ASME B30.8-2004
(Revision of ASME B30.8-1999)

FLOATING CRANES AND FLOATING DERRICKS

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

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FLOATING CRANES AND FLOATING DERRICKS

ASME B30.8-2004

(Revision of ASME B30.8-1999)

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 2007. 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 had its beginning in December 1916 when an eight-page Code of Safety Standards for Cranes, prepared by an ASME Committee on the Protection of Industrial Workers, was presented 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 volumes (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 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.

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.

Suggestions for the improvement of this volume of the Standard are welcome. They should be addressed to The American Society of Mechanical Engineers; Secretary, B30 Main Committee; Three Park Avenue; New York, NY 10016-5990.

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 February 20, 2004.

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

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

B30 SERIES INTRODUCTION

(04)

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.

(04) 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: articulating-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

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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 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 (04)

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

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ASME B30.8-2004
SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.8-2004 was approved by the American National Standards Institute on February 20, 2004.

ASME B30.8-2004 includes editorial changes, revisions, and corrections introduced in ASME B30.8a-2001, as well as the following changes identified by a margin note, **(04)**.

Page	*Location*	*Change*
vii	Introduction: General	Revised
viii	Section I	Revised
ix	Section VI	Revised
1	Section 8-0.1	Revised
1–3	Section 8-0.2	(1) Definition of *anchorage* and *side loading* added (2) Definition of *fiddle block* revised
6, 7	8-1.2.1	Subparagraphs (a) and (b) revised
	8-1.2.2	Revised

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FLOATING CRANES AND FLOATING DERRICKS

Chapter 8-0
Scope, Definitions, and References

(04) SECTION 8-0.1: SCOPE OF B30.8

Within the general scope defined in Section I of the Introduction, B30.8 applies to cranes and derricks mounted on barges or pontoons. Floating cranes are convertible for excavation service and other uses that are categorically not considered to be lifting service. The requirements of this volume are applicable only to floating cranes and floating derricks used for vertical lifting and lowering of freely suspended unguided loads (see Figs. 1 through 5).

SECTION 8-0.2: DEFINITIONS

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

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

(04) *anchorage:* a point of attachment for tie-downs.

angle indicator, boom: a device that measures the angle of the boom to the horizontal.

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

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

auxiliary hoist: a secondary hoist rope system used either in conjunction with, or independently of, the main hoist system.

axis of rotation: the vertical axis around which the crane superstructure rotates.

billboard: a flat, usually inclined platform on which to stow spare or emergency anchors.

bitt (bollard): an upright wooden or metal post on a dock, barge, or pontoon to which hawsers may be secured.

boom: a member hinged to the superstructure and used for supporting the hoisting tackle.

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

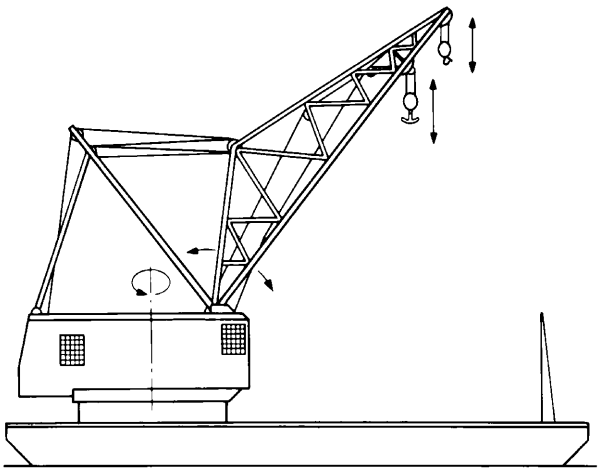


Fig. 1 Floating Crane

boom harness: the block and sheave arrangement on the boom point to which the topping lift rope is reeved for raising and lowering the boom.

boom hoist mechanism: a means for supporting the boom and controlling the boom angle.

boom point: the outward end of the top section of the boom.

boom stop (crane): a device used to limit the angle of the boom at the highest position.

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

cab: the operator's compartment on a crane or derrick.

capstan: a spool-shaped revolving drum, manually or power operated, used for heaving in of heavy mooring lines. A capstan head may be a component of an anchor windlass.

chock: a mooring fitting having faired inner surfaces or rollers for guiding lines.

cleat: a mooring fitting having two horizontal arms to which mooring lines are secured.

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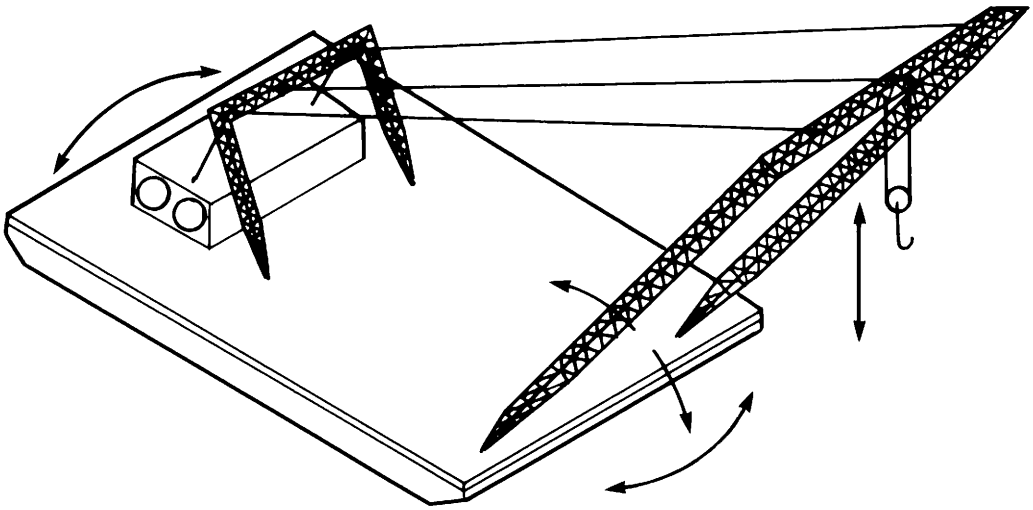


Fig. 2 Barge-Mounted Shearleg

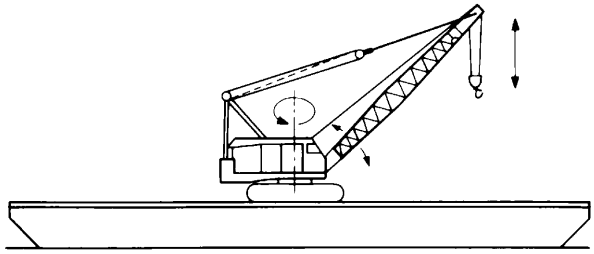


Fig. 3 Barge-Mounted Land Crane

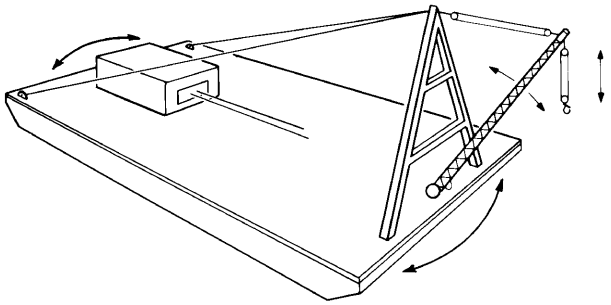


Fig. 5 Floating A-Frame Derrick

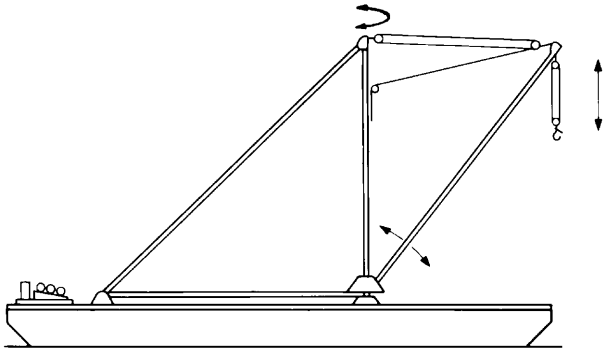


Fig. 4 Floating Stiffleg Derrick

clutch: a friction, electromagnetic, hydraulic, pneumatic, or positive mechanical device for engagement or disengagement of power.

counterweight: weight used to supplement the weight of the machine in providing stability for lifting working loads.

cross angle: the lateral angle between the load tackle and center plane of boom caused by list and trim.

derrick, shearleg: a boom with or without a mast, not capable of swinging, hinged at the bottom, and raised and lowered by a boom hoist mechanism or a hydraulic cylinder.

derrick, stiffleg: a rigid member supporting the mast at the head.

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

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

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

eye: a loop formed at the end of a rope by securing the dead end to the live end at the base of the loop.

fiddle block: a type of tandem block consisting of two sheaves in the same plane held in place by the same cheek plates. (04)

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floating crane: a rotating superstructure, power plant, operating machinery, and boom, mounted on a barge or pontoon. The power plant may be installed below decks. The crane's function is to handle loads at various radii.

floating derrick: a mast or equivalent member held at the head by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes, mounted on a barge or pontoon. The power plant may be installed below decks.

foot bearing or block (sill block): the lower support on which the derrick mast rotates.

gantry (A-frame): a structural frame, extending above the superstructure, to which the boom support ropes are reeved.

gudgeon pin: a pin connecting the mast cap to a derrick mast allowing rotation of the mast.

guy, derrick: a rope used to steady or secure the mast or other member in the desired position.

hoist mechanism: a hoist drum and rope reeving system used for lifting and lowering loads.

hook, latch-type: a type of hook with a mechanical device to close the throat opening of the hook.

jib: an extension attached to the boom point to provide added boom length for lifting specified loads. The jib may be in line with the boom or offset to various angles in the vertical plane of the boom.

land crane: a crane designed primarily for operation on land.

list: angle of inclination about longitudinal axis of barge or pontoon.

load, rated: the maximum allowable working load in pounds (kilograms) designated by the manufacturer in accordance with Section 8-1.1.

load, working: the external load in pounds (kilograms) applied to the crane or derrick, including the weight of load-attaching equipment, such as load blocks, shackles, and slings.

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

load block, upper: the assembly of sheaves, pins, and frame suspended from the boom.

mast (derrick): the upright member of the derrick used for support of the boom.

mast cap (spider): the fitting at the top of the derrick mast to which the guys are connected.

multiple sheave block: a block consisting of two or more sheaves held in place by the same cheek plates.

normal operating conditions: conditions during which a crane or derrick is performing functions within the scope of the original or modified design. Under these conditions, the operator is at the operating control devices.

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

pin, boom foot: the pin connecting the foot of the boom to the boom seat or superstructure.

