involves operation with randomly distributed loads within the rated load limit, or with uniform loads of less than 65% of the rated load, for no more than 15% of the time of a single work shift for manually operated cranes and 25% of the time of a single work shift for electrically pneumatically powered cranes.

crane service, heavy: service that involves operation within the rated load limit that exceeds normal service.

crane service, severe: service that involves normal or heavy service with abnormal operating conditions.

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

[1] Hand and load chain properties do not conform to those shown in ASME B30.9

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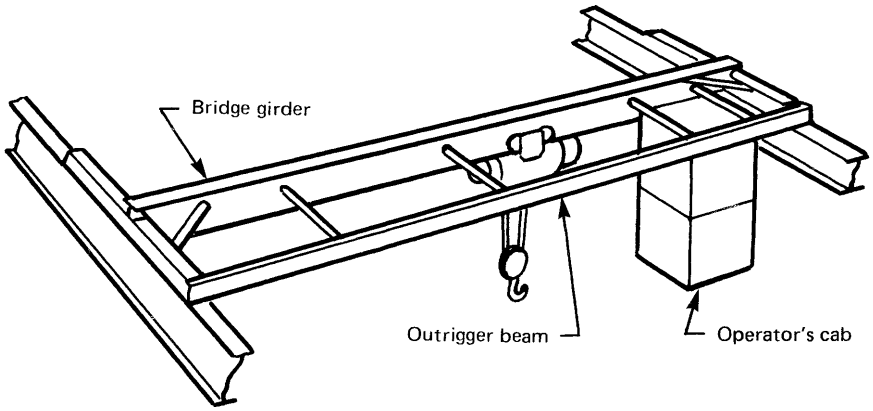


Fig. 1 Overhead Cab-Operated Crane

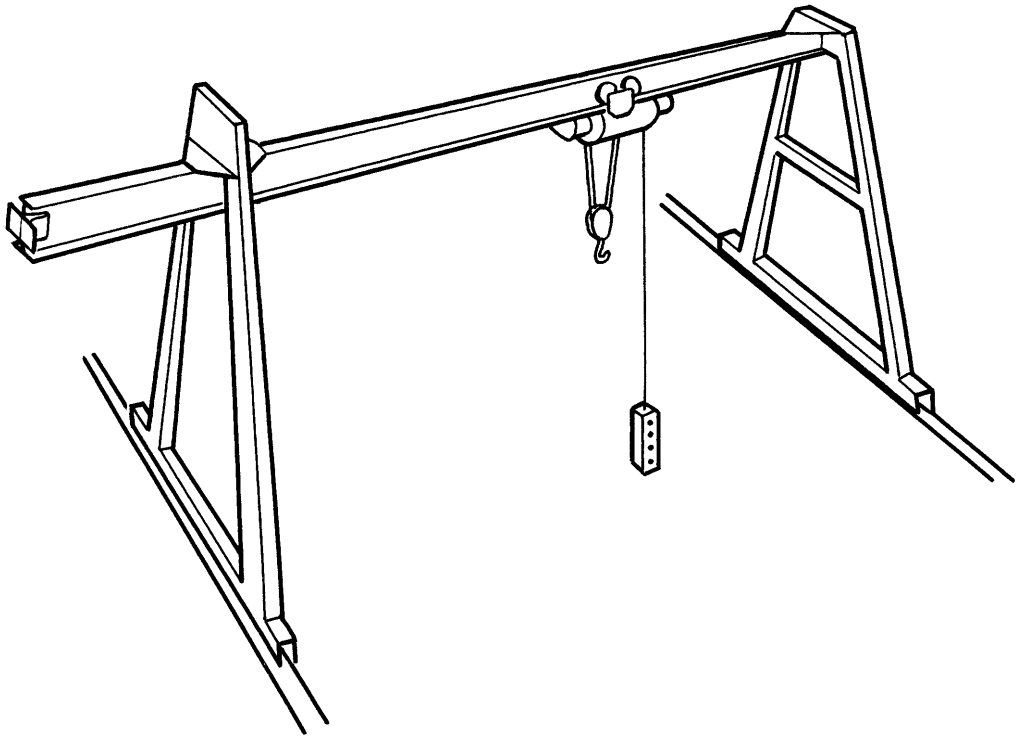


Fig. 2 Cantilever Gantry Crane

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

drift point: a point on a travel motion master switch or on a manual controller that maintains the brake released while the motor is not energized. This allows for coasting.

end truck: the assembly consisting of the frame and wheels that support the crane girder or sill and allow movement along the runway.

exposed: applies to hazardous objects not guarded or isolated (capable of being contacted inadvertently).

gantry leg: the structural member that supports a bridge girder or end tie from the sill.

hazardous (classified) locations: locations where fire or explosion hazards may exist. Locations are classified depending on the properties of the flammable vapors, liquids, or gases, or the combustible dusts or fibers,

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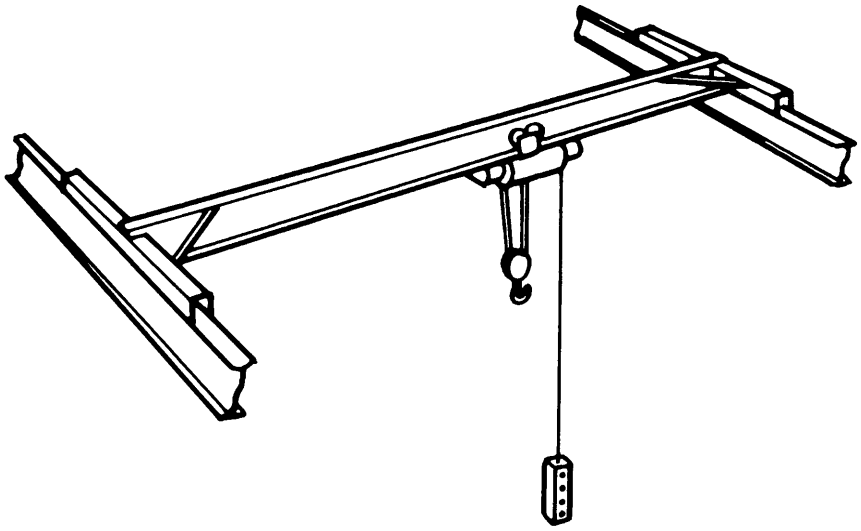


Fig. 3 Overhead Floor-Operated Crane

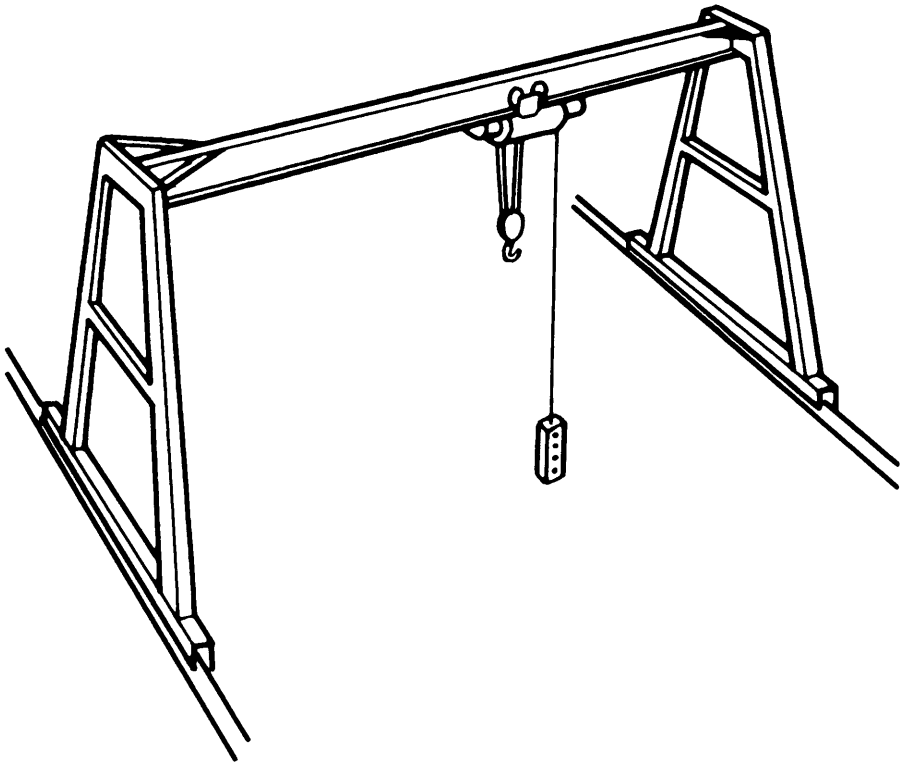


Fig. 4 Gantry Crane

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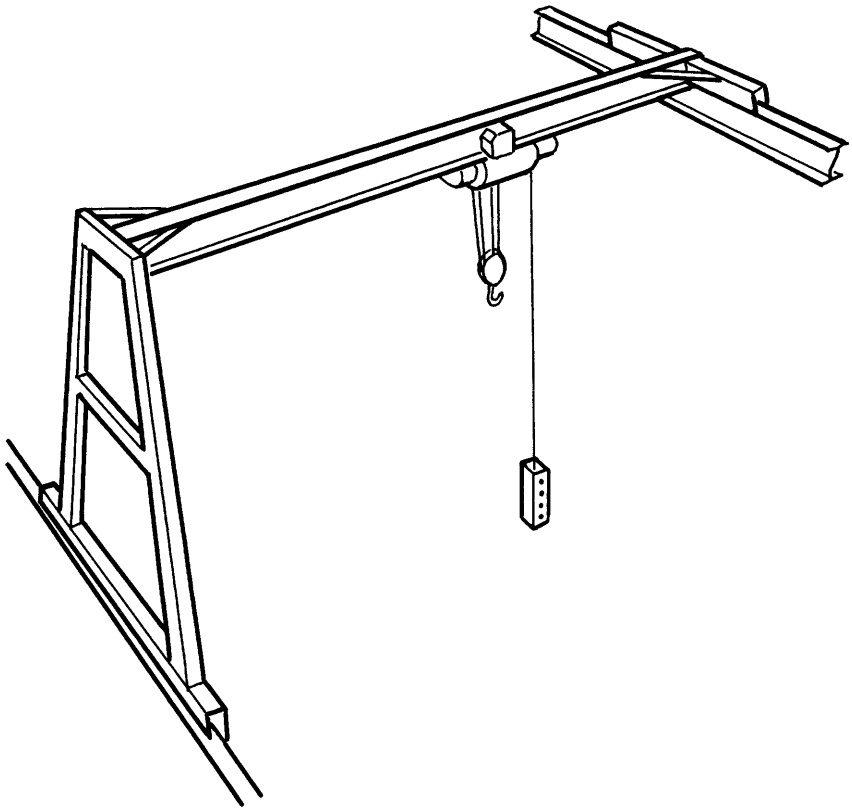


Fig. 5 Semigantry Crane

which may be present and the likelihood that a flammable or combustible concentration or quantity is present (see ANSI/NFPA 70).

