ASME B30.12-2024
[Revision of ASME B30.12-2011 (R2021)]

Handling Loads Suspended From Rotorcraft

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

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

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This Standard will be revised when the Society approves the issuance of a new edition. This Standard will become effective 1 year after the Date of Issuance.

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Two Park Avenue, New York, NY 10016-5990

CONTENTS

FOREWORD

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

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

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

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

Due to changes in design, advancement in techniques, and general interest of labor and industry in safety, the Sectional Committee, under the joint sponsorship of ASME and the Bureau of Yards and Docks (now the Naval Facilities Engineering Command), was reorganized on January 31, 1962, with 39 members representing 27 national organizations. The new Committee changed the format of ASA B30.2-1943 so that the multitude of equipment types it addressed could be published in separate volumes that could completely cover the construction, installation, inspection, testing, maintenance, and operation of each type of equipment that was included in the scope of ASA B30.2. This format change resulted in B30.3, B30.5, B30.6, B30.11, and B30.16 being designated as revisions of B30.2 with the remainder of the B30 volumes being published as totally new volumes. ASA changed its name to USASI in 1966 and to ANSI in 1969, which resulted in B30 volumes from 1943 to 1968 being designated as either ASA B30, USAS B30, or ANSI B30, depending on their date of publication.

In 1982, the Committee was reorganized as an Accredited Organization Committee operating under procedures developed by ASME and accredited by ANSI. This Standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment falling within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees.

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

This edition of the B30.12 Volume was approved by the B30 Committee and by ASME and was revised in its entirety. It was approved by ANSI and designated as an American National Standard on September 5, 2024.

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

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

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Revisions and Errata. The committee processes revisions to this Standard on a periodic basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases. The committee does not issue cases for this Standard.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Inquiry Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic email confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at https://go.asme.org/Interpretations.

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Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The B30 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B30committee.

B30 STANDARD INTRODUCTION

SECTION I: SCOPE

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

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

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

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

B30.3 Tower Cranes

B30.4 Portal and Pedestal Cranes

B30.5 Mobile and Locomotive Cranes

B30.6 Derricks

B30.7 Winches

B30.8 Floating Cranes and Floating Derricks

B30.9 Slings

B30.10 Hooks

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

B30.12 Handling Loads Suspended From Rotorcraft

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

B30.14 Side Boom and Rotating Pipelayers

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

B30.16 Overhead Underhung and Stationary Hoists

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

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

B30.19 Cableways

B30.20 Below-the-Hook Lifting Devices

B30.21 Lever Hoists

B30.22 Articulating Boom Cranes

B30.23 Personnel Lifting Systems

B30.24 Container Cranes

B30.25 Scrap and Material Handlers

B30.26 Rigging Hardware

B30.27 Material Placement Systems

B30.28 Balance Lifting Units

B30.29 Self-Erecting Tower Cranes

B30.30 Ropes

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

B30.32 Unmanned Aircraft Systems (UAS) Used in Inspection, Testing, Maintenance, and Load-Handling Operations

SECTION II: SCOPE EXCLUSIONS

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

SECTION III: PURPOSE

The B30 Standard is intended to

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

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

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

SECTION IV: USE BY REGULATORY AGENCIES

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

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

SECTION V: EFFECTIVE DATE

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

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

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

SECTION VI: REQUIREMENTS AND RECOMMENDATIONS

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

SECTION VII: USE OF MEASUREMENT UNITS

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

SECTION VIII: ADDITIONAL GUIDANCE

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

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

(a) the condition of the equipment or material
(b) the loads
(c) the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums
(d) the type of attachments
(e) the number, size, and arrangement of sheaves or other parts
(f) environmental conditions causing corrosion or wear
(g) many variables that must be considered in each individual case

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

ASME B30.12-2024
SUMMARY OF CHANGES

Following approval by the ASME B30 Standards Committee and ASME, and after public review, ASME B30.12-2024 was approved by the American National Standards Institute on September 5, 2024.

ASME B30.12-2024 has been revised in its entirety.

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Chapter 12-0
Scope, Definitions, and References

SECTION 12-0.1: SCOPE

Within the general scope as defined in the Introduction, Section I, this Volume applies to the load-handling activity (LHA) of loads suspended from rotorcraft using a cargo sling or powered hoist, or other attaching means to lift, carry, pull, or tow a jettisonable load outside of the rotorcraft airframe. This Volume does not establish any design specifications for the rotorcraft or the nonhuman external cargo (NHEC) components specified by the rotorcraft manufacturer and this Volume is not applicable to unmanned aerial vehicles (UAV). See ASME B30.32 for UAVs.

SECTION 12-0.2: PURPOSE

The purpose of this Volume is to protect flight crews, ground personnel, and property on the surface while working directly with or in the vicinity of rotorcraft conducting non-human external-load operations.