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

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

radius (reach): the horizontal distance from the theoretical intersection of the axis of rotation and the waterline to the center of the hoist line(s) at the waterline (see Fig. 6).

rope: refers to wire rope unless otherwise specified

rope, rotation resistant: a wire rope consisting of an inner layer of strand laid in one direction covered by a layer of strand laid in the opposite direction; this has the effect of counteracting torque by reducing the tendency of the finished rope to rotate.

shall: indicates that the rule is mandatory and must be followed.

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

side loading: lateral load on boom and crane due to list, trim, wind, or other sources. **(04)**

sill, derrick: a horizontal member connecting the foot block and stiff leg or a horizontal member connecting the lower ends of a double member mast.

soft patch: gasketed metal plate bolted over a deck or bulkhead opening.

stability (barge): the tendency of a vessel to return to an upright position after having been inclined by an external force.

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

standing rope (pendant): a supporting rope that maintains a constant distance between the two components connected by the rope.

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

superstructure: the rotating upper frame structure of the crane and the operating machinery mounted thereon.

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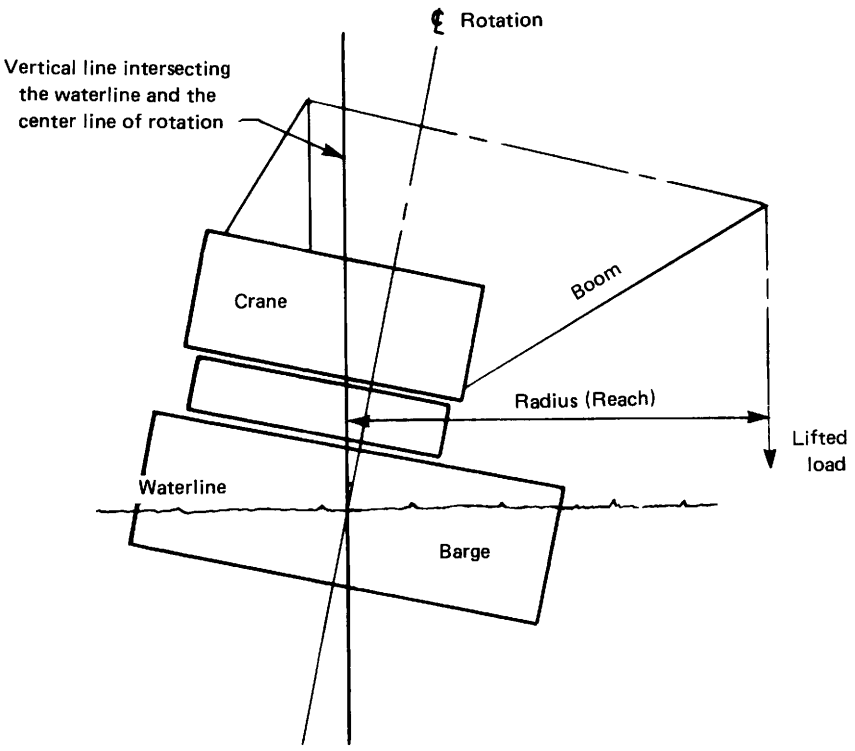


Fig. 6 Reach for Floating Cranes

swing: rotation of the superstructure or derrick boom for movement of loads in a horizontal direction about the axis of rotation.

swing mechanism: the machinery involved in providing rotation of the superstructure or derrick boom.

tackle: an assembly of ropes and sheaves arranged for lifting, lowering, and pulling.

ton (short): two thousand pounds (907.2 kg).

towing pad: a large pad eye to which mooring lines are secured.

trim: angle of inclination about transverse axis of the barge or pontoon.

trim, crane: the inclination of the longitudinal center line of the base of the crane from the horizontal.

vangs (vang lines): tackle attached to each side of a derrick boom near the outer end, and to the base or pontoon at a lateral distance, by means of which the boom is rotated (slewed) from one side to the other (usually used on floating derricks).

whipline (runner or auxiliary line): a separate hoist rope system usually of a lighter load capacity than provided by the main hoist.

windlass: a deck machine, usually power operated, used for heaving in or paying out anchor chain.

SECTION 8-0.3: REFERENCES

The following is a list of publications referenced in this Standard.

ANSI A12.1-1973, Safety Requirements for Floor and Wall Openings, Railings, and Toe Boards

ANSI A14.3-1984, Ladders — Fixed — Safety Requirements

ANSI S1.8-1969 (R1984), Preferred Reference Quantities for Acoustical Levels

ANSI Z26.1-1983, Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways

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

ANSI/AWS D1.1-86, Structural Welding Code — Steel[1]

ANSI/AWS D14.3-82, Specification for Welding Earthmoving and Construction Equipment[1]

Publisher: American Welding Society (AWS), 550 NW LeJeune Road, Miami, FL 33135

ANSI/NFPA 70-1987, National Electrical Code[1]

Publisher: National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269

[1] May also be obtained from the American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036.

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ANSI/SAE J185-JUN81, Access Systems for Off-Road Machines[1]

ANSI/SAE J983-OCT80, Crane and Cable Excavator Basic Operating Control Arrangements[1]

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

ASME B30.5-1989, Mobile and Locomotive Cranes[1]

ASME B30.6-1990, Derricks[1]

ASME B30.7-1989, Base Mounted Drum Hoists[1]

ASME B30.10-1993, Hooks[1]

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: P.O. Box 2350, 22 Law Drive, Fairfield, NJ 07007

ICS 3-1978, National Electrical Manufacturers Association Industrial Control Standard

Publisher: National Electrical Manufacturers Association (NEMA), 2101 L Street, NW, Washington, DC 20037

IEEE 45-1977, Recommended Practice for Electrical Installations on Shipboard[1]

Publisher: Institute of Electrical and Electronics Engineers (IEEE), 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331

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Chapter 8-1
Construction and Installation

SECTION 8-1.1: LOAD RATINGS AND MARKINGS

8-1.1.1 Basis

The load rating of a floating crane or floating derrick is dependent upon its structural competence, rope strength, hoist capacity, and structural attachment to the floating platform of the crane or derrick, and upon stability and freeboard of the floating platform, barge, or pontoon upon which it is mounted.

8-1.1.2 Rated Loads

(a) Rated loads shall be the maximum working loads at various radii as determined by the manufacturer or qualified person considering list and trim for each installation.

(b) When deck loads are to be carried while lifting, the situation should be specifically analyzed for modified ratings.

(c) When mounted on barges or pontoons, the rated loads and radii of land cranes and derricks shall be modified as recommended by the manufacturer or qualified person.

8-1.1.3 Rated Load Marking

A durable rating chart with legible letters and figures shall be provided with each crane or derrick and fixed at a location visible to the operator while seated at his control station. These data shall also be available at the job site office. The data and information to be provided shall include, but not necessarily be limited to, the following:

(a) a full and complete range of crane or derrick load ratings at all stated operating radii and boom angles, and for all permissible boom lengths, jib lengths, and angles

(b) the list and trim conditions on which the load rating chart is based

(c) recommended parts of hoist reeving, size, and type of rope for various loads should be shown either on the rating chart or in the operating manual

(d) essential precautionary or warning notes relative to limitations on equipment, operating procedures, and stability factors such as deck loads, list, trim, weather conditions, and paras. 8-1.2.2(b)(2)(b) through (e) should be shown either on the rating chart or in the operating manual

SECTION 8-1.2: CONSTRUCTION AND LOADING CONDITIONS

8-1.2.1 Structural Competence (04)

(a) Floating cranes and floating derricks shall be capable of withstanding the loads imposed on all components under normal operation conditions when installed and handling loads not exceeding the manufacturer's load ratings with recommended reeving, and in accordance with other conditions specified herein. Stresses created by such loads shall not exceed the limitations specified in the code or standard governing the design of the crane or derrick.

(b) Barges or pontoons shall be capable of withstanding imposed operational and in-transit loads under conditions specified by the crane or derrick manufacturer. Stresses created by such loads shall not exceed the limitations specified in the code or standard governing the design of the barge or pontoon.

(c) Welding shall conform to recommended practices of the American Welding Society as outlined in ANSI/AWS D1.1 or ANSI/AWS D14.3 as applicable.

8-1.2.2 Operational Criteria (04)

(a) Operating List and Trim. The lift system, comprising the crane or derrick mounted on the barge hull or pontoon, shall be analyzed by a qualified person to determine barge or pontoon list and trim under all permitted operating conditions do not exceed the following:

(1) Cranes Designed for Barge or Pontoon Mounting

(a) Rated at 25 tons (22 680 kg) capacity or less, the maximum allowable list or trim shall be 5 deg.

(b) Rated at over 25 tons (22 680 kg), the maximum allowable list or trim shall be 7 deg; however, 5 deg is recommended.

(c) Wind Load. A wind load created by a minimum wind speed of 40 mph shall be considered in establishing operating criteria.

(2) Derricks Designed for Barge or Pontoon Mounting. For any capacity, the maximum allowable list or trim shall be 10 deg.

(3) Land Cranes and Derricks Mounted on Barges or Pontoons. The maximum allowable machine list or trim shall be the lesser of 5 deg or the maximum recommended by crane manufacturer.

(b) Design Loading Conditions. The crane or derrick designed for barge or pontoon mounting shall be stable under the following conditions:

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(1) Cranes and Derricks Designed for Barge or Pontoon Mounting

(a) rated load, 60 mph (100 km/h) wind 2 ft (610 mm) minimum freebroad

(b) rated load, plus 25%, 60 mph (100 km/h) wind, 1 ft (300 mm) minimum freebroad

(c) high boom, no load, 60 mph (100 km/h) wind 2 ft (610 mm) minimum freebroad

(d) for backward stability of the boom: high boom, no load, full back list (least stable condition), 90 mph (142 km/h) wind

(2) Land Cranes and Derricks Mounted on Barges or Pontoons

(a) Barge- or pontoon-mounted land cranes require modified ratings due to increased loading from list, trim, wave action, and wind. This rating will be different for each size of pontoon or barge used; therefore, the load rating of barge- or pontoon-mounted land cranes and derricks shall not exceed that recommended by the manufacturer or qualified person for the particular barge or pontoon under the expected environmental conditions.

(b) All deck surfaces of the pontoon or barge shall be above the water.

(c) The entire bottom area of the barge or pontoon shall be submerged.

(d) Tie-downs shall be provided for derricks to transmit the loading to the barge or pontoon.

(e) Cranes shall be blocked and secured to prevent shifting.

SECTION 8-1.3: GENERAL REQUIREMENTS FOR PONTOONS AND BARGES

8-1.3.1 Machinery and Electrical Equipment

(a) Machinery and electrical equipment should be located clear of the deck loading area and for desirable effect on floating stability.

(b) Working areas, companionways, and ladders providing access to equipment shall be surfaced with antislip material.

(c) Wiring and equipment shall comply with IEEE 45-1977, *Recommended Practice for Electrical Installations on Shipboard*.

8-1.3.2 Compartments

(a) Watertight Compartments. For seagoing barges or pontoons, there shall be enough watertight compartments to prevent capsizing or sinking, when any one compartment is flooded while the boom is stowed and the barge or pontoon is fully loaded with its design deckload.