(a) Class I locations: locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures

(b) Class II locations: locations that are hazardous because of the presence of combustible dust

(c) Class III locations: locations that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures

hoist: a machinery unit that is used for lifting or lowering a freely suspended (unguided) load.

hoist, auxiliary: a supplemental hoisting unit, usually of lower load rating and higher speed than the main hoist.

hoist motion: motion that lifts or lowers a load.

lifting devices: devices that are not reeved onto the hoist rope or chain, such as hooks on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the rated load.

load: the total superimposed weight on the load block or hook.

load block: the assembly of hook or shackle, swivel, bearing, sheaves, pins, and frame suspended by the hoisting rope or load chain. This shall include any appurtenances reeved in the hoisting rope or load chain.

load, rated: the maximum load designated by the manufacturer for which a crane or individual hoist is designed and built.

master switch: see *switch, master.*

noncoasting mechanical drive: a drive that automatically results in decelerating a trolley or bridge when power is not available.

normal operating conditions (of cab-operated cranes): conditions during which a crane is performing functions within the scope of the original design. Under these conditions, the operator is at the operating control devices and no other person is on the crane.

normal operating conditions (of floor-operated cranes): conditions during which a crane is performing functions within the scope of the original design. Under these conditions, the operator is at the operating control devices that are attached to the crane, but it is operated

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with the operator off the crane and with no person on the crane.

normal operating conditions (of remote-operated cranes): conditions during which a crane is performing functions within the scope of the original design. Under these conditions, the operator is at the operating control devices that are not attached to any part of the crane and no person is on the crane.

overload: any load greater than the rated load.

pendant station: controls suspended from the crane for operating the unit from the floor.

qualified person: a person who, by possession of a recognized degree in an applicable field or 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.

rail sweep: a device attached to the crane and located in front of the crane's leading wheels to push aside loose obstructions.

rope: refers to wire rope unless otherwise specified.

runway: an assembly of rails, beams, girders, brackets, and framework on which the crane travels.

service platform: a means provided for workers to perform maintenance, inspections, adjustments, and repairs of cranes.

shall: use of this word indicates that a rule is mandatory and must be followed.

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

side pull: the component of the hoist pull acting horizontally when the hoist lines are not operated vertically.

sills: horizontal structural members that connect the lower ends of two or more legs of a gantry crane on one runway.

span: the horizontal distance, center to center, between runway rails.

stop: a device to limit travel of a trolley or crane bridge. This device normally is attached to a fixed structure and normally does not have energy absorbing ability.

switch (valve): a device for making, breaking, or changing the connections in an electric, hydraulic, or pneumatic circuit.

switch, emergency stop: a manually actuated switch to disconnect power independently of the regular operating controls.

switch, limit: a device that is actuated by the motion of a part of a power-driven machine or equipment to alter or disconnect the electric, hydraulic, or pneumatic circuit associated with the machine or equipment.

switch, main (crane disconnect): a switch on the crane controlling the main power supply from the runway conductors.

switch, master: switch that dominates the operation of contractors, relays, or other remotely operated devices.

switch, master, spring-return: a master switch that, when released, will return automatically to a neutral (OFF) position.

switch, runway disconnect: a switch, usually at floor level, controlling the main power supply to the runway conductors.

trolley (carrier): the unit that travels on the bottom flange of the bridge girder and carries the hoist.

trolley travel: the trolley movement in directions at right angles to the crane runway.

unattended: a condition in which the operator of a crane is not at the operating control devices. On a floor-operated crane, however, if the operating control devices are within sight of the operator and within a distance equal to the span of the crane, the crane should be considered attended.

Section 17-0.3: REFERENCES

The following is a list of publications referenced in this Standard. Within the text, reference is made to the following publications, copies of which may be obtained from the publishers as indicated.

ANSI A14.3-1992, Safety Requirements for Fixed Ladders

ANSI Z244.1-1982 (R1993), Safety Requirements for the Lock Out/Tag Out of Energy Sources

Publisher: American National Standards Institute, Inc. (ANSI), 25 West 43rd Street, New York, NY 10036

ANSI Z241.2-1999 Safety Requirements for Melting and Pouring of Metals in the Metal Casting Industry[2]

Publisher: American Foundry Society (AFS), 505 State Street, Des Plaines, IL 60016

ANSI/ASCE 7-95, Minimum Design Loads for Buildings and Other Structures[2]

Publisher: American Society of Civil Engineers (ASCE), 1801 Alexander Bell Drive, Reston, VA 20191-4400

ANSI/AWS D1.1-2002, Structural Welding Code — Steel[2]

ANSI/AWS D14.1-97, Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment[2]

Publisher: American Welding Society (AWS), 550 NW LeJeune Road, Miami, FL 33126

[2] May also be obtained from American National Standards Institute, Inc., 25 West 43rd Street, New York, NY 10036.

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ANSI Z535.4-1998, Product Safety Signs and Labels[2]

Publisher: National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Rosslyn, VA 22209

ANSI/NFPA 70-2002, National Electrical Code

Publisher: National Fire Protection Association (NFPA), 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269

ANSI/SAE Z26.1-1996, Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicles Operating on Land Highways — Safety Standard[2]

Publisher: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001

ASME B15.1-2000, Safety Standard for Mechanical Power Transmission Apparatus[2]

ASME B30.9-1996, Slings[2]

ASME B30.10-1999, Hooks[2]

ASME B30.16-1998, Overhead Hoists (Underhung)[2]

ASME B30.20-1999, Below-the-Hook Lifting Devices[2]

Publisher: The American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

ANSI A1264.1-1995, Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems[2]

Publisher: American Society of Safety Engineers (ASSE), 1800 East Oakton Street, Des Plaines, IL 60018-2187

CMAA Specification No. 74, Revised 2000, Specification for Top Running and Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist

Publisher: Crane Manufacturers Association of America (CMAA), Inc., 8720 Red Oak Boulevard, Suite 201, Charlotte, NC 28217

LRFD Manual of Steel Construction 2nd Edition, 2nd Revision (1998)

Publisher: American Institute of Steel Construction, (AISC), One East Wacker Drive, Suite 3100, Chicago, IL 60601-2001

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Chapter 17-1
General Construction and Installation

SECTION 17-1.1: MARKINGS

17-1.1.1 Rated Load Markings: Crane

The rated load of the crane shall be marked on each side of the crane bridge girder, or other component attached to the crane bridge girder, and shall be legible from the ground or floor.

17-1.1.2 Rated Load Markings: Hoist

(a) The rated load of the hoist shall be marked on the hoist or trolley unit or its load block and shall be legible from the ground or floor.

(b) If the crane has more than one hoisting unit, each hoist shall have its rated load marked on the hoist or trolley unit or its load block and each rated load marking shall be legible from the ground or floor.

(c) The combined load applied to all hoists on a crane shall not exceed the rated load of the crane.

17-1.1.3 Manufacturer's Identification Markings

The crane shall be marked with manufacturer's identification information, on a plate or label attached to the crane, as follows:

(a) name and address of manufacturer

(b) manufacturer's model or serial number

(c) voltage of AC or DC power supply and phase and frequency of AC power supply

17-1.1.4 Multiple Hoist Identification Markings

If the crane has more than one hoisting unit, each hoist shall have an identification marking on the hoist or trolley unit or its load block (e.g., #1 and #2; A and B; north and south; etc.) and shall be legible from the ground or floor. These markings shall also appear on the controllers used by the operator to indicate the controllers that operate each hoist.

17-1.1.5 Warnings

(a) Floor-operated and remote-operated cranes shall have a safety label or labels affixed to the pendant station or load block. The label or labels shall be in compliance with ANSI Z535.1, ANSI Z535.3, and ANSI Z535.4, and shall include cautionary language against

(1) lifting more than rated load

(2) operating hoist when load is not centered under hoist

(3) operating hoist with twisted, kinked, or damaged chain or rope

(4) operating damaged or malfunctioning crane

(5) lifting people

(6) lifting loads over people

(7) operating a rope hoist with a rope that is not properly seated in its groove

(8) operating manual motions with other than manual power

(9) removing or obscuring safety label

(b) Cab-operated and pulpit-operated cranes shall have a safety label or labels affixed in the cab or pulpit. The label or labels shall be in compliance with ANSI Z535.1, ANSI Z535.3, and ANSI Z535.4, and shall include cautionary language against

(1) lifting more than rated load

(2) operating hoist when load is not centered under hoist

(3) operating hoist with twisted, kinked, or damaged chain or rope

(4) operating damaged or malfunctioning crane

(5) lifting people

(6) lifting loads over people

(7) operating a rope hoist with a rope that is not properly seated in its groove

(8) removing or obscuring safety label

(c) A label shall be affixed on all electrical control enclosures. The label shall be in compliance with ANSI Z535.4 and shall include, but not be limited to, information such as (03)

(1) Disconnect power and lockout/tagout disconnecting means before removing cover or servicing this equipment.

(2) Do not operate without cover in place.

SECTION 17-1.2 CLEARANCES

17-1.2.1 Clearance From Obstruction

(a) Clearance shall be maintained between the crane and the building, as well as between parallel running cranes and cranes operating at different elevation, under all operating conditions. In the design of new cranes, all factors that influence clearance, such as wheel float, truss sag, bridge skewing, or trolley positions and configurations, shall be considered.

(b) Where passageways or walkways are provided on the structure supporting the crane, obstructions shall not be placed so that personnel will be jeopardized by movements of the crane.

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17-1.2.2 Clearance Between Parallel Cranes

If the runways of two cranes are parallel and there are no intervening walls or structures, there shall be clearance provided and maintained between the two bridges.

SECTION 17-1.3: GENERAL CONSTRUCTION: RUNWAYS AND SUPPORTING STRUCTURE

17-1.3.1 Foundations and Anchorage

(a) Permanent concrete or masonry foundations shall rest on footings below the frost line, except in permafrost.

(b) Every outdoor crane shall be provided with secure fastenings convenient to apply and to hold the crane against a wind pressure of 30 lb/ft^2 (1436 Pa). Parking brakes may be considered to provide minimum compliance with this rule.

(c) Where wind forces are specified to be in excess of 30 lb/ft^2 (1436 Pa), special anchorages such as latches or tie downs at the home position or remotely operated rail clamps for all positions to supplement the primary braking system shall be provided (ANSI/ASCE 7 may be used as a reference for this condition).

(d) Outdoor gantry cranes shall be provided with remotely operated rail clamps or other equivalent devices. Parking brakes may be considered minimum compliance with this rule.

(e) Rail clamps should only be applied when the crane is not in motion.

(f) When rails are used for anchorages, they shall be secured to withstand the resultant forces applied by the rail clamps. If the clamps act on the rail, any projection or obstruction in the clamping area shall be avoided.

(g) A wind-indicating device shall be provided for all outdoor cranes. The device shall be mounted on the crane or the crane runway structure and shall give a visible and audible alarm to the crane operator at a predetermined wind velocity. A single wind-indicating device may serve as an alarm for more than one crane.

17-1.3.2 Crane Runways

(a) Construction of Runways and Rails

(1) The crane runways and supporting structures shall be designed to withstand the loads and forces imposed by the crane.

(2) Runway columns shall be securely anchored to foundations.

(3) The structure shall be free from detrimental vibration under normal operating conditions.

(4) Rails shall be level, straight, joined, and spaced to crane span within recommended tolerances as specified in CMAA Specification No. 74, or within tolerances specified by the crane manufacturer or a qualified person compatible with the design of the crane.

(5) Where curves are required, special design will be necessary.

(6) Where grades are required, special design will be necessary.

(b) Runway Stops **(03)**

(1) Stops shall be provided at limits of travel of the bridge.

(2) Stops shall engage the bumper or bumper pads mounted on a power-driven bridge. On a hand-operated bridge, the stops should engage parts of the crane other than the wheel. If a stop engages the tread of the wheel, its height shall be not less than the radius of the wheel.

(3) Stops for a power driven bridge shall be designed to withstand the forces applied to the bumpers, as specified in para. 17-1.8.2(b).

(4) Stops for a hand-operated bridge shall be designed to withstand the forces applied to them.

SECTION 17-1.4: CRANE CONSTRUCTION

17-1.4.1 Welded Construction

All welding procedures and welding operating qualifications to be used on load-sustaining members shall be in accordance with ANSI/AWS D1.1, except as modified by ANSI/AWS D14.1. Where special steels or other materials are used, the manufacturer or qualified person shall provide welding procedures.

17-1.4.2 Girders

All cranes built after the issuance of this volume should conform to the minimum design parameters as specified in CMAA Specification No. 74.

17-1.4.3 Modifications

Cranes may be modified or rerated, provided such modifications and the supporting structure are analyzed thoroughly and approved by a qualified person or manufacturer of cranes. A rerated crane or one whose load-supporting components have been modified shall be tested in accordance with para. 17-2.2.2. The new rated load shall be displayed in accordance with paras. 17-1.1.1 and 17-1.1.2.

SECTION 17-1.5: CABS: NORMAL OR SKELETON (IF PROVIDED)

17-1.5.1 Cab Location

(a) The general arrangement of the cab and the location of the control and protective equipment should be such that all operating and control devices are within convenient reach of the operator when facing the area to be served by the load block or when facing the direction of travel of the cab.

(b) The arrangement of the cab should allow the operator a full view of the load block in all positions. This

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is an important and desirable condition, but it is recognized that there are physical arrangements that may make this impossible. When the load block is in these positions, the operator shall be aided by other means, such as, but not limited to, closed circuit television, mirrors, radio, telephone, or signalperson.

(c) The cab shall be clear of all fixed structures within its area of possible movement.

(d) The clearance of the cab above the working floor or passageway should be not less than 7 ft (2.1 m), except when the operations require dimensions that are less. In this case, precautions shall be taken during the operation of the crane to keep personnel and other obstructions clear of the low overhead.

17-1.5.2 Cab Construction

(a) The cab shall be constructed and attached to the crane to minimize swaying or vibration.

(b) If an integral outside platform is provided, the door (if provided) shall be a sliding type or shall open outward.

(c) In the absence of an outside platform, the door (if provided) shall open inward or slide and shall be self-closing. It shall be equipped with a positive latching device to prevent inadvertent opening.

(d) The width of a doorway shall have a clear opening of not less than 18 in. (460 mm).

(e) A trap door (if provided) above the cab or in the cab roof shall have a clear opening of not less than 24 in. (610 mm) on each side. There should be no obstructions to prevent complete opening of the trap door.

(f) Guard railings and toeboards shall be in compliance with ANSI A1264.1.

(g) Outdoor cabs should be enclosed. All cab glazing shall be safety glazing material as defined in ANSI/SAE Z26.1.

(h) The cab construction shall offer protection from falling objects, if this possibility exists. The protection shall support 50 lb/ft^2 (2400 Pa) static load.

(i) If the cab of a molten material crane is exposed to heat, it shall be provided with the following, or equivalent, protection

(1) cab enclosed as for outdoor operation

(2) windows with metal sash and heat-resisting safety glazing material, as defined in ANSI/SAE Z26.1

(3) floor insulated with heat-resistant material

(4) a shield of metal at least $\frac{1}{8}$ in. (3 mm) thick located at least 6 in. (152 mm) below bottom of cab floor

(5) materials that will not propagate combustion or rekindle

17-1.5.3 Access to Cab

Access to the cab or bridge service platform shall be by a fixed ladder, stairs, or platform. The ladder shall be in conformance with ANSI A14.3, except as modified to meet the requirements of this volume.

17-1.5.4 Toolbox

If a receptacle is provided for the stowing of tools and oil cans, it shall be made of a noncombustible material and shall be fastened in the cab or on the service platform.

17-1.5.5 Fire Extinguisher

A portable fire extinguisher, with a basic minimum extinguisher rating of 10 BC, shall be installed in the cab.

17-1.5.6 Lighting

Cab lighting, either natural or artificial, shall provide a level of illumination that enables the operator to observe the operating controls.

SECTION 17-1.6: LUBRICATION

Lubricating points should be accessible.

SECTION 17-1.7: SERVICE PLATFORMS (FOOTWALKS)

17-1.7.1 Construction of Service Platforms

Service platforms, when provided with or added to the crane, and attached to the crane, shall conform to the following requirements.

(a) The dimension of the working space in the vertical direction from the floor surface of the platform to the nearest overhead obstruction shall be a minimum of 48 in. (1 220 mm) at the location where a person is performing a function while on the platform.

(b) Service platforms shall have a clear passageway at least 18 in. (457 mm) wide except at the bridge drive mechanism where not less than 15 in. (380 mm) of clear passageway shall be allowed.

(c) The dimension of the working space in the direction of access to live (energized) electrical parts that are likely to require examination, adjustment, servicing, or maintenance while energized shall be a minimum of 30 in. (762 mm).

(d) The door(s) of electrical control cabinets shall either open at least 90 deg or be removable.

(e) Service platforms shall have a slip-resistant walking surface.

(f) Service platforms shall be provided with guard railings and toeboards.

(1) Toeboards and guard railings shall be provided in accordance with ANSI A1264.1, except as modified to meet the requirements of this volume.

(2) Guard railings shall be at least 42 in. (1 065 mm) high and shall be provided with an intermediate railing.

17-1.7.2 Ladders and Stairways

(a) Gantry cranes shall be provided with ladders or stairways extending from the runway elevation to the service platform or cab platform.

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(b) Stairways shall be equipped with metal handrails and should be at an angle of not more than 50 deg with the horizontal. Walking surfaces shall be of a slip-resistant type.

(c) Ladders shall be fastened in place and shall be in compliance with ANSI A14.3, except as modified to meet the requirements of this volume.

17-1.7.3 Egress

There should be a means of egress from cab-operated cranes to permit departure under emergency conditions. The means of egress should depend on the facts of the situation.

SECTION 17-1.8: STOPS AND BUMPERS

17-1.8.1 Trolley Stops

(a) Stops shall be provided at the limits of travel of the trolley.

(b) Stops shall engage the bumpers or bumper pads mounted on the trolley, as specified in para. 17-1.8.3.

(c) Stops shall be designed to withstand the forces applied by the bumpers, as specified in para. 17-1.8.3.

17-1.8.2 Bridge Bumpers

(a) A power-operated bridge shall be provided with bumpers or other automatic means providing equivalent effect.

(b) Bridge bumpers shall have the following minimum characteristics:

(1) energy absorbing (or dissipating) capacity to stop the bridge when traveling with power off at a speed of at least 40% of rated speed

(2) the capability of stopping the bridge (but not including load block and lifted load unless they are guided vertically) at a rate of deceleration not to exceed an average of 3 ft/sec^2 (0.9 m/s^2) when traveling with power off in either direction at 20% of rated speed

(3) a design and installation with a means of retaining the bumper in case of broken or loosened mounting connections

(c) Multiple power-operated bridges operating on the same runway shall have contact bumpers which meet the requirements of para. 17-1.8.2(b)(2).