(b) Machinery and Equipment Compartments. Compartments below deck shall be floored with easily removable, skid resistant metal flooring and provided with watertight hatches for access and ventilation. They shall be of ample size for repair of machinery and equipment. Companionways and ladders shall be supplied.

8-1.3.3 Manholes and Hatches

(a) Manholes shall be no smaller than 15 in. × 22 in. (380 mm × 560 mm).

(b) Access shall be provided to all void compartments.

(c) Where hatches permit access through the main deck, they shall be raised above the deck to prevent accidental entry of spilled liquids, especially fuels, which create a hazard below deck.

8-1.3.4 Fittings

The following fittings shall be provided as needed:

(a) removable stanchions and lifelines along all edges of the barge or pontoon

(b) capstan(s) or winch(es), forward and aft

(c) anchor(s)

(d) towing lugs and chocks

(e) boarding ladder, port, and starboard

(f) double bitt at each corner and cleats along sides on deck

8-1.3.5 Life Preservers

(a) At least one Coast Guard-approved life jacket or work vest shall be provided for each person aboard. It is recommended that such life jackets and work vests be capable of floating an unconscious person with his face out of the water.

(b) Two ring buoys, 30 in. (760 mm) in diameter, each with at least 90 ft (27 m) of line, shall be provided.

(c) For night operations, one of the life rings shall have water lights attached to it.

8-1.3.6 Rescue Skiff

A rescue skiff with oars and ring buoy 30 in. (760 mm) in diameter with at least 90 ft (27 m) of line shall be provided.

SECTION 8-1.4: GENERAL REQUIREMENTS FOR CRANES AND DERRICKS

8-1.4.1 Guards

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

(b) Electrical equipment shall be protected from dirt, grease, oil, and moisture.

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

(d) Guards shall be secured.

(e) Guards shall be capable of supporting, without permanent distortion or making contact with electrical

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or moving parts, the weight of a 200 lb (90 kg) person, unless the guard is located where it is improbable for a person to step on it.

(f) Brake(s) and clutches shall be provided with rain and spray guards unless otherwise protected.

8-1.4.2 Lubrication

Lubricating points should be accessible without the necessity of removing guards or other parts.

8-1.4.3 Miscellaneous Equipment

(a) A Coast Guard-approved portable fire extinguisher, with a basic minimum rating of 10 BC, shall be provided in the crane cab and outside the machinery spaces at all times.

(b) Equipment of a permanent nature, such as tool boxes, shall be secured to the crane derrick or deck.

(c) An audible warning device shall be provided. The controls for the device shall be within reach of the operator.

(d) Fuel tanks should be equipped with a self-closing filler cap. Where gasoline is the fuel, a flame arrester should be provided on both fill pipe and vent lines.

(e) Means shall be provided for the operator to visually determine the list of the pontoon or barge.

(f) A device should be provided to indicate to the operator either actual loads on the hook or when rated loads are reached.

(g) Navigational lights as required by Coast Guard regulations shall be provided.

SECTION 8-1.5: VERTICAL CLEARANCE

The counterweight or other projections that rotate to and from positions accessible to personnel shall have the area over which the projection moves barricaded unless there is 7 ft (2.1 m) or greater clearance from the deck.

SECTION 8-1.6: BOOM HOIST (LUFFING HOIST) AND LOAD HOIST MECHANISMS

8-1.6.1 Boom Hoist (Luffing Hoist)

(a) When using recommended reeving and with rated loads suspended, the boom hoist shall be capable of raising the boom, holding it stationary without action by the operator, and lowering it only when coupled to its prime mover or suitable retarder.

(b) Unless directly coupled, the boom hoist mechanism shall be provided with a suitable clutching or power-engaging device.

(c) The boom hoist mechanism shall be equipped with at least one brake having not less than 125% of the maximum full load hoisting torque at the point where the brake is applied.

(d) The brake(s) shall have sufficient thermal capacity for the service required.

(e) Brakes and clutches shall be provided with adjustments to compensate for wear.

(f) The boom hoist drum shall be provided with an auxiliary ratchet and pawl or other positive locking device that is controllable from the operator's station to hold the drum from rotating in the lowering direction and to hold the rated load indefinitely.

(g) The boom hoist drum shall have sufficient rope capacity to operate the boom at all positions from horizontal to the highest angle recommended when using the manufacturer's recommended reeving and rope size.

(1) No less than two full wraps of rope shall remain on the drums with boom point lowered to its lowest possible position.

(2) The drum end of each rope shall be anchored by a clamp securely attached to the drum or by a socket arrangement recommended by the crane, hoist, or rope manufacturer.

(3) Drum flanges shall extend a minimum of 0.5 in. (13 mm) over the top layer of rope at all times.

(h) The diameter of the boom hoist drum(s) shall provide a first layer rope pitch diameter of not less than 15 times the nominal diameter of the rope used.

(i) When land cranes are mounted on barges or pontoons, the requirements of ASME B30.5 para. 5-1.3.1 shall apply.

8-1.6.2 Load Hoist

(a) When using recommended reeving, the load hoist shall be capable of lifting and lowering rated loads with operational characteristics required in crane and derrick service.

(b) Unless directly coupled, the load hoist mechanism shall be provided with a suitable clutching or power engaging device.

(c) Each load hoist mechanism shall be equipped with at least one brake having not less than 125% of the maximum rated line pull at the maximum rated rope layer on the drum.

(d) A means controllable from the operator's station shall be provided to hold the drum from rotating in the lowering direction and to hold the rated load without further action by the operator. Foot-operated brakes having a continuous mechanical linkage between the actuating and braking forces and equipped with a positive mechanical means to hold the linkage in the applied position meet this requirement.

(e) Brakes and clutches shall be provided with adjustments to compensate for wear.

(f) A power control braking means, such as regenerative, dynamic, or countertorque braking; power-load lowering; or a mechanically controlled braking means, shall be provided and shall be capable of maintaining rated lowering speeds of rated loads.

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(g) Mechanically or electrically controlled braking means shall have thermal capacity for the frequency of operation required by the service.

(h) The load hoist drum shall have sufficient rope capacity with recommended rope size and reeving to perform lifting services within the range of boom lengths, operating radii, and lifts stipulated by the manufacturer.

(1) No less than two full wraps of rope shall remain on the drum when the hook is in its extreme lower position.

(2) The drum end of each rope shall be anchored by a clamp securely attached to the drum or by a socket arrangement recommended by the crane, hoist, or rope manufacturer.

(3) Drum flanges shall extend a minimum of 0.5 in. (13 mm) over the top layer of rope at all times.

(i) The diameter of load hoist drum(s) shall provide a first layer rope pitch diameter of not less than 18 times the nominal diameter of the rope used.

(j) A means controllable from the operator's station shall be provided to hold the drum from rotating in the lowering direction and to hold the rated load without further action by the operator.

(k) Drum rotation indicators should be provided and located to afford sensing by the operator.

(l) Foot-operated brake pedals shall be constructed so that the operator's feet will not readily slip off. The pedal shall be equipped with a means for latching in the applied position.

(m) When land cranes are mounted on barges or pontoons, the requirements of ASME B30.5 para. 5-1.3.2 shall apply.

SECTION 8-1.7: SWING MECHANISM

8-1.7.1 Swing Control

The swing mechanism shall be capable of controlling the swing of the rated load under all operating conditions.

8-1.7.2 Swing Brake and Locking Device

(a) A brake(s) with holding power in both directions shall be provided to restrict movement of the rotating superstructure, when desired, under normal operation. The brake shall be capable of being set in the holding position and remaining so without further action by the operator.

(b) A device for positively locking the rotating superstructure should be provided. When provided, it shall be constructed to prevent inadvertent engagement or disengagement.

(c) Brake(s) shall have sufficient thermal capacity for the service required.

(d) Brakes shall be provided with adjustment means to compensate for wear.

(e) When land cranes are mounted on barges or pontoons, the requirements of ASME B30.5 para. 5-1.4.2 shall apply.

SECTION 8-1.8: CONTROLS

8-1.8.1 General

(a) All controls used during the normal crane or derrick operating cycle shall be located within reach of the operator while at the operator's station. Controls for load hoist, boom hoist, and swing clutches, when provided, shall have means for holding in the neutral position without the use of latches.

(b) Remote-operated cranes shall function so that if the control signal for any crane motion becomes ineffective, that crane motion shall stop.

(c) Electric motor-operated cranes or derricks shall be provided with a device that will disconnect all motors from the line on failure of power, and will not permit any motor to be restarted until the controller handle is brought to the neutral position and a reset switch or button is operated. When the prime mover is an electric motor, a self-setting electric motor brake or other self-setting braking means shall be provided to prevent drum rotation in the event of power failure. The load may then be lowered by declutching or manual brake release. In case of circuit failure, electrically controlled cranes shall be equipped with a quick disconnect means in the cab to stop all motion.

(d) Electric motor-operated cranes or derricks that are capable of overspeeding the power plant on overhauling regenerative loads shall be provided with means to prevent such overspeeding.

8-1.8.2 Power Plant Control

Controls for operating the power plant shall be within reach of the operator and shall include, where applicable, the means to

(a) start and stop, with provision to lock in the off position

(b) control the speed of internal combustion engines

(c) stop diesel engines under emergency conditions

(d) shift selective transmissions

8-1.8.3 Control Forces and Movements

When a crane is operated within the manufacturer's ratings and recommended reeving, the following shall be provided under normal operation:

(a) forces not greater than 35 lb (156 N) on hand levers, and forces not greater than 50 lb (222 N) or less than 8 lb (36 N) on foot pedals

(b) travel distance on hand levers not greater than 14 in. (356 mm) from neutral position on two-way levers and not greater than 24 in. (610 mm) on one-way levers; travel distance on foot pedals not greater than 10 in. (254 mm)

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8-1.8.4 Engine Clutch

All cranes with a direct mechanical or hydrodynamic (such as torque converter or fluid coupling) drive to any crane function shall be provided with a clutch or other means for disengaging power. The control shall be within reach from the operator's station.

8-1.8.5 Electric Drive Control Panels

(a) Controller for the boom hoist, main load hoist, auxiliary load hoist, and swing motor shall conform to Part 443 of NEMA Industrial Control Standards ICS 3, as applicable.

(b) Controls shall be electrically interlocked to prevent operation of the motion if its locking device is engaged.

8-1.8.6 Resistors

(a) Resistors and connectors shall be of corrosion resistant material, protected or enclosed with provision for ventilation, and installed to prevent the accumulation of combustible matter near hot parts.

(b) Resistor units shall be supported so as to minimize vibration effects.

8-1.8.7 Switches

(a) The lifting motion of electrically driven crane boom or load hoists shall be provided with an overall limit switch in the lifting direction.