17-1.8.3 Trolley Bumpers

(a) A power-operated trolley shall be provided with bumpers or other automatic means providing equivalent effect.

(b) Trolley bumpers shall have the following minimum characteristics:

(1) energy absorbing (or dissipating) capacity to stop the trolley when traveling with power off at a speed of at least 50% of rated load speed

(2) the capability of stopping the trolley (not including load block and lifted load unless they are guided vertically) at a rate of deceleration not to exceed an average of 4.7 ft/sec^2 (1.4 m/s^2) when traveling with power off at one-third of rated load speed

(3) a design and installation with a means of retaining the bumper in case of broken or loosened mounting connections

(c) Multiple power-operated trolleys operating on the same bridge shall have contact bumpers that meet the requirements of para. 17-1.8.3(b)(2).

SECTION 17-1.9: BRIDGE RAIL SWEEPS

(a) Bridge truck rail sweeps shall be provided in front of the leading wheels on both ends of the bridge end truck.

(b) The rail sweep shall clear the rail of objects on the runway that, if they came into contact between the wheel and rail, could cause damage to the wheel or derail the wheel.

(1) Clearance between the top surface of the rail head and the bottom of the sweep should not exceed $^3/_{16}$ in. (5 mm).

(2) On overhead crane end trucks, the sweep shall extend below the top surface of the rail head, for a distance not less than 50% of the thickness of the rail head, on both sides of the rail head.

(3) On gantry crane end trucks, when the rail head is located above the pavement or ground level, the sweep shall extend below the top surface of the rail head, for not less than 50% of the thickness of the rail head, on both sides of the rail head.

(4) Clearance between the vertical inside surfaces of the sweep should be equal to the wheel tread width plus $^3/_8$ in. (10 mm), and clearance should be evenly spaced on each side of the wheel tread width.

SECTION 17-1.10: GUARDS FOR MOVING PARTS

(a) Exposed moving parts, such as gears, set screws, projecting keys, chains, and chain sprockets, which constitute a hazard under normal operating conditions, shall be guarded.

(b) Each guard shall be capable of supporting, without deformation, the weight of a 200-lb (90-kg) person unless the guard is located where it is not probable that a person will step on it.

SECTION 17-1.11: WHEEL AND TRUCK FRAMES

Means shall be provided to limit the drop of bridge truck frames to 1 in. (25.4 mm) in case of wheel, axle, or bearing breakage.

SECTION 17-1.12: BRAKES AND BRAKING MEANS

17-1.12.1 Hoist Brakes

Hoisting brakes shall meet the requirements of ASME B30.16.

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17-1.12.2 Trolley Brakes and Braking Means

(a) Each power-driven trolley unit of the crane shall be equipped with either a braking means or have trolley drive frictional characteristics that will provide stopping and holding functions, under conditions where the rails are dry and free of snow and ice, as follows:

(1) Have torque capability to stop trolley travel within a distance in feet (meters) equal to 10% of rated load speed in ft/min (m/min) when traveling with rated load.

(2) Have torque capability to impede horizontal motion of the trolley against a horizontal force equal to 1% of the combined weight of the trolley, hoist, and rated load when the trolley is in a parked condition.

(b) A power-drive cab-operated crane with the cab on the trolley shall be equipped with a trolley brake that will provide the stopping and holding functions described in paras. 17-1.12.2(a)(1) and (2).

(c) Each trolley brake shall have thermal capacity for the frequency of operation required by the service.

17-1.12.3 Bridge Brakes and Braking Means

(a) A power-driven bridge shall be equipped with either a braking means or have bridge drive frictional characteristics that will provide stopping and holding functions, under conditions where the rails are dry and free of snow and ice, as follows:

(1) Have torque capability to stop bridge travel within a distance in feet (meters) equal to 10% of rated load speed in ft/min (m/min) when traveling with rated load.

(2) Have torque capability to impede horizontal motion of the bridge against a horizontal force equal to 1% of the combined weight of the bridge, trolley, hoist, and rated load when the bridge is in a parked condition.

(b) A power-driven cab-operated crane shall be equipped with a bridge brake that will provide the stopping and holding functions described in paras. 17-1.12.3(a)(1) and (2).

(c) Each bridge brake shall have thermal capacity for the frequency of operation required by the service.

17-1.12.4 Trolley and Bridge Brake Provisions

General provisions as outlined below apply, as applicable, to trolley and bridge brakes.

(a) Brakes may be applied by mechanical, electrical, pneumatic, hydraulic, or gravity means.

(b) Brakes shall be provided with means of adjustment to compensate for lining wear.

(c) Brake pedals, latches, and levers should allow release without the exertion of greater force than was used in applying the brake.

(d) Foot-operated brakes shall require an applied force of not more than 70 lb (310 N) to develop rated brake torque.

(e) Foot-operated brake pedals shall be so constructed that the operator's foot will not readily slip off the pedal.

(f) Foot-operated brake pedals should be so located that they are convenient to the operator at the controls.

(g) Foot-operated brakes shall be equipped with a means for positive release when force is released from the pedal.

(h) If a parking brake is provided, it shall be applied either automatically or manually, and it shall impede horizontal motion of the trolley or bridge in accordance with the requirements of para. 17-1.12.2(a)(2) or 17-1.12.3(a)(2). The use of a parking brake shall not prohibit the use of a drift point in the control circuit.

(i) If a service brake is provided it shall be applied manually by the operator of a cab-operated crane during normal operation, and it shall stop trolley or bridge travel in accordance with the requirements of para. 17-1.12.2(a)(1) or 17-1.12.3(a)(1).

(j) If a drag brake is provided, it shall provide a continuous retarding torque without external control.

(k) If an emergency brake is provided, it shall be applied when initiated by the operator or automatically upon loss of power, shall stop trolley or bridge travel in accordance with the requirements of para. 17-1.12.2(a)(1) or 17-1.12.3(a)(1), and shall impede horizontal motion of the trolley or bridge in accordance with the requirements of para. 17-1.12.2(a)(2) or 17-1.12.3(a)(2).

SECTION 17-1.13: ELECTRICAL EQUIPMENT

17-1.13.1 General

(a) Wiring and equipment shall comply with Article 610 of ANSI/NFPA 70.

(b) The control circuit voltage shall not exceed 600 V for AC or DC.

(c) The control circuit voltage in pendant push buttons shall not exceed 150 V for AC or 300 V for DC.

(d) Where multiple-conductor cable is used with a suspended push button station, the station shall be supported so that electrical conductors are protected from strain.

(e) Pendant control stations shall be constructed to prevent electrical shock. The push button enclosure shall be at ground potential and marked for identification of functions.

(f) When cranes are used in hazardous locations as defined by ANSI/NFPA 70, modifications to these rules or additional safety requirements may be necessary. In these locations, cranes shall be designed and installed in a manner suitable for the conditions encountered.

17-1.13.2 Equipment

(a) Electrical equipment shall be located or enclosed so that under normal operating conditions, energized parts will not be exposed to inadvertent contact.

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(b) Energized parts of electrical equipment shall be protected from direct exposure to grease, oil, and moisture, and they should be protected from dirt.

(c) Guards for live parts, if provided, shall be so constructed or located that they cannot be inadvertently deformed so as to make contact with live parts.

17-1.13.3 Controllers

(a) Cranes not equipped with spring-return controllers, spring-return master switches, or momentary contact push buttons shall be provided with a device that will disconnect all motors from the line if a power failure occurs. This disconnect device shall not permit any motor to be restarted until the controller or master switch handle is brought to the OFF position, or a reset switch or power on button is operated.

(b) For cab-operated cranes, lever-operated manual controllers and master switches shall be provided with a spring-return arrangement, off-point detent, or off-point latch.

(c) For cab-operated cranes, the manual controller or master switch operating handle shall be located within reach of the operator.

(d) For cab-operated cranes, the movement and arrangement of controllers or master switches should conform to Figs. 6 and 7.

(e) For floor-operated cranes, the controller or controllers, if rope operated, shall automatically return to the OFF position when released by the operator.

(f) Push buttons in pendant stations shall return to the OFF position when pressure is released by the crane operator.

(g) Automatic cranes shall be so designed that operation of all motions shall be discontinued if the automatic sequence control becomes ineffective. The completion of the last command is permissible if power is available.

(h) Remote-operated cranes shall function so that if the control signal for any crane motion becomes ineffective, that crane motion shall stop; conversely, signals received from any source other than the operating station (transmitter) shall not result in operation of any motion of the crane.

(i) The arrangement of pendant push button stations and radio-controlled transmitters should conform to Figs. 8 and 9, respectively. Compass directions may be substituted for "right-left" and "forward-reverse" in Fig. 8, and for the W, X, Y, and Z designations in Fig. 9.

17-1.13.4 Resistors (When Provided)

(a) Resistor units shall be supported to minimize vibration effect.

(b) Provision shall be made to prevent broken parts or molten metal from falling upon the operator or from the crane.

(c) If resistor enclosures are provided, the enclosures shall be installed so that accumulation of combustible matter is minimized.

17-1.13.5 Switches

(a) The power supply to the runway conductors shall be controlled by a switch or circuit breaker located on a fixed structure, accessible from the floor, and arranged to be locked in the open position.

(b) On cab-operated cranes, a switch or circuit breaker of the enclosed type with provision for locking in the open position shall be provided in the leads from the runway conductors. A means of opening this device shall be located within the reach of the operator when the operator is in the operating position. When the operator opens this switch or circuit breaker, the holding brake(s) should set.

(c) On floor-, remote-, or pulpit-operated cranes, a device of the enclosed type shall be provided in the leads from the runway conductors. This device shall be mounted on the bridge or footwalk near the runway collectors. There shall be provisions for locking the device in the open position unless the crane is the only load on a lockable switch or circuit breaker that is accessible from the floor. One of the following types of floor-, remote-, and pulpit-operated disconnects shall be provided:

(1) nonconductive rope attached to the main disconnect device on a floor-operated crane. If this is selected, the rope shall be suspended adjacent to the operating ropes if manual controllers are used, or near the pendant push button station if magnetic controls are used.