(b) Lower overtravel limit switches are recommended for all load hoists where the hook enters areas not visible to the operator.

(c) All cranes or derricks using a lifting magnet shall have a magnet circuit disconnect switch of the enclosed type with provision for locking in the open position. Means for discharging the inductive load of the magnet shall be provided.

SECTION 8-1.9: ROPES AND REEVING ACCESSORIES

8-1.9.1 Rope Design Factors

(a) For supporting rated loads and the boom and working attachments at recommended travel or transit positions and boom lengths:

(1) the design factor for live or running ropes that wind on drums or travel over sheaves shall not be less than 3.5

(2) the design factor for boom pendants or standing ropes shall not be less than 3.0

(b) For supporting the boom under recommended boom erection conditions:

(1) the design factor for live or running ropes shall not be less than 3.0

(2) the design factor for boom pendants or standing ropes shall not be less than 2.5

(c) Rotation resistant ropes shall have a design factor of 5 or greater. The design factor of 5 or greater for rotation-resistant ropes may be modified by the crane user by complying with the provisions of para. 8-3.2.1(d).

(d) The design factors specified in paras. 8-1.9.1(a), (b), and (c) shall be the total minimum breaking strength of all ropes in the system divided by the load imposed on the rope system when supporting the static weights of structure and crane rated load.

NOTE: "minimum breaking strength" formerly referred to as "nominal breaking strength."

(e) Ropes for derrick- and base-mounted drum hoists shall conform to ASME B30.6 and ASME B30.7, respectively.

8-1.9.2 Ropes: General

(a) The ropes shall be of a construction recommended by the rope or crane manufacturer or qualified person for that service.

(b) Rotation resistant and fiber core ropes shall not be used for boom hoist reeving.

(c) Rotation resistant rope shall be given special care in installations, as it is easily damaged.

(d) Socketing shall be done in the manner specified by the manufacturer of the wire rope or fitting.

(e) If a load is supported by more than one part of rope, the tension in the parts shall be equalized.

(f) Wherever exposed to ambient temperatures at the rope in excess of 180°F (82°C), rope having an independent wire-rope or wire-strand core, or other temperature damage-resistant core shall be used.

(g) The drum end of each rope shall be anchored by a clamp securely attached to the drum or by a socket arrangement recommended by the crane, hoist, or rope manufacturer.

(h) Tie-downs (kicker devices) shall have locknuts or other provision to prevent loosening.

(i) The live rope reeving system in a boom suspension shall withstand the maximum load imposed and be of a length to permit lowering the boom point to the deck level or to a boom cradle with at least two full wraps of rope remaining on the hoist drum.

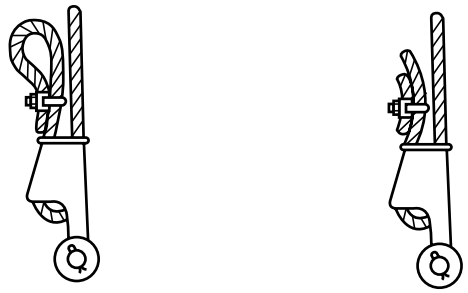
(j) Load and boom hoist ropes shall be of a length to serve the entire range movement specified for the application, with at least two full wraps of rope remaining on the hoist drum when the hook is in its extreme lower position.

(k) Ropes of material other than steel may be used only in accordance with crane or derrick manufacturer's recommendation.

8-1.9.3 Reeving Accessories

(a) Eye splices shall be made in a manner recommended by the rope, crane, or derrick manufacturer or qualified person, and rope thimbles should be used in the eye.

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(a) Loop Back Method

(b) Extra Piece of Same Size Rope is Clipped to Main Rope

Fig. 7 Dead Ending Rope in a Socket

(b) Wire rope clips shall be drop-forged steel of the single saddle (U-bolt) or double saddle type clip. Malleable cast iron clips shall not be used. For spacing, number of clips, and torque values, refer to the clip manufacturer's recommendation. Wire rope clips attached with U-bolts shall have the U-bolt over the dead end of the rope and the live rope resting in the clip saddle. Clips shall be tightened evenly to the recommended torque. After the initial load is applied to the rope, the clip nuts shall be retightened to the recommended torque to compensate for any decrease in rope diameter caused by the load. Rope clip nuts should be retightened periodically to compensate for any further decrease in rope diameter during usage.

(c) Swaged, compressed, or wedge socket fittings shall be applied as recommended by the rope, crane, derrick, or fitting manufacturer.

(d) Wire rope clips used in conjunction with wedge sockets shall be attached to the unloaded dead end of the rope only (see Fig. 7).

8-1.9.4 Sheaves

(a) Sheave grooves shall be smooth and free from surface conditions that could cause rope damage. The cross-sectional radius at the bottom of the groove should be such so as to form a saddle for the size of rope used; the sides of the groove should be tapered outwardly to facilitate entrance of the rope into the groove. Flange corners should be rounded and the rims should run true about the axis of rotation.

(b) Sheaves carrying ropes that can be momentarily unloaded shall be provided with close-fitting guards or other devices to keep the rope in the sheave.

(c) The sheaves in the lower load block shall be equipped with close-fitting guards or other devices that will prevent ropes from becoming fouled when the block is lying on the deck of the barge or pontoon with ropes loose.

(d) Means should be provided, if necessary, to prevent chafing of the ropes.

(e) All sheave bearings shall be provided with means for lubrication. Permanently lubricated bearings are acceptable.

8-1.9.5 Sheave Sizes

(a) Boom hoist sheaves shall have pitch diameters of not less than 15 times the nominal diameter of the rope used.

(b) Load hoist sheaves shall have pitch diameters not less than 18 times the nominal diameter of the rope used.

(c) Load block sheaves shall have pitch diameters not less than 16 times the nominal diameter of the rope used.

8-1.9.6 Load Hooks, Ball Assemblies, and Load Blocks

Load hooks, ball assemblies, and load blocks shall be of sufficient weight to overhaul the line from the highest hook position for boom or boom and jib lengths and the number of parts of line in use. All hook and ball assemblies and load blocks shall be labeled with their rated capacity and weight. Hooks shall be equipped with latches unless the application makes the use of a latch impractical. When provided, the latch shall bridge the throat opening of the hook for the purpose of retaining slings or other lifting devices, under slack conditions (see ASME B30.10).

SECTION 8-1.10: CABS

8-1.10.1 Construction

(a) All cabs and enclosures should be constructed to protect the superstructure machinery, brakes, and the operator's station from the weather.

(b) All cab glazing shall be safety glazing as defined in ANSI Z26.1. Windows shall be provided in the front and on both sides of the cab or operator's compartment for visibility forward and to both sides. Visibility forward shall include a vertical range adequate to cover the boom point at all times. The front window may have a section that can be removed or held open if desired. If the section is of the type held in the open position, it shall be secured to prevent inadvertent closure. A windshield wiper should be provided on the front window.

(c) All cab doors, whether of the sliding or swinging type, shall be restrained from inadvertent opening or closing while the machine is in operation. The door adjacent to the operator, if of the swinging type, should open outward and, if of the sliding type, should slide rearward to open.

(d) A clear passageway shall be provided from the operator's station to an exit on the operator's side or rear.

(e) Means shall be provided for cleaning the windows.

8-1.10.2 Platforms to Cab

(a) Principal walking surfaces shall be of a skid resistant type.

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(b) Outside platforms, if furnished, shall be provided with guardrails in accordance with ANSI A14.3 and ANSI/SAE J185. On barge-mounted land cranes where platforms are too narrow to use guardrails, handholds shall be provided at convenient points above the platform.

8-1.10.3 Access to Cab

Handholds or steps shall be provided in accordance with ANSI A14.3 and ANSI/SAE J185 to facilitate entrance to and exit from the cab.

8-1.10.4 Cab Roof

Where necessary for rigging or service requirements, a ladder or steps shall be provided to give access to the cab roof. The ladder or steps shall conform to the requirements of ANSI A14.3 and ANSI/SAE J185. Where necessary, areas of the cab roof shall be capable of supporting, without permanent distortion, the weight of a 200 lb (90 kg) person.

8-1.10.5 Exhaust Gases

Engine exhaust gases shall be piped to the outside of the cab and discharged in a direction away from the operator. All exhaust pipes shall be guarded or insulated to prevent contact with personnel when performing normal duties.

SECTION 8-1.11: GENERAL REQUIREMENTS FOR BOOMS

8-1.11.1 Booms

(a) Boom stops shall be provided to resist the boom falling backwards. Boom stops should be of one of the following types:

(1) a fixed or telescoping bumper

(2) a shock absorbing bumper

(3) hydraulic boom elevation cylinder(s)

(4) derrick masts, which shall be considered to be boom stops

(b) Jibs shall be restrained from backward overturning.

(c) A boom angle indicator readable from the operator's station shall be provided on all floating cranes.

(d) On all floating cranes requiring boom stops, a boom hoist disconnect, shutoff, or hydraulic relief shall be provided to stop the boom hoist automatically when the boom reaches a predetermined angle.

(e) A boom length indicator readable from the operator's station shall be provided for telescoping booms unless the load rating is independent of the boom length.

(f) Booms, boom sections, and jibs shall be identified and shall be used only for the purposes recommended by the manufacturer.

(g) Prototype booms of production models of rope-supported lattice booms shall meet the performance requirements of ANSI/SAE J987. On special design booms (not production models) or special lift conditions, calculations to a standard or by a qualified person, or those specified by the crane manufacturer are acceptable.

(h) Prototype booms of production models of telescopic cantilever booms shall meet the performance of ANSI/SAE J1063. On special design booms (not production models) or special lift conditions, calculations to a standard or by a qualified person, or those specified by the crane manufacturer are acceptable.

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Chapter 8-2
Inspection, Testing, and Maintenance

SECTION 8-2.1: INSPECTION — GENERAL

The manufacturer shall furnish operation and maintenance information.

8-2.1.1 Inspection Classifications

(a) Initial Inspection. Prior to initial use, all new, reinstalled, and altered cranes and derricks shall be inspected by a designated person to verify compliance with provisions of this volume.

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

(1) Frequent Inspection. Daily to monthly intervals.

(2) Periodic Inspection. One- to 12-month intervals, or as specifically recommended by the manufacturer.

8-2.1.2 Frequent Inspection

Items such as the following shall be inspected at intervals as defined in para. 8-2.1.1(b)(1), or as specifically indicated, including observation during operation for any deficiencies that might appear between regular inspections. Any deficiencies, such as listed, shall be examined and determination made as to whether they constitute a hazard. This inspection does not require dismantling unless external conditions indicate further examination is required.