(2) an under voltage trip for a main circuit breaker, operated by an emergency stop button in the pendant push button station or the pulpit.

(3) a main line contactor operated by a switch or push button on the pendant push button station, the remote control station, or the pulpit.

(d) On power-driven hoists, an overtravel limit device shall be provided in the lifting direction to stop hoist motion.

(e) Hoist overtravel protection shall be in accordance with the provisions of ASME B30.16.

17-1.13.6 Runway Conductors

Conductors of the open type, mounted on the crane runway beams or overhead, shall be so located or guarded that persons cannot inadvertently come into contact with the energized conductors under normal operating conditions or under maintenance procedures as stated in para. 17-2.3.2.

17-1.13.7 Lifting Magnets

(a) A crane for use with a lifting magnet shall have a separate magnet circuit switch of the enclosed type

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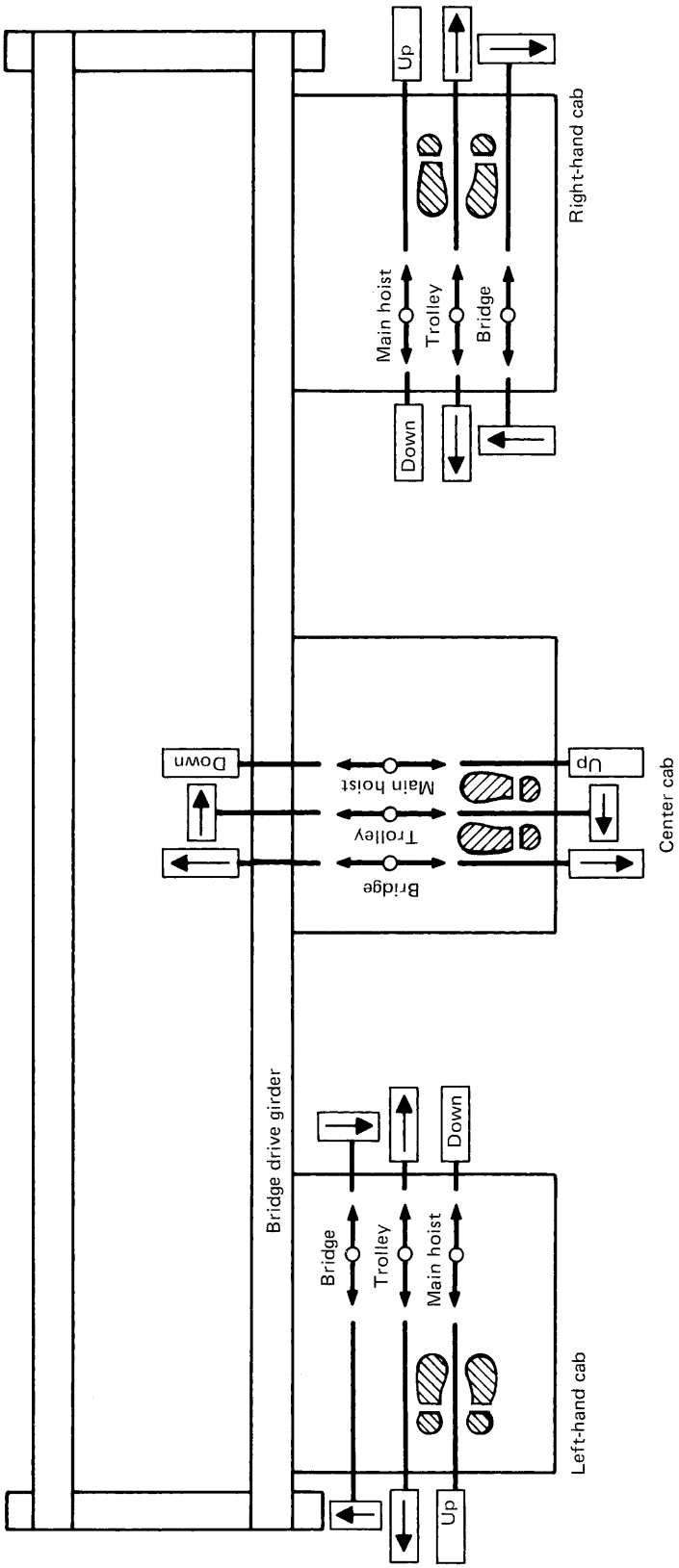


Fig. 6 Recommended Arrangement of Controllers or Master Switches (3-Motor Crane)

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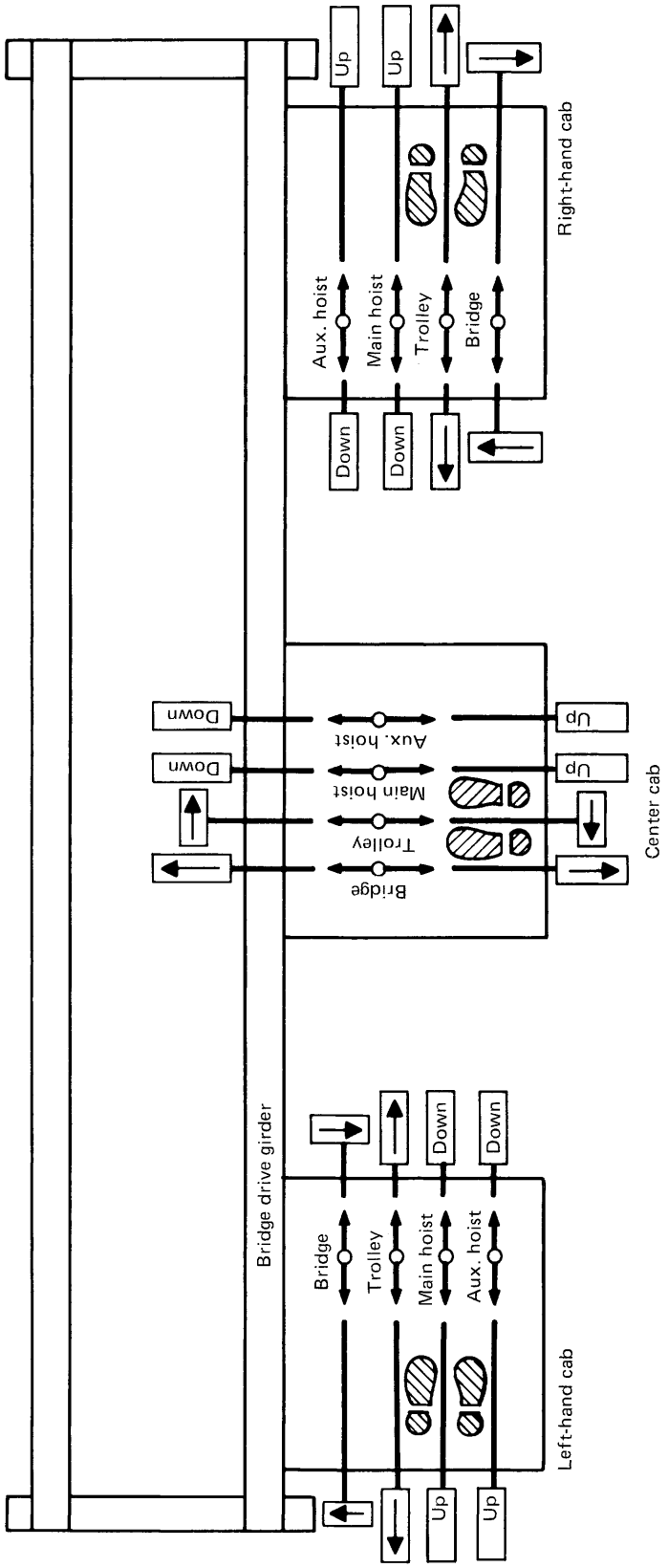
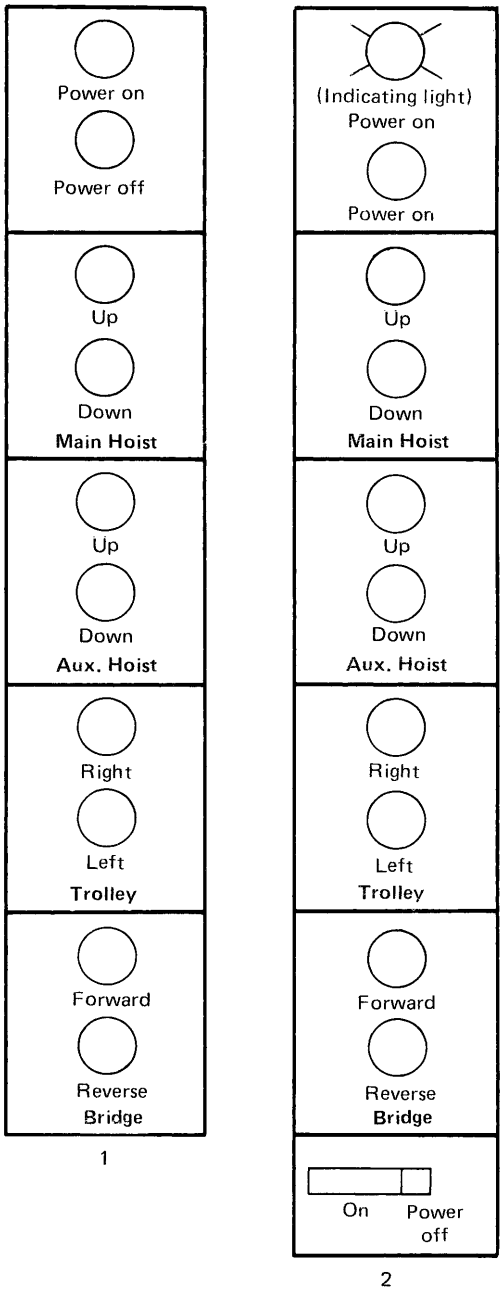


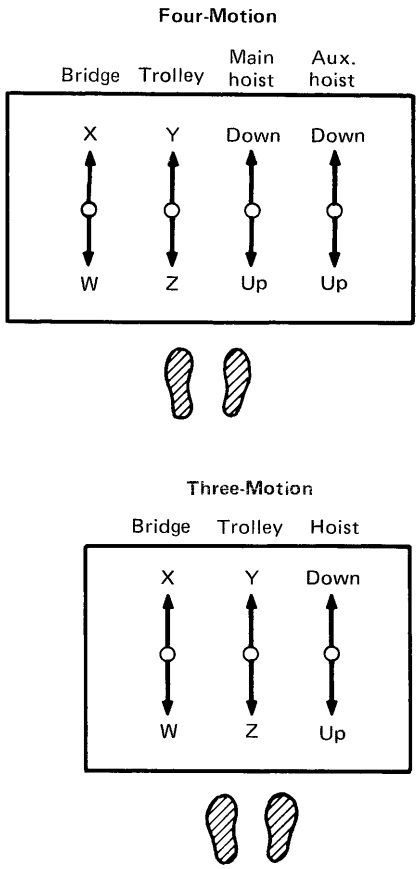
Fig. 7 Recommended Arrangement of Controllers or Master Switches (4-Motor Crane)

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GENERAL NOTE: In each user location, the relative arrangement of units on crane pendant push button stations should be standardized. In the absence of such standardization, arrangements 1 and 2 above are suggested.