(a) Cranes and Derricks

(1) all control mechanisms for maladjustment interfering with proper operation — daily, when used

(2) all chords and lacing — visually inspected daily, when used

(3) all control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter

(4) all safety devices for proper function

(5) all air and hydraulic hoses, and particularly those that flex in normal operation of crane functions, should be visually inspected

(6) hooks in accordance with ASME B30.10

(7) rope reeving for compliance with crane or derrick manufacturer's recommendations

(8) electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation

(9) guys for tension, inspected daily, when used (guy derricks only)

(10) derrick mast fittings and connections for compliance with manufacturer's recommendations

(11) hoist brakes, clutches, and operating levers for proper functioning before beginning operation — daily, when used

(b) Barge or Pontoon

(1) ballast compartments for proper ballast

(2) deckloads for proper securing

(3) chain lockers, storage, fuel compartments, and battening of hatches

(4) fire-fighting and lifesaving equipment in place and functional

(5) null void compartments sounded for leakage — inspected weekly

8-2.1.3 Periodic Inspection

Complete inspections shall be performed at intervals as generally defined in para. 8-2.1.1(b)(2), depending on the activity, severity of service, and environment, or as specifically indicated below. These inspections shall include the requirements of para. 8-2.1.2 and, in addition, items such as the following. Any deficiencies, such as listed, shall be examined and determination made as to whether they constitute a hazard. This inspection does not require dismantling unless external conditions indicate further examination is required.

(a) Cranes and Derricks

(1) structural members including boom for deformed, cracked, or corroded members

(2) bolts or rivets for tightness

(3) sheaves and drums for cracked or worn surfaces

(4) pins, bearings, shafts, gears, rollers, and locking devices for wear, cracks, and distortion

(5) brake and clutch system parts, linings, pawls, and ratchets for excessive wear

(6) load, boom angle, and other indicators, over their full range, for any significant inaccuracies

(7) gasoline, diesel, electric, or other power plants for proper performance or compliance with applicable safety requirements

(8) chain drive sprockets for excessive wear and chain for stretch

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(9) hooks for cracks

(10) tie-downs on barge-mounted land cranes for wear, corrosion, and tightness

(11) gudgeon pin for cracks, wear, and distortion

(12) supports for continued ability to sustain the imposed loads

(13) hydraulic and pneumatic hose, fittings, and tubing inspection

(a) evidence of leakage at the surface of the flexible host or its junction with the end fittings

(b) blistering or abnormal deformation of the outer covering of the hydraulic or pneumatic hose

(c) leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures

(d) evidence of excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or fitting. Means shall be taken to eliminate the interference of elements in contact or otherwise protect the components

(14) hydraulic and pneumatic pumps and motors:

(a) loose bolts or fasteners

(b) leaks at joints between sections

(c) shaft seal leaks

(d) unusual noises or vibration

(e) loss of operating speed

(f) excessive heating of the fluid

(g) loss of pressure

(15) hydraulic and pneumatic valves:

(a) cracks in valve housing

(b) improper return of spool to neutral position

(c) leaks at spools or joints

(d) sticking spools

(e) failure of relief valves to attain correct pressure setting

(f) relief valve pressures shall be checked as specified by the manufacturer

(16) hydraulic and pneumatic cylinders:

(a) drifting caused by fluid leaking across the piston

(b) rod seal(s) leakage

(c) leaks at welded joints

(d) scored, nicked, or dented cylinder rods

(e) dented cylinder barrel

(f) loose or deformed rod eyes or connecting joints

(17) hydraulic filters: evidence of rubber particles on the filter element may indicate hose, O-ring, or other rubber component deterioration. Metal chips or pieces on the filter may denote failure in pumps, motors, or cylinders. Further checking will be necessary to determine the origin of the problem before corrective action can be taken.

(b) Barge or Pontoon

(1) cleats, bitts, chocks, fenders, capstans, ladders, stanchions for corrosion, wear, deterioration, and deformation

(2) compartments for leakage and structural damage; void compartment atmosphere shall be tested before entering

(3) rescue skiff, lifelines, work vests, life preservers, and ring buoys for deterioration and seaworthiness

(4) four-corner draft readings

(5) fire-fighting equipment for serviceability

8-2.1.4 Cranes or Derricks Not in Regular Use

(a) A crane or derrick that has been idle for a period of 1 month or more, but less than 6 months, shall be given an inspection conforming with the requirements of paras. 8-2.1.2, 8-2.1.3, and 8-2.4.1 before being placed in service.

(b) A crane or derrick that has been idle for a period of over 6 months shall be given a complete inspection conforming with the requirements of paras. 8-2.1.2, 8-2.1.3, and 8-2.4.1 before being placed in service.

(c) Standby cranes or derricks shall be inspected at least semiannually in accordance with the requirements of paras. 8-2.1.2 and 8-2.4.1(b). Those cranes or derricks exposed to adverse environments should be inspected more frequently.

8-2.1.5 Inspection Records

Dated records shall be made on critical items such as brakes, hooks, and ropes. Records should be available to appointed personnel.

SECTION 8-2.2: TESTING

8-2.2.1 Operational Tests

(a) New or Reinstalled Floating Cranes or Derricks. Prior to initial use, all new or reinstalled floating cranes or derricks shall be tested with no hook load, under the direction of a qualified person to ensure compliance with this volume, including but not limited to the following:

(1) lifting and lowering the hook(s) through full range of hook travel.

(2) raising and lowering the boom through full range of boom travel.

(3) swinging each direction through full range of swing.

(4) operating hoist clutches and brakes.

(5) over-hoist limit devices (when provided). The actuating mechanism of the limit device shall be located so it will trip the device under all conditions in sufficient time to prevent two-blocking.

(6) locking, limiting, and indicating devices, when provided.

(b) Anchorages. All anchorages shall be inspected by a designated person prior to performing an operational or load test.

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(c) Repaired, Altered, or Modified Floating Cranes or Derricks. Prior to use, a repaired, altered, or modified floating crane or derrick shall be tested. Testing may be limited to the function(s) affected by the repair.

8-2.2.2 Load Test

(a) New or Reinstalled Floating Cranes or Derricks

(1) Prior to initial use, all new or reinstalled floating cranes or derricks shall be inspected and load tested by or under the direction of a qualified person. A written test report shall be prepared by the qualified person and placed on file. Test loads shall not be less than 100% or more than 110% of the rated load, unless otherwise recommended by the manufacturer or a qualified person.

(2) The load test shall consist of the following operations as a minimum requirement:

(a) hoist the test load to ensure that the load is supported by the floating crane or derrick and held by the hoist brake(s)

(b) swing the floating crane or derrick, if applicable, the full range of its swing, with the test load

(c) boom the floating crane or derrick up and down within the allowable working radius for the test load

(d) lower the test load, stop, and hold the load with the brake(s)

(b) Repaired, Altered, or Modified Floating Cranes or Derricks. The need for load testing a repaired, altered, or modified floating crane or derrick shall be determined by a qualified person. When a load test is required, testing shall be in accordance with para. 8-2.2.2(a).

SECTION 8-2.3: MAINTENANCE

8-2.3.1 Preventive Maintenance

(a) A preventive maintenance program based on the crane or derrick manufacturer's recommendation should be established. Dated records should be available.

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

8-2.3.2 Maintenance Procedure

(a) Before adjustments and repairs are started, the following precautions shall be taken, as applicable:

(1) crane or derrick placed where it will cause the least interference with other equipment or operations in the area and secured from movement

(2) boom lowered to the boom rest, if possible, or otherwise secured against inadvertent lowering

(3) all controls at the off position and all dogs engaged

(4) starting means rendered inoperative, or main or emergency switch locked in open position if electric hoist is used

(5) "Warning" or "Out of Service" signs placed on the crane or derrick

(6) power plant stopped or disconnected at takeoff, and tagged

(7) procedures for repairs by welding shall be approved by a qualified person

(8) relieve hydaulic oil pressure from all hydraulic circuits before loosening or removing hydraulic components

(b) After adjustments and repairs have been made, the crane or derrick shall not be placed back in service until all guards have been reinstalled, safety devices reactivated, and maintenance equipment removed.

8-2.3.3 Adjustments and Repairs

(a) Any hazardous conditions disclosed by the inspection requirements of Section 8-2.1 shall be corrected before operation is resumed. Adjustments and repairs shall be done only by designated personnel.

(b) Adjustments shall be maintained to ensure correct functioning of components. The following are examples:

(1) functional operating mechanisms
(2) safety devices
(3) control systems
(4) power plants
(5) vang lines
(6) brakes and clutches
(7) signal systems

(c) Repairs or replacements shall be provided as needed for operation. The following are examples:

(1) Critical parts of functional operating mechanisms that are cracked, bent, broken, corroded, or excessively worn shall be repaired or replaced.

(2) Critical parts of the structure that are cracked, bent, broken, or excessively corroded shall be repaired or replaced.

(3) Hooks showing indications described in para. 8-2.1.2 shall be discarded if after examination a determination is made that they constitute a hazard. Repairs by welding or reshaping are not recommended.

(4) Pitted or burned electrical contacts should be corrected only by replacement in sets.

8-2.3.4 Lubrication

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

(b) Machinery shall be stationary while lubricants are being applied and protection provided as called for in paras. 8-2.3.2(a)(2) through (5), unless equipped for automatic or remote lubrication.

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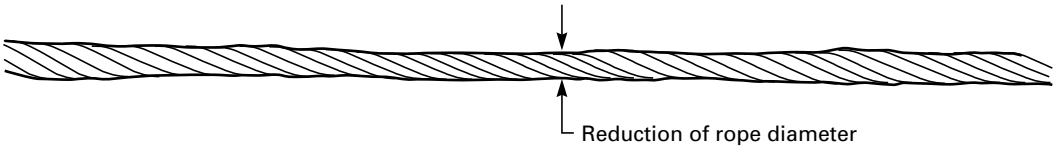


Fig. 8 Core Failure in 19 × 7 Rotation-Resistant Rope
(Note the lengthening of lay and reduction of diameter)

(c) The operator shall be notified immediately before any crane, derrick, winch, or capstan parts are to be lubricated.

SECTION 8-2.4: ROPE INSPECTION, REPLACEMENT, AND MAINTENANCE

8-2.4.1 Frequent Inspection

(a) All crane and derrick running ropes in continuous service should be visually inspected once each working day. As a minimum, a visual inspection shall consist of observation of all rope that can reasonably be expected to be used during the day's operations. These visual observations should be concerned with discovering gross damage, such as listed below, which may be an immediate hazard:

(1) distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion.

(2) general corrosion.

(3) broken or cut strands.

(4) number, distribution, and type of visible broken wires [see paras. 8-2.4.3(b)(1) and (2) for further guidance]. When such damage is discovered, the rope shall either be removed from service or given an inspection as detailed in para. 8-2.4.2.

(b) Care shall be taken when inspecting sections of rapid deterioration such as flange points, crossover points, and repetitive pickup points on drums.

(c) Care shall be taken when inspecting certain ropes such as:

(1) rotation-resistant rope because of its higher susceptibility to damage, increased deterioration, and core failure (see Fig. 8) when working on equipment with limited design parameters. The internal deterioration of rotation-resistant ropes may not be readily observable.

(2) boom hoist ropes because of the difficulties of inspection and important nature of these ropes.

8-2.4.2 Periodic Inspection

(a) The inspection frequency shall be determined by a qualified person and shall be based on such factors as expected rope life as determined by experience on the particular installation or similar installations, severity of environment, percentage of capacity lifts, frequency rates of operation, and exposure to shock loads. Inspections need not be at equal calendar intervals; they should be more frequent as the rope approaches the end of its useful life. This inspection shall be made at least annually.

(b) Periodic inspections shall be performed by an appointed or authorized person. This inspection covers the entire length of the rope. Only the surface wires of the rope need be inspected. No attempt should be made to open the rope. Any deterioration resulting in appreciable loss of original strength, such as described below, shall be noted and determination made as to whether further use of the rope would constitute a hazard:

(1) points listed in para. 8-2.4.1

(2) reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires (see Fig. 8)

(3) severely corroded or broken wires at end connections

(4) severely corroded, cracked, bent, worn, or improperly applied end connections

(5) wire rope clips for tightness

(c) Care shall be taken when inspecting sections of rapid deterioration, such as the following:

(1) sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited

(2) sections of the rope at or near terminal ends where corroded or broken wires may protrude

8-2.4.3 Rope Replacement

(a) No precise rules can be given for determination of the exact time for rope replacement since many variable factors are involved. Once a rope reaches any one of the specified removal criteria, it may be allowed to operate to the end of the work shift, based on the judgment of a qualified person.

The rope shall be replaced after that work shift, at the end of the day, or at the latest time prior to the equipment being used by the next work shift.

(b) Removal criteria for rope replacement shall be as follows:

(1) in running ropes, six randomly distributed broken wires in one lay, or three broken wires in one strand in one lay

(2) one outer wire broken at the contact point with the core of the rope, which has worked its way out of

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the rope structure and protrudes or loops out from the rope structure

(3) wear of one-third the original diameter of outside individual wires

(4) kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure

(5) evidence of heat damage

(6) reductions from nominal diameter greater than those shown below:

Rope Diameter	Maximum Allowable Reduction From Nominal Diameter
Up to $^5/_{16}$ in. (8 mm)	$^1/_{64}$ in. (0.4 mm)
Over $^5/_{16}$ in. to $^1/_2$ in. (13 mm)	$^1/_{32}$ in. (0.8 mm)
Over $^1/_2$ in. to $^3/_4$ in. (19 mm)	$^3/_{64}$ in. (1.2 mm)
Over $^3/_4$ in. to $1^1/_8$ in. (29 mm)	$^1/_{16}$ in. (1.6 mm)
Over $1^1/_8$ in. to $1^1/_2$ in. (38 mm)	$^3/_{32}$ in. (2.4 mm)

(7) in standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection

(c) Broken wire removal criteria cited in this volume apply to wire rope operating on steel sheaves and drums. The user shall contact the sheave, drum, crane, or derrick manufacturer, or a qualified person, for broken wire removal criteria for wire ropes operating on sheaves and drums made of material other than steel.

(d) Replacement rope shall have strength rating at least as great as the original rope furnished by the crane manufacturer. Any deviation from the original size, grade, or construction shall be specified by the rope manufacturer, the crane manufacturer, or a qualified person.

8-2.4.4 Ropes Not in Regular Use

All rope that has been idle for a period of a month or more, due to shutdown or storage of a crane or derrick on which it is installed, shall be given an inspection in accordance with para. 8-2.4.2 before it is placed in service. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope.

8-2.4.5 Inspection Records

(a) Frequent Inspection. No records required.

(b) Periodic Inspection. In order to establish data as a basis for judging the proper time for replacement, a dated report of rope condition at each periodic inspection shall be kept on file, available to appointed personnel. This report shall cover points of deterioration listed in para. 8-2.4.2(b).

(c) Service History. A historical inspection program should be established and include records on examination of ropes removed from service so a relationship can be established between visual observation and actual condition of the internal structure.

8-2.4.6 Rope Maintenance

(a) Replacement rope should be stored to prevent damage or deterioration.

(b) Unreeling or uncoiling of rope should be done as recommended by the rope manufacturer and with care to avoid kinking or inducing a twist.

(c) Before cutting a rope, means shall be used to prevent unlaying of strands on each side of the place where the rope is to be cut.

(d) During installation, care should be exercised to avoid dragging of the rope in dirt or around objects that will scrape, nick, crush, or induce sharp bends in it.

(e) Rope should be maintained in a well-lubricated condition. It is important that lubricant applied as part of a maintenance program shall be compatible with the original lubricant, and to this end, the rope manufacturer should be consulted. Lubricant applied should be the type that does not hinder visual inspection. Those sections of rope that are located over sheaves or otherwise hidden during inspection and maintenance procedures require special attention when lubricating the rope. The object of rope lubrication is to reduce internal friction and to prevent corrosion. Periodic field lubrication is particularly important for rotation-resistant rope.

(f) When an operating rope shows greater wear at well-defined localized areas than on the remainder of the rope, rope life can be extended (in cases where a reduced rope length is adequate) by cutting off a section at one end, thus shifting the wear to different areas on the rope.

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Chapter 8-3
Operation

SECTION 8-3.1: QUALIFICATIONS FOR AND CONDUCT OF OPERATORS

8-3.1.1 Operators

(a) Cranes and derricks shall be operated only by the following 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

(b) No one other than the personnel specified in subpara. 8-3.1.1(a) shall enter a crane cab or operator's station, with the exception of persons such as oilers, supervisors, and those specific persons authorized by supervisors, whose duty requires them to do so, and then only in the performance of those duties and with the knowledge of the operator or other appointed person.

8-3.1.2 Qualifications for Operators

(a) Operators shall be required by the employer to pass a written or oral examination and a practical operating examination unless satisfactory evidence of qualifications and experience can be furnished. Qualifications shall be limited to the specific type of equipment for which examined.

(b) Operators and operator trainees 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) the ability to distinguish color, if color differentiation is required for operation

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

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

(c) Evidence of physical limitations or emotional instability that could render 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.

(e) Operators and operator trainees should have good depth perception, field of vision, reaction time, manual dexterity, coordination, and no tendencies to dizziness or similar undesirable characteristics.

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

8-3.1.3 Conduct of Operators

(a) The operator shall not engage in any practice that might divert his attention while actually engaged in operating the crane or derrick.

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

(c) Each operator shall be held 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.

(d) Before leaving the crane or derrick unattended, the operator shall

(1) land any attached load.

(2) lower boom to boom rest or otherwise secure against displacement by wind loads or other outside forces.

(3) engage manual locking devices in the absence of automatic holding equipment on derricks and swing, boom brakes, and other locking devices on cranes.

(4) disengage clutches.

(5) put controls in the off or neutral position.

(6) open main switch or stop the engine.

(7) An exception to para. 8-3.1.3(d)(6) may exist when crane operation is frequently interrupted during a shift and the operator must leave the crane. Under these circumstances, the engine may remain running and the following conditions, including those in paras. 8-3.1.3(d)(1) through (d)(5) above, shall apply:

(a) the operator shall be where unauthorized entry of the crane can be observed

(b) the crane is located within an area protected from unauthorized entry

(8) When a local weather storm warning exists, consideration shall be given to the recommendations of the manufacturer for securing the crane.

(e) If there is a "Warning" or "Out of Service" sign on the switch or engine starting controls, the operator

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shall not close the switch or start the engine until the warning sign has been removed by the person who installed it.

(f) Before closing the switch or starting the engine, the operator shall see that all controls are in the off or neutral position and all personnel are in the clear.

(g) If power fails during operations, the operator shall

(1) set all brakes and locking devices

(2) move all clutches or other power controls to the off or neutral position

(3) if practical, land suspended load under brake control

(4) communicate with the appointed person in charge of operations

(h) The operator shall be familiar with the equipment and its proper care. If adjustments or repairs are necessary, the operator shall promptly report this to the appointed person. Upon changing shifts, the operator should also notify the next operator of any remaining uncorrected conditions.

(i) All controls shall be tested by the operator at the start of a new shift. If any controls fail to operate properly, they shall be adjusted or repaired before operations are begun.

SECTION 8-3.2: OPERATING PRACTICES

8-3.2.1 Load Weight

(a) No crane or derrick shall be loaded beyond the load rating, except for test purposes as provided in Section 8-2.2.

(b) When loads approach the maximum rating of the crane or derrick, the person responsible for the job shall ascertain that the weight of the load has been determined within ±10% before it is lifted.

(c) When operating in windy conditions, the rated load shall be reduced to allow for the wind effect on the lifted load.

(d) When rotation resistant ropes are used with an operating design factor less than 5, but in no case less than 3.5, the special provisions that follow shall apply.

(1) For each lifting equipment:

(a) an appointed person shall direct each lift.

(b) a qualified person shall ascertain that the rope is in satisfactory condition both before and after lifting; but more than one broken wire in any one lay shall be reason to consider not using the rope for such lifts. See paras. 8-2.4.1(a)(1) through (4).

(c) operations shall be conducted in such manner and at such speeds as to minimize dynamic effects.

(2) These provisions are not intended to permit duty cycle or repetitive lifts to be made with operating design factors less than 5.

8-3.2.2 Attaching the Load

(a) The hoist rope shall not be wrapped around the load.

(b) The load shall be attached to the hook by means of slings or other devices of sufficient capacity.

8-3.2.3 Moving the Load

(a) The person directing the lift shall see that the load is secured and balanced in the sling or lifting device before it is lifted more than a few inches.

(b) Before starting to hoist, the following conditions shall be observed:

(1) The hoist rope shall not be kinked.

(2) Multiple-part lines shall not be twisted around each other.

(3) The hook shall be brought over the load in such a manner as to minimize swinging.

(4) If there is a slack rope condition, it shall be determined that the rope is properly seated on the drum and in the sheaves as the slack is removed.

(c) During lifting operations, 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

(d) A crane or derrick shall not be used for side loading except when specifically authorized by a qualified person who has determined that the various structural components will not be overstressed. Otherwise, side loading of a crane boom shall be limited to freely suspended loads. Cranes shall not be used for dragging loads sideways.

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

(f) The operator shall test the brakes each time a load approaching the rated load is handled by raising it a few inches and applying the brakes.

(g) Neither the load nor the boom shall be lowered below the point where no less than two full wraps of rope remain on their respective drums.

(h) When rotating a crane or derrick, sudden starts and stops shall be avoided. Rotational speed shall be such that the load does not swing out beyond the radius at which it can be controlled. A tag or restraint line shall be used when rotation of the load is hazardous.

(i) Boom and hoisting rope systems shall not be twisted.

(j) When two or more cranes or derricks are used to lift one load, one designated person shall be responsible for the operation. He shall analyze the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made.