Fig. 8 Recommended Arrangement of Controllers (Pendant Push Button Station Arrangements)



GENERAL NOTES:

(a) Markings on the crane, visible from the floor, shall indicate the direction of bridge and trolley travel corresponding to the W, X, Y, and Z designations on the transmitter.

(b) The letters used are only intended for the purpose of illustration.

(c) Designations should be selected as appropriate to each illustration.

Fig. 9 Recommended Arrangement of Controllers (Radio Crane Control Transmitter Lever Arrangements)

with provision for locking in the open (OFF) position. The magnet disconnect switch shall be connected on the line side (power supply side) of the crane disconnect switch.

(b) Means shall be provided for discharging the inductive load of a lifting magnet.

(c) Indication or signal lights should be provided to indicate that power to a lifting magnet is on or off. These lights, if used, shall be visible to the crane operator and to persons on the floor.

(d) For a remote-operated crane, the loss of the remote signal shall not result in demagnetizing the lifting magnet.

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17-1.13.8 Service Receptacle

If a service receptacle is provided in the cab or on the bridge, it shall be a grounded-type permanent receptacle not exceeding 300 V.

SECTION 17-1.14: HOISTING EQUIPMENT

Electrical and mechanical requirements for the hoist shall be in accordance with the provisions of ASME B30.16.

SECTION 17-1.15: WARNING DEVICES FOR CRANES WITH POWER TRAVELING MECHANISM

17-1.15.1 Cab- and Remote-Operated Cranes

(a) A warning device shall be provided.

(b) Refer to para. 17-3.1.5(o) for operation of the device.

17-1.15.2 Floor-Operated Cranes

(a) A warning device should be provided for installations where the ability of the operator to warn persons in the path of the load is impaired.

(b) Refer to para. 17-3.1.5(o) for operation of the device.

17-1.15.3 Types of Devices

One or more of the following devices shall be provided when required:

(a) manually operated gong

(b) power-operated audible signal

(c) rotating beacon

(d) strobe light

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Chapter 17-2
Inspection, Testing, and Maintenance

SECTION 17-2.1: INSPECTION

17-2.1.1 Inspection Classification

(a) Initial Inspection. New, reinstalled, altered, repaired, and modified cranes shall be inspected prior to initial use to verify compliance with applicable provisions of this volume. Inspection of altered, repaired, and modified cranes may be limited to the provisions affected by the alteration, repair, or modification, as determined by a qualified person.

(b) Inspection Intervals. Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are designated as *frequent* and *periodic*, with respective intervals between inspections as defined below.

(1) Frequent Inspection. Visual examinations conducted by the operator or other designated personnel with records not required, as follows:

(a) normal service — monthly

(b) heavy service — weekly to monthly

(c) severe service — daily to weekly

(2) Periodic Inspection. Visual inspections of the equipment in place conducted by a designated person making records of apparent external conditions to provide the basis for a continuing evaluation as follows:

(a) normal service — yearly

(b) heavy service — yearly

(c) severe service — quarterly

17-2.1.2 Frequent Inspection

(a) Frequent inspection shall include observations during operations.

(b) A designated person shall determine whether conditions found during the inspection constitute a hazard and a more detailed inspection is required.

(c) The following items shall be inspected:

(1) operating mechanisms for proper operation, proper adjustment, and unusual sounds

(2) upper limit device(s) in accordance with ASME B30.16

(3) tanks, valves, pumps, lines, and other parts of air or hydraulic systems for leakage

(4) hooks and hook latches (if used) in accordance with ASME B30.10

(5) hoists in accordance with ASME B30.16

17-2.1.3 Periodic Inspection

(a) A designated person shall determine whether conditions found during inspection constitute a hazard and disassembly is required for additional inspection.

(b) The inspection shall include the items listed in para. 17-2.1.2(c) and the following items, as applicable:

(1) deformed, cracked, or corroded members.

(2) loose or missing bolts, nuts, pins, or rivets.

(3) cracked or worn sheaves and drums.

(4) worn, cracked, or distorted parts such as pins, bearings, wheels, shafts, gears, rollers, locking and clamping devices, bumpers, and stops.

(5) excessive wear of brake system parts.

(6) excessive wear of drive chain sprockets and excessive drive chain stretch.

(7) deterioration of controllers, master switches, contacts, limit switches, and push button stations, but not limited to these items.

(8) wind indicators for proper operation.

(9) gasoline, diesel, electric, or other power plants for proper operation.

(10) motion limit devices that interrupt power or cause a warning to be activated for proper performance. Each motion shall be inched or operated at low speed into the device with no load on the crane.

(11) controller function labels for legibility and replacement.

(12) hoists in accordance with ASME B30.16.

17-2.1.4 Cranes Not in Regular Service

(a) A crane that is used in infrequent service, which has been idle for a period of one month or more, but less than one year, shall be inspected before being placed in service in accordance with the requirements listed in para. 17-2.1.2.

(b) A crane that is used in infrequent service, which has been idle for one year or more, shall be inspected before being placed in service in accordance with the requirements listed in para. 17-2.1.3.

17-2.1.5 Inspection Records

Dated inspection reports or comparable records shall be made on critical items such as hoisting machinery,

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sheaves, hooks, chains, ropes, and other lifting devices as listed in para. 17-2.1.3 and ASME B30.16. Records shall be placed on file.

SECTION 17-2.2: TESTING

17-2.2.1 Operational Tests

(a) New, reinstalled, altered, repaired, and modified cranes shall be tested by a designated person prior to initial use to verify compliance with this volume.

(b) Tests shall include, as applicable, the following functions:

(1) lifting and lowering

(2) trolley travel

(3) bridge travel

(4) limit devices (the trip setting of hoist limit devices shall be determined by tests with an empty hook comprising a series of runs, each at increasing hook speed up to a maximum speed unless the hoist has only a single speed; the actuating mechanism of the upper limit device shall be located or adjusted so that it will trip the device in sufficient time to prevent contact of the load block or load with any part of the trolley or bridge)

(5) travel limiting devices

(6) locking and indicating devices, if provided

(c) Operational testing of altered, repaired, and modified cranes may be limited to the functions affected by the alteration, repair, or modification, as determined by a qualified person.

17-2.2.2 Load Test

(a) New, reinstalled, altered, repaired, and modified cranes should be load tested by a designated person prior to initial use as determined by a qualified person. A qualified person shall determine if a load test is required.

(b) Load testing of altered, repaired, and modified cranes may be limited to the functions affected by the alteration, repair, or modification, as determined by a qualified person.

(c) If a load test is conducted, the load shall be not less than 100% of the rated load of the crane or more than 125% of the rated load of the crane, unless otherwise recommended by the manufacturer or a qualified person.

(d) If a load test is conducted, the person conducting the load test shall prepare a written report of the load sustained during the test and the operations performed during the test. Reports shall be placed on file.

(e) If a load test is performed, operations shall be performed as outlined below or as modified by a qualified person.

(1) Hoist the test load a distance to assure that the load is supported by the crane and held by the hoist brake(s). (Hoists shall be tested under the provisions of ASME B30.16.)

(2) Transport the test load by means of the trolley for the full length of the bridge.

(3) Transport the test load by means of the bridge for the full length of the runway in one direction with the trolley as close to the extreme right-hand end of the crane as practical, and in the other direction with the trolley as close to the left-hand end of the crane as practical.

(4) Lower the test load, and stop and hold the test load with the brake(s).

Section 17-2.3: MAINTENANCE

17-2.3.1 Preventive Maintenance

(a) A preventive maintenance program should be established. The program should be based on the recommendations outlined in the crane manufacturer's manual and the hoist manufacturer's manual. If a qualified person determines it is appropriate, the program should also include that individual's additional recommendations based upon a review of the crane hoist application and operation. Dated records should be placed on file. (03)

(b) Replacement parts shall be at least equal to the original manufacturer's specification.

17-2.3.2 Maintenance Procedure

(a) The following precautions shall be taken before performing maintenance on a crane:

(1) The crane shall be moved to a location where it will cause the least interference with other cranes and operations in the area.

(2) If a load is attached to the crane, it shall be landed.

(3) All controllers shall be placed in the OFF position.

(4) A lockout/tagout procedure shall be performed (see para. 17-3.5.1).

(5) Warning signs and barriers shall be used on the floor beneath the crane where overhead maintenance work creates a hazard.

(6) If the runway remains energized, stops or a signalperson(s), located full time at a visual vantage point for observing the approach of an active crane(s), shall be provided to prohibit contact by the active crane(s) with the idle crane, with persons performing maintenance, and with equipment used in performing maintenance.

(7) A guard or barrier shall be installed between adjacent runways for the length of the established work area to prevent contact between persons performing maintenance and a crane on the adjacent runway.

(8) Crane travel shall be prohibited or restricted while a person is on a service platform and the overhead clearance is less than 78 in. (1 980 mm) at any location in the path of the crane.

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(b) The following precautions shall be taken before performing maintenance on a crane runway, the runway support structure, the runway conductor system, or the areas of the building in the path of travel of the crane bridge or trolley:

(1) A lockout/tagout procedure shall be performed (see para. 17-3.5.1).

(2) Warning signs and barriers shall be used on the floor beneath the crane where overhead maintenance work creates a hazard.

(3) If the runway remains energized, stops or a signalperson(s), located full time at a visual vantage point for observing the approach of an active crane(s), shall be provided to prohibit contact by the active crane(s) with persons performing maintenance and with equipment used in performing maintenance.

(4) A guard or barrier shall be installed between adjacent runways for the length of the established work area to prevent contact between persons performing maintenance and a crane on the adjacent runway.

(c) Only trained and designated persons shall work on energized equipment.

(d) After maintenance work is completed and before restoring the crane to normal operation

(1) guards shall be reinstalled

(2) safety devices shall be reactivated

(3) replaced parts and loose material shall be removed

(4) maintenance equipment shall be removed

17-2.3.3 Adjustments, Repairs, and Replacements

(a) Any condition disclosed by the inspections performed in accordance with the requirements of Section 17-2.1 that is determined to be a hazard to continued operation shall be corrected by adjustment, repair, or replacement before continuing to use the crane.

(b) Adjustments, repairs, and replacements shall be performed by designated personnel.

(c) Components shall be adjusted or repaired as needed. The following are examples:

(1) all operating mechanisms

(2) limit switches

(3) control systems

(4) brakes

(d) Repairs or replacements shall be made as needed. The following are examples.

(1) Damaged or worn hooks as described under Maintenance in ASME B30.10. Repairs by welding or reshaping are not recommended.

(2) All critical parts that are cracked, broken, bent, excessively worn, or missing.

(3) Pitted or burned electrical contacts should be corrected by replacement and in sets. Controller parts should be lubricated as recommended in the manual supplied with the crane.

(4) Controller function labels on pendant control stations or master switches shall be kept legible.

(e) If repairs of load-sustaining members are made by welding, identification of materials shall be made and appropriate welding procedures shall be followed.

17-2.3.4 Lubrication

(a) All moving parts of the crane for which lubrication is specified should be regularly lubricated. Lubricating systems should be checked for delivery of lubricant. Care should be taken to follow the manufacturer's recommendations as to points and frequency of lubrication, maintenance of lubricant levels, and types of lubricant used.

(b) Machinery shall be stationary while lubricants are being applied, and protection shall be provided as called for in paras. 17-2.3.2(a)(1) through (4), unless machinery is equipped with automatic or remote lubrication.

Section 17-2.4: CHAIN AND ROPE INSPECTION, REPLACEMENT, AND MAINTENANCE

Chains and ropes shall be inspected, replaced, and maintained according to ASME B30.16.

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CHAPTER 17-3
Operation

SECTION 17-3.1: QUALIFICATIONS FOR AND CONDUCT OF OPERATORS

17-3.1.1 Operators of Cranes

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

(1) designated persons

(2) trainees under the direct supervision of a designated person

(3) maintenance and test personnel, when it is necessary in the performance of their duties

(4) inspectors (crane)

(b) No one other than personnel specified in (a) shall enter a crane cab or pulpit, with the exception of persons such as oilers and supervisors, whose duties require them to do so, and then only in the performance of their duties and with the knowledge of the operator or other appointed person.

17-3.1.2 Qualifications for Operators of Cab-Operated and Pulpit-Operated Cranes

(a) Operators shall be required by the employer to pass a written or oral examination and a practical operating examination unless they are able to furnish satisfactory evidence of qualifications and experience. Qualification shall be limited to the specific type of equipment for which the operator is examined.

(b) Operators and operator trainees should have normal depth perception, field of vision, reaction time, manual dexterity, coordination, no tendencies to dizziness or similar undesirable characteristics, and shall meet the following physical qualifications:

(1) vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses

(2) ability to distinguish colors regardless of position of colors, if color differentiation is required for the operation

(3) adequate hearing, with or without a hearing aid, for a specific operation

(4) sufficient strength, endurance, agility, coordination, and speed of reaction to meet the demands of equipment operation

(c) Evidence of physical defects or emotional instability that could render the operator a hazard to the operator or others, or that in the opinion of the examiner could interfere with the operator's safe performance may be cause for disqualification. In such cases, specialized clinical or medical judgments and tests may be required.

(d) Evidence that an operator is subject to seizures or loss of physical control shall be reason for disqualification. Specialized medical tests may be required to determine these conditions.

17-3.1.3 Qualifications for Operators of Floor-Operated Cranes

Personnel shall be required by the employer to pass a practical operating examination. Qualification shall be limited to the specific type of equipment for which the operator is examined.

17-3.1.4 Qualifications for Operators of Remote-Operated Cranes

The use of remote control equipment involves such a wide variety of service requirements and conditions that each installation should be carefully analyzed and operation reviewed at least monthly for the first 6 months of operation to determine whether para. 17-3.1.2 or para. 17-3.1.3 should apply.

17-3.1.5 Conduct of Operators

(a) The operator shall not engage in any practice that will divert the operator's attention while actually engaged in operating the crane.

(b) When physically or otherwise unfit, an operator shall not engage in the operation of the equipment.

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

(d) Each operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall consult with the supervisor before handling the loads.

(e) Before leaving the cab-operated crane unattended, the operator shall land any attached load, place controllers or master switches in the OFF position, and open the main line device of the specific crane.

(f) The operator shall not close the main disconnect device until certain that no worker is on or adjacent to the crane. If there is a warning sign or lock on the device, it shall not be energized until the sign or lock is removed by either the person who placed it thereon or by an authorized person.

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(g) Before closing the main line disconnect of a cab-operated crane, the operator shall see to it that all controllers are in the OFF position.

(h) If power goes off during operation of a cab-operated crane, the operator shall immediately place all controllers or master switches in the OFF position. Prior to reuse of the crane, operating motions shall be checked for proper direction.

(i) The operator shall be familiar with the equipment and its proper care. If adjustments or repairs are necessary, the operator shall report the same promptly to the appointed person who shall be responsible for the operation and maintenance repairs of the crane. The operator shall also notify the next operator of any remaining uncorrected defects upon changing shifts.

(j) Contacts with runway stops or other cranes shall be made with caution. The operator shall do so with care for the safety of persons on or below the cranes, and only after making certain that any persons on the other cranes are aware of what is being done.

(k) When the wind-indication device of an outdoor crane gives the alarm, crane operation shall be discontinued, and the crane shall be prepared and stored for excess wind conditions.

(l) Before the operator performs any maintenance work on the crane, the operator shall lock and tag the main switch (crane disconnect) (see para. 17-2.3.2) in the deenergized position. If the crane is equipped with a lifting magnet and the magnet is not deenergized when the main switch (crane disconnect) is in the deenergized position, the operator shall also lock and tag the magnet disconnect switch in the deenergized position.

(m) All controls of a cab-operated crane shall be tested by the operator before beginning a new shift. If any controls do not operate properly, they shall be adjusted or repaired before operations are begun.

(n) Persons boarding or leaving the cab of an overhead crane should do so only at authorized locations and designated boarding entrances.

(o) The operator shall activate the warning device on cab- and remote-operated cranes, and when provided, on floor-operated cranes

(1) before starting the bridge or trolley motion of the crane

(2) intermittently during travel of the crane when approaching persons in the path of the load

SECTION 17-3.2: HANDLING THE LOAD

17-3.2.1 Load Weight

(a) The crane shall not be loaded in excess of its rated load except for test purposes as provided in para. 17-2.2.2 or for planned engineered lifts as provided in para. 17-3.2.1.1.

(b) When multiple hoists are used for lifting a load, the combined load applied to more than one hoisting unit shall not exceed the rated load of the crane.

(c) When multiple hoists are used for lifting a load, the center of gravity of the load should be determined and the load positioned so that an individual hoist shall not be loaded in excess of its rated load.

17-3.2.1.1 Planned Engineered Lifts. Lifts in excess of the rated load may be required from time to time on a limited basis for specific purposes such as new construction or major repairs. Every planned engineered lift exceeding the rated load shall be treated as a special and separate event. Limitations and planned requirements shall be applicable as follows:

(a) Planned engineered lifts are only applicable to powered cranes having a load rating of 5 tons and above.

(b) When planned engineered lifts are made, the load shall not exceed 125% of the crane load rating.

(c) Frequency of planned engineered lifts shall be limited to two such lifts during a continuous 12-month period. If such lifts are required on a more frequent basis, the crane shall be rerated in accordance with para. 17-1.4.3 or replaced by a crane having a load rating for the load being handled.

(d) The crane manufacturer or qualified person shall be consulted if the planned engineered lift exceeds 125% of rated load or if the frequency of planned engineered lifts exceeds two during a continuous 12-month period.

(e) Each planned engineered lift shall comply with the following requirements:

(1) A written review of the crane service history shall be prepared, including reference to previous planned engineered lifts, structural repairs, and modifications of original design.

(2) The design of the structural, mechanical, electrical, pneumatic, and hydraulic components of the crane shall be reviewed by applicable calculations for the load to be lifted and approved by the crane manufacturer or a qualified person according to accepted crane design standards.

(3) The design of the crane supporting structure shall be reviewed and approved by a qualified person for conformance to applicable design criteria. The crane support shall be inspected, and any deterioration or damage shall be taken into consideration in design calculations for the load to be lifted.

(4) The crane shall be inspected in accordance with para. 17-2.1.3 just prior to making the lift.

(5) The lift shall be made under controlled conditions under the direction of a designated person in accordance with a previously prepared lift plan. All persons in the area of the crane shall be alerted that the lift is being made.

(6) The operator shall test the crane at the planned engineered load by lifting the load a short distance and setting the brakes. The lift shall only be continued if the brake stops and holds the load. Any failure to hold the load shall be corrected before proceeding with the lift.