(k) When a crane is to operated with the boom at a fixed radius, the boom-hoist-pawl or other positive locking device shall be engaged.

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8-3.2.4 Holding the Load

(a) The operator shall not leave the controls while the load is suspended.

(b) No person should be permitted to stand or pass under a load on the hook.

(c) If the load hoist mechanism is not equipped with an automatic brake and the load must remain suspended for any considerable length of time, the operator shall hold the drum from rotating in the lowering direction by activating the device specified in para. 8-1.6.2(d). The boom hoist brakes shall be set and the device specified in para. 8-1.6.1(f) shall be engaged.

8-3.2.5 Use of Winch Heads

(a) Ropes shall not be handled on a winch head without the knowledge of the operator.

(b) While a winch head is being used, the operator shall be within reach of the power unit control lever.

8-3.2.6 Securing Booms

Crane booms and derrick booms are not normally designed to resist high wind loads. Unloaded booms shall not be left at high boom angles. Unless otherwise specified by the manufacturer, booms shall be lowered to deck level when winds exceed 50 mph (80 km/h).

(a) Derrick Booms. When not in use, the derrick boom shall be:

(1) laid down; or

(2) secured to a stationary member, as near under the head as possible, by attachment of a sling to the load block; or

(3) raised to a vertical position and secured to the mast.

(b) Crane Booms. When not in use, the crane boom shall be:

(1) lowered to the deck of the barge and secured; or

(2) secured on the boom rest or boom cradle, when provided.

(c) Derrick and Crane Booms. Dogs, pawls, or other positive locking mechanisms on the boom hoist shall be engaged.

8-3.2.7 Personnel Access

Means suitable for embarking and disembarking barges or pontoons shall be provided in accordance with applicable regulatory requirements.

8-3.2.8 Personnel Lifting

This volume recognizes that floating cranes and floating derricks are designed and intended for handling materials. They do not meet personnel lifting or elevator requirements. Therefore, no crane or derrick function shall be performed while a person is on the hook, load, manlift platform, boom, or other personnel lifting device attached to the crane load line or boom, unless each of the specific, special following requirements are met.

(a) The following special procedures shall be followed when personnel are to be lifted:

(1) The person on the jobsite specifically responsible for the overall work function to be performed shall determine that there is no practical alternate way to perform the needed work and authorize its usage.

(2) For each personnel lifting procedure, the person responsible for the task shall attest to the need for the operation by issuing a statement (describing the procedure and its time frame). The statement, after being approved by the authorizer, shall be retained at the jobsite.

(3) When used for lifting personnel, the crane or derrick shall be inspected daily in accordance with the requirements of paras. 8-2.1.2(a) and 8-2.4.1.

(4) The lift shall be made under controlled conditions and under the direction of an appointed signalperson.

(5) A meeting attended by the crane or derrick operator, signalperson, person(s) to be lifted, and the person responsible for the task to be performed shall be held daily to plan and review procedures to be followed, including procedures for entering and leaving the manlift platform and the points at which persons will enter and leave the platform.

(6) The operator and signalperson shall conduct an operational test lift with an empty manlift platform daily, before using.

(7) Communication between the operator, signalperson, and person(s) being lifted shall be maintained.

(8) Warning or limiting devices shall be installed to prevent two-blocking, unless audible communication has been provided and one of the persons being lifted has been specifically assigned the task of warning of the approach of a two-block condition.

(9) The crane or derrick shall be operated so that downward motion will be power controlled lowering (no free-fall).

(10) When welding is done by an employee on the platform, the electrode holders shall be protected from contact with metal components of the platform.

(11) Employees on the platform shall wear safety belts with lanyards attached, preferably above the hook or shackle.

(12) The operator shall remain at the controls when the platform is suspended.

(13) When lifting or lowering platforms, the operator shall control the speed and it shall not exceed 100 ft/min (0.51 m/s).

(14) Cranes or derricks shall not travel while personnel are on the platform.

(15) The employees being lifted, moved, or positioned shall remain in continuous sight or in communication with the operator or signalperson.

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(16) Cranes with outriggers shall have the outriggers extended and blocked.

(17) The total weight of the lifted load (including personnel) shall not exceed 50% of the crane or derrick rating.

(b) A platform that is designed and constructed in accordance with the following shall be used.

(1) The platform shall be designed by a qualified person.

(2) The platform shall be limited to a capacity of six persons.

(3) The platform and attaching devices shall have a minimum design factor of 5.

(4) The platform shall have a plate specifying the weight of the empty platform and the maximum number of persons and weight for which the platform is rated.

(5) The platform shall have standard railing as defined in ANSI A12.1.

(6) The sides of the platform shall be enclosed from floor to mid-rail.

(7) If access doors are installed, they shall open only to the interior of the platform. Access doors shall be equipped with a device to restrain the door from inadvertent opening.

(8) The platform shall have overhead protection when there is an overhead hazard.

(9) The platform shall be easily identifiable by high visibility color or marking.

(10) The platform shall be attached by means such as, but not limited to, shackle, hook (latched or moused), or wedge and socket attachment. A wedge and socket attachment shall have a clip on the free end of the load line (see Fig. 7).

(11) The suspension system shall minimize inclination of the platform due to the movement of personnel on the platform.

SECTION 8-3.3: SIGNALS

8-3.3.1 Standard Signals

Standard signals to the operator shall be in accordance with the standards prescribed in paras. 8-3.3.2 and 8-3.3.3, unless voice communication equipment (telephone, radio, or equivalent) is utilized. Signals shall be discernible or audible at all times. No response shall be made unless signals are clearly understood.

8-3.3.2 Hand Signals

Hand signals shall be in accordance with Fig. 9 and shall be posted conspicuously.

8-3.3.3 Bell Signals

Bells of different tone shall be used for boom and load. The signals shall be as follows:

(a) When operating, one bell means stop.

(b) When stopped, one bell means raise; two bells mean lower.

(c) When temporarily stopped, two bells alternately on boom and load mean dog it off or stop for some time.

(d) When dogged off, before starting, ring four bells alternately on boom and load, which means get ready to start work again.

8-3.3.4 Special Signals

Some special operations may require additions to, or modifications of, the basic signals standardized herein. In all such cases, these special signals should be agreed upon and understood by both the signalperson and the operator, and should not be in conflict with the standard signals.

8-3.3.5 Instructions

If it is desired to give instructions to the operator other than provided for in the standard signal system, the crane or derrick motions shall be stopped.

SECTION 8-3.4: MISCELLANEOUS

8-3.4.1 Fire Extinguishers

Operating and maintenance personnel shall be familiar with the use and care of the fire extinguishers provided. See para. 8-1.4.3(a).

8-3.4.2 Refueling

(a) When refueling with a portable container, it shall be a safety type and equipped with automatic closing spout and flame arrester.

(b) Machines shall not be refueled while the engine is running.

(c) Smoking or open flames shall be prohibited in the refueling area.

8-3.4.3 Operating Near Electric Power Lines

(a) Cranes or derricks shall be operated so that no part of the crane, derrick, or load enters into the danger zone shown in Fig. 10.

EXCEPTIONS:

(1) The danger zones may be entered if the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work, or

(2) The danger zone may be entered if insulating barriers (not a part of nor attachment to the crane or derrick) have been erected to prevent physical contact with the lines.

(1) For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load (including handling appendages) shall be 10 ft (3 m). For higher voltages, see Table 1.

(2) Caution shall be exercised when working near overhead lines, because they can move horizontally or vertically due to wind, moving the danger zone to new positions.

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Table 1 Required Clearance for Normal Voltage in Operation Near High Voltage Power Lines and Operation in Transit With No Load and Boom or Mast Lowered

Normal Voltage, kV (Phase to Phase)	Minimum Required Clearance, ft (m)
Operation Near High Voltage Power Lines	
To 50	10 (3.05)
Over 50 to 200	15 (4.60)
Over 200 to 350	20 (6.10)
Over 350 to 500	25 (7.62)
Over 500 to 750	35 (10.67)
Over 750 to 1000	45 (13.72)
Operation in Transit With No Load and Boom or Mast Lowered	
To 0.75	4 (1.22)
Over 0.75 to 50	6 (1.83)
Over 50 to 345	10 (3.05)
Over 350 to 750	16 (4.87)
Over 750 to 1000	20 (6.10)

(3) In transit, with no load and boom lowered, the clearance shall be as specified in Table 1.

(4) A qualified signalperson shall be assigned to observe the clearance and give warning when the crane or derrick is within a boom's length before approaching in the above limits.

(b) If cage-type boom guards, insulating links, or proximity warning devices were used on cranes or derricks, such devices shall not be a substitute for the requirements of para. 8-3.4.3(a), even if such devices are required by law or regulation. In view of the complex, invisible, and lethal nature of the electrical hazard involved and to lessen the potential of false security, limitations of such devices, if used, shall be understood by operating personnel and tested in the manner and intervals prescribed by the manufacturer of the device. Compliance with para. 8-3.4.3(a) is the recommended practice of this volume in determining proximity of the crane or derrick and its protuberances, including load, to electric power lines.

(c) Before the commencement of operations near electrical lines, the person responsible for the job shall notify the owners of the lines or their authorized representatives, provide them with all pertinent information, and request their cooperation.

(d) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities verifies that it is not an energized line.

(e) Exceptions to this procedure, if approved by the owner of the electrical lines, may be granted by the administrative or regulatory authority if the alternate procedure provides protection and is set forth in writing.

8-3.4.4 Cab or Operating Enclosure

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

(b) Tools, oilcans, waste, extra fuses, and other necessary articles shall be stored in the toolbox, and shall not be permitted to lie loose in or about the cab or operating enclosure.