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(7) The crane shall be inspected in accordance with para. 17-2.1.3 after the lift is completed and before it is used to lift any other load.

(8) A record of the planned engineered lift, including calculations, inspections, and all distances moved, shall be placed on file for availability to appointed personnel.

(f) The rated load test specified in para. 17-2.2.2 is not applicable to planned engineered lift provisions.

17-3.2.2 Attaching the Load

(a) The hoist chain or hoist rope shall be free from kinks or twists and shall not be wrapped around the load.

(b) The load shall be attached to the load block hook by means of slings or other devices. If slings are used, refer to ASME B30.9. If below-the-hook lifting devices are used, refer to ASME B30.20.

(c) Care shall be taken to make certain that the load, sling, attachments, and load block clear all obstacles.

17-3.2.3 Moving the Load

(a) The appointed person directing the lift shall ascertain that

(1) the load, sling, or lifting device is seated in the bowl of the hook

(2) the load is secured, balanced, and positioned in the hook, sling, or lifting device before the load is lifted more than a few inches (centimeters). If slings are used, refer to ASME B30.9. If below-the-hook lifting devices are used, refer to ASME B30.20

(3) hoist chain or rope is not kinked

(4) multiple part lines are not twisted around each other

(5) the hook is brought over the load in such a manner as to minimize swinging

(6) the rope is seated in the drum grooves and in the sheaves, if there is or has been a slack rope condition

(b) During lifting, care shall be taken that

(1) there is no sudden acceleration or deceleration of the moving load

(2) the load does not contact any obstructions

(c) Cranes shall not be used for side pulls except when specifically authorized by a qualified person who has determined that

(1) the various parts of the crane will not be overstressed

(2) the stability of the crane is not endangered

(3) such side pulls will not cause the hoist rope to be pulled out of the sheaves or across drum grooves

(4) such side pulls will not result in excessive swinging of the load block or load

(d) The operator shall not cause the crane to lift, lower, or travel while anyone is on the load or hook.

(e) The operator should avoid carrying loads over people.

(f) The operator of a floor-operated crane having a lifting magnet should exercise caution due to the hazard of possible falling metal.

(g) The operator shall check the hoist brake(s) at least once each shift if a load approaching the rated load is to be handled. This shall be done by lifting the load a short distance and applying the brake(s).

(h) The load shall not be lowered below the point where two wraps of rope remain on each anchorage of the hoisting drum unless a lower limit device is provided, in which case no less than one wrap shall remain.

(i) When two or more cranes are used to lift a load, one qualified person shall be in charge of the operation. This person shall analyze the operation and instruct other personnel involved in the proper positioning, rigging of the load, and the movements to be made.

(j) The operator shall not leave the position at the controls while the load is suspended over an area accessible to people.

17-3.2.4 Parking the Load

(a) The operator should not leave a suspended load unattended unless specific precautions have been instituted and are in place.

(b) The load block should be lifted above head level for storage when the crane is not in use.

17-3.2.5 Hoist Limit Device (Switches)

The hoist limit device that controls the upper limit of travel of the load block shall not be used as an operating control in normal operation unless additional means are provided to prevent damage from overtravel.

SECTION 17-3.3: SIGNALS

17-3.3.1 Standard Signals

(a) Signals to the operator shall be in accordance with this volume, unless voice communication (telephone, radio, or equivalent) is used.

(b) Signals should be discernible or audible to the operator.

(c) Hand signals shall be posted conspicuously and should be as illustrated in Fig. 10.

17-3.3.2 Special Signals

(a) Special operations may require additions to or modifications of standard signals.

(b) Special signals shall be agreed upon and understood by the signalperson and the operator.

(c) Special signals shall not conflict with standard signals.

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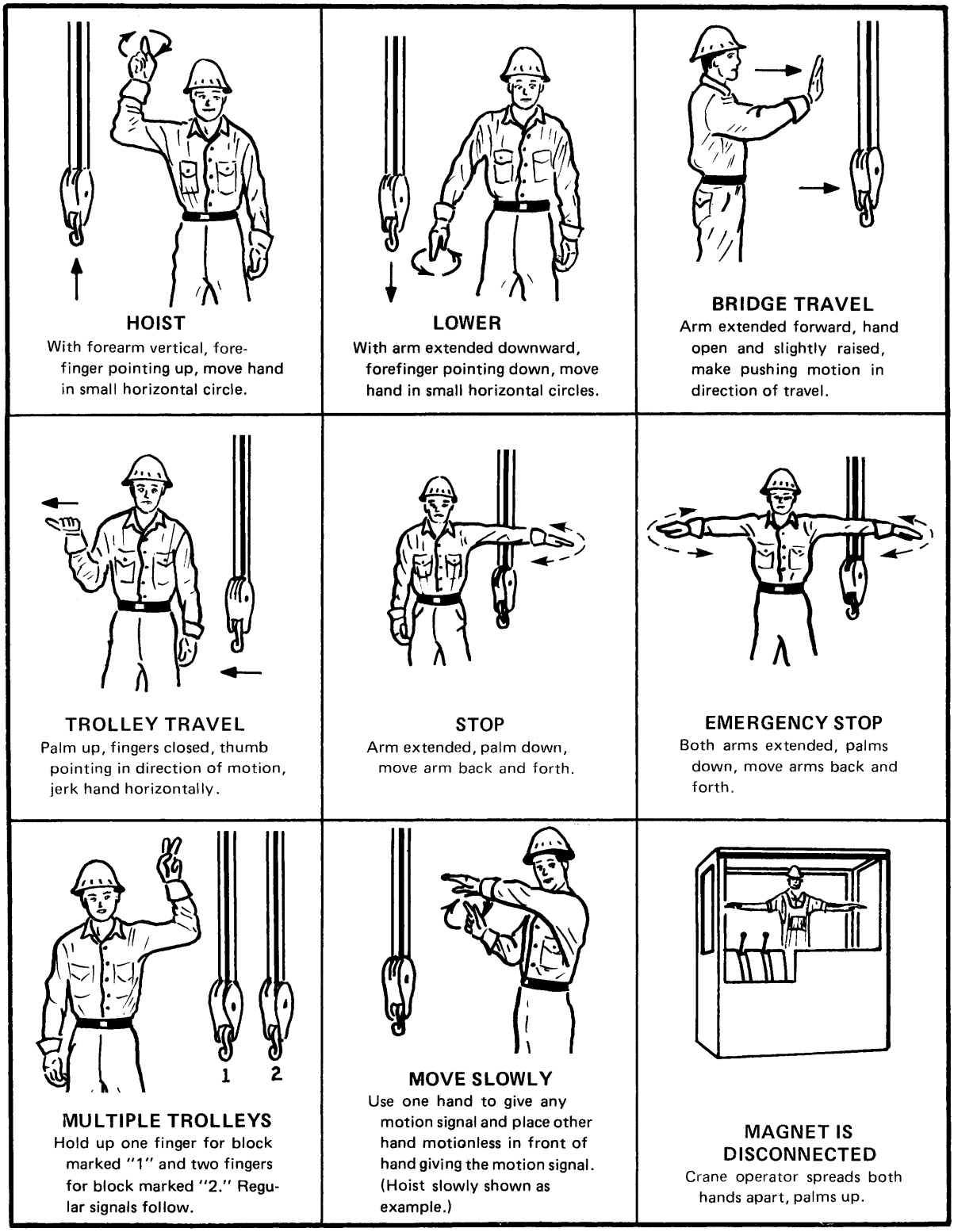


Fig. 10 Standard Hand Signals for Controlling Single-Girder Top Running Cranes

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SECTION 17-3.4: MISCELLANEOUS

17-3.4.1 Ladders

(a) Hands shall be free from encumbrances while personnel are using ladders.

(b) Articles that are too large to be carried in pockets or tool belts shall be lifted and lowered by hand line.

17-3.4.2 Cabs

(a) Necessary clothing and personal belongings shall be stored in a manner that does not interfere with access or operation.

(b) Tools, oil cans, rags, and other necessary articles shall be stored in a fire-resistant container and shall not be permitted to lie loose in or about the cab.

17-3.4.3 Fire Extinguishers

Operators shall be familiar with the location, operation, and care of fire extinguishers provided (see para. 17-1.5.5).

Section 17-3.5: CRANE LOCKOUT/TAGOUT

17-3.5.1 General

(a) A lockout/tagout policy and procedure shall be developed, documented, and implemented by the owner or user of overhead cranes.

(b) The lockout/tagout policy and procedure shall comply with the requirements of ANSI Z244.1.

(c) The policy shall give consideration to the following:

(1) single crane runways

(2) multiple crane runways

(3) cranes on an adjacent runway

(4) runway disconnecting means

(5) crane disconnecting means

(6) work to be done on a crane

(7) work to be done other than on a crane but within the path of a crane where its movement creates a hazard

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ASME B30.17 INTERPRETATIONS

Replies to Technical Inquiries
November 1998 – October 2002

FOREWORD

This publication includes all of the written replies issued between the indicated dates by the Secretary, speaking for the ASME B30 Committee, Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings, to inquiries concerning interpretations of technical aspects of ASME B30.17, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).

These replies are taken verbatim from the original letters, except for a few typographical corrections and some minor editorial corrections made for the purpose of improved clarity. In some few instances, a review of the interpretations reveals a need for corrections of a technical nature: in these cases a corrected interpretation immediately follows the original reply.

These interpretations were prepared in accordance with accredited ASME procedures. ASME procedures provide for reconsideration of these interpretations when or if additional information is available which the inquirer believes might affect the interpretation. Further, persons aggrieved by this interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

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Interpretation: 17-3

Subject: ASME B30.17-1998, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)

Date Issued: January 28, 2002

Question: When utilizing a single monorail with multiple hoists and trolleys, and the load to be lifted is known to be less than or equal to the rated load of the monorail, can the individual or combined rated load of the hoists and trolleys be greater than the rated load of the monorail?

Reply: Yes.

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