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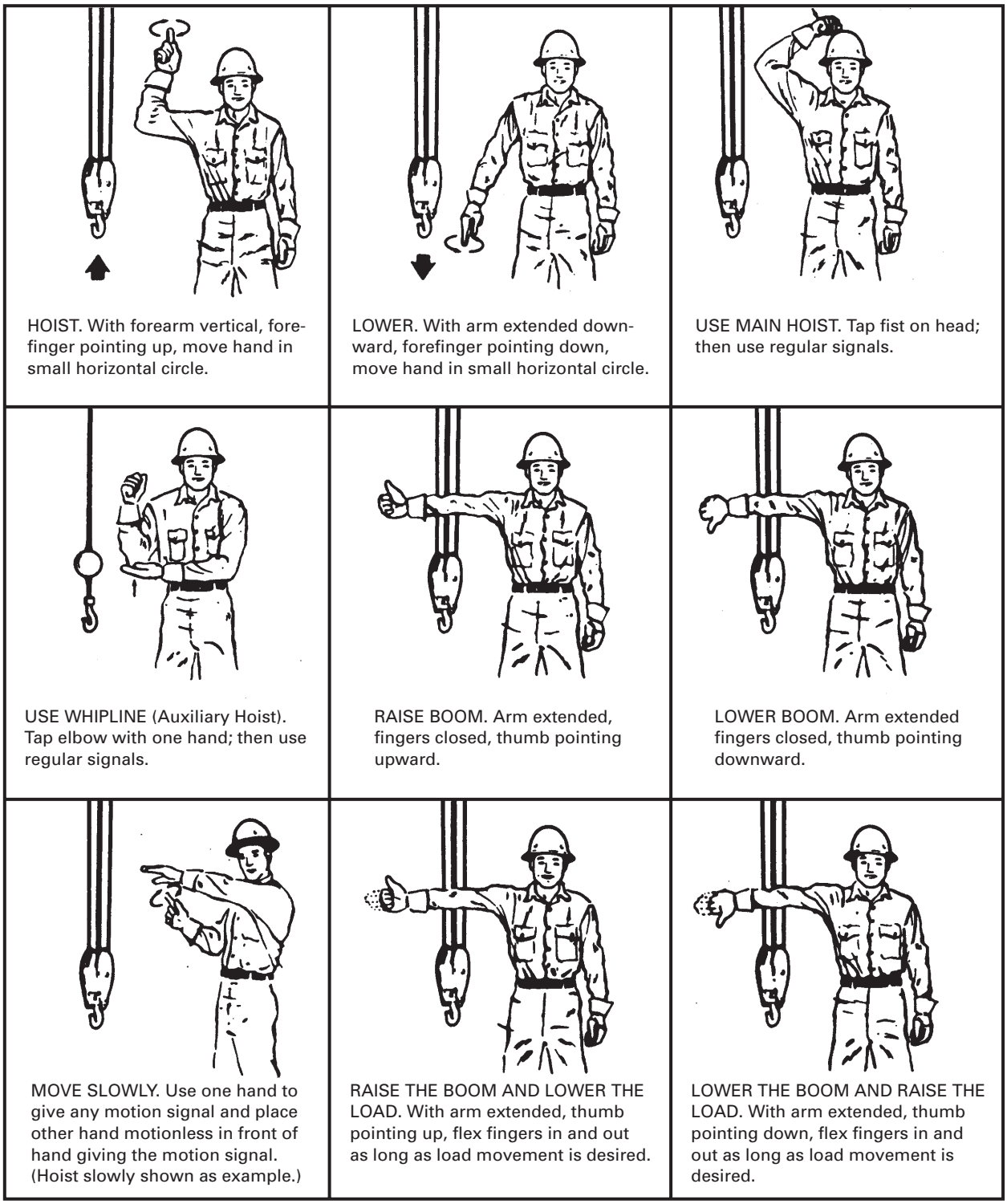


Fig. 9 Standard Hand Signals for Controlling Crane and Derrick Operations

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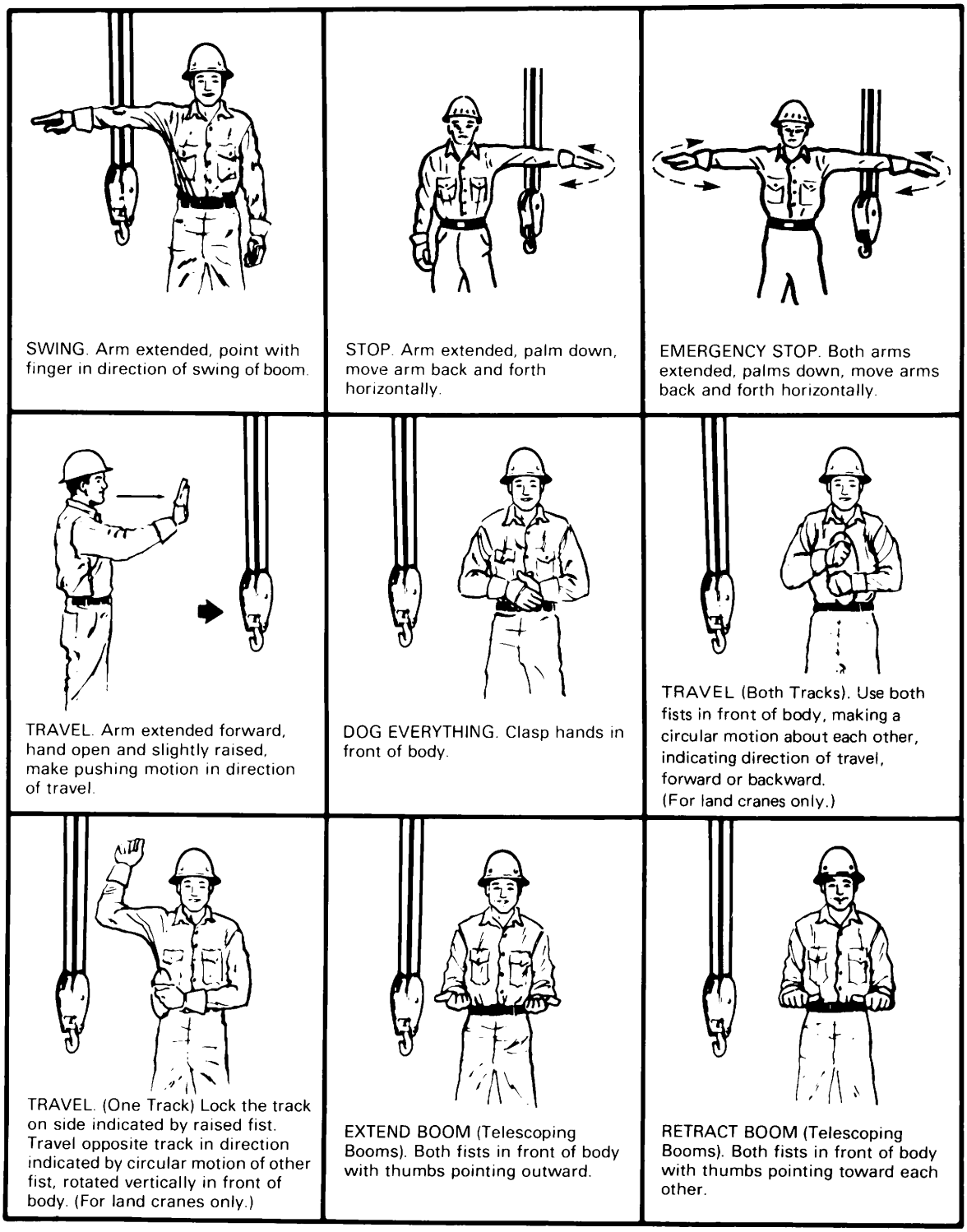


Fig. 9 Standard Hand Signals for Controlling Crane and Derrick Operations (Cont'd)

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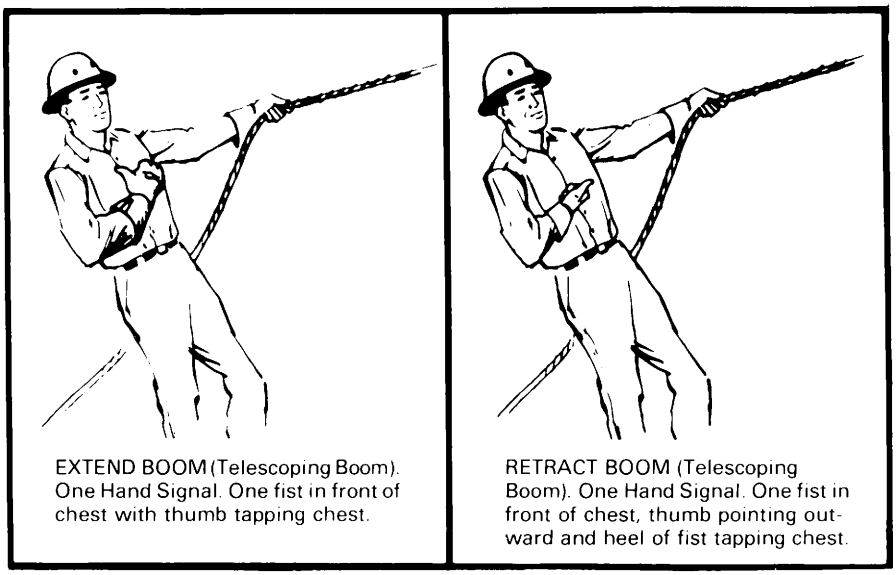
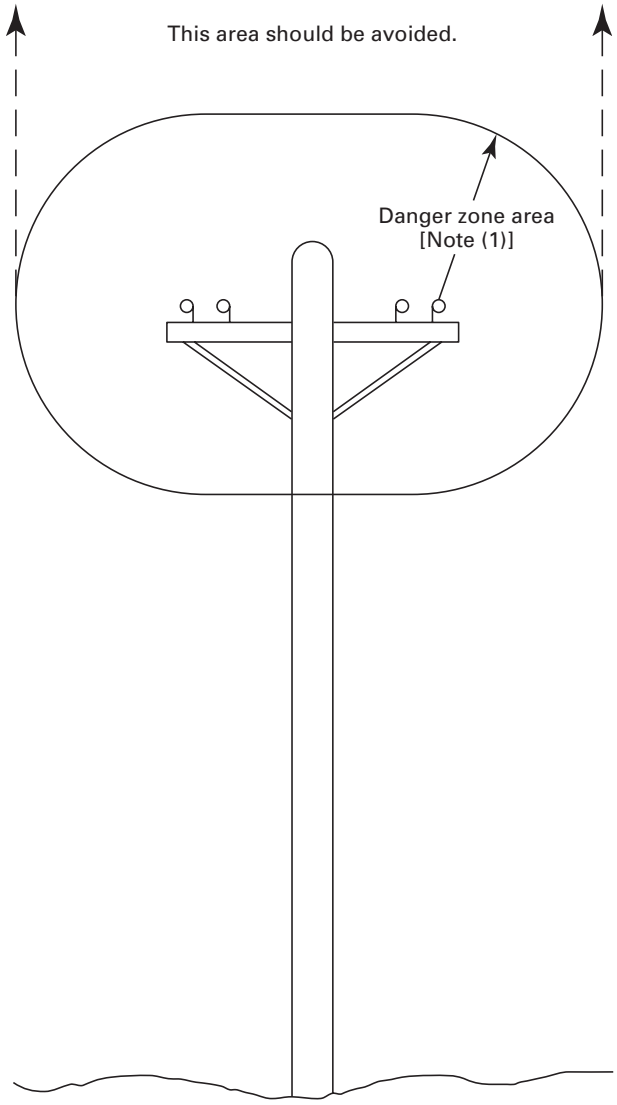


Fig. 9 Standard Hand Signals for Controlling Crane and Derrick Operations (Cont'd)

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NOTE:
(1) For minimum radial distance of danger zone, see para. 8-3.4.3.

Fig. 10 Danger Zone for Cranes, Derricks, and Lifted Loads Operating Near Electrical Transmission Lines

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