SECTION 12-0.3: DEFINITIONS

12-0.3.1 Rotorcraft External Load Classifications

Class A rotorcraft external load: a load combination in which the external load cannot move freely, cannot be jettisoned, and does not extend below the landing gear. This category usually features multiple attachments to the airframe. A typical example is a hard-mounted cargo basket attached to the rotorcraft airframe that is used to carry cargo from points A to B.

Class B rotorcraft external load: a load combination in which the external load is jettisonable and lifted free of land or water during the rotorcraft LHA. The load is typically suspended from a hook or similar device. The hook may be attached to the rotorcraft structure or to a movable hoist cable and the hoist itself rigidly attached to the rotorcraft. Typical use is to lift a cargo load until it is completely airborne and fly it from points A to B.

Class C rotorcraft external load: a load combination in which the external load is jettisonable and remains in contact with land or water during rotorcraft operation. The load is typically partially suspended by a net, slings, or ropes from a cargo hook or similar device. The cargo hook may be attached to the rotorcraft structure, or to a movable hoist cable and the hoist itself rigidly attached to the rotorcraft. It is typically used for stringing wire or laying cable, rope, strand, etc., where the load is partially suspended from the ground or attached to a structure elevated from the ground.

Class D rotorcraft external load: a load combination in which the external load is other than a Class A, B, or C, and has been specifically approved by the administrator for that operation. This load combination includes human cargo. For human cargo operations, the load that typically consists of personnel and their containment device is suspended from a hook or similar device during all or part of the flight. The hook may be attached to a movable hoist cable and the hoist itself rigidly attached to the rotorcraft. Typical use is for transfer of personnel to or from a ship. Carrying devices may transport one or more persons. Typical carrying devices are vest and straps, baskets, life preservers with straps and attachment devices, cages, harnesses, or a suspended container (included for reference only).

12-0.3.2 General Definitions

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

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

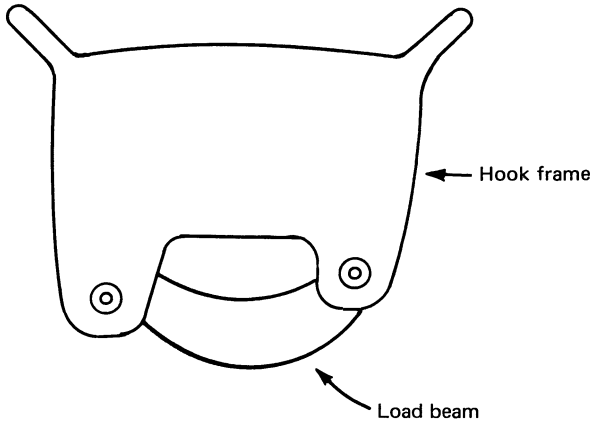
administrator: the Federal Aviation Administrator or any person to whom the administrator has delegated authority in the matter concerned.

aircraft: a device that is used or intended to be used for flight in the air.

airframe: the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors but excluding propellers and rotating airfoils of engines), and landing gear of an aircraft, and their accessories and controls.

approach or departure path: a prescribed area extending outward and upward at a prescribed ratio from a landing or takeoff area.

Figure 12-0.3.2-1
Hook With Closed-Throat Load Beam



attitude: the position of the rotorcraft or suspended load with reference to a horizontal position, such as nose up or down.

backup quick-release subsystem (BQRS): the secondary or second-choice subsystem used to perform a normal or emergency jettison of external cargo.

bank angle: the angle between the lateral axis of flight and the horizon.

below-the-hook lifting device: a device used for attaching a load to a hoist, hook, or load attachment point. The device may contain components such as slings, hooks, and rigging hardware addressed by other volumes of the ASME B30 Standard.

birdcaging: a rope condition that results in deformation with the outer strands being displaced away from the rope axis. It is usually the result of shock loading or localized twisting in a rope.

cargo: the part of the rotorcraft load combination that is removable, changeable, and attached to the rotorcraft by an approved means.

cargo net: a type of net made of synthetic rope, or wire rope that is typically square or rectangle with cinch ropes extending from the corners.

chocking: blocking to prevent rolling or other inadvertent movement of the wheels of an aircraft when on the ground or other supported areas with a block of wood, metal, or other substance.

choker hitch: a method of rigging a sling in which the sling is passed around the load, then through one loop eye, end fitting, or another device with the loop eye or end fitting attached to the lifting device. This hitch can be made with a sliding choker hook or similar device.

closed-throat load beam: the weight-bearing part of a primary cargo hook that shall be manually relatched or closed. See Figure 12-0.3.2-1.

commercial operator: the company, firm, individual, or other business enterprise that, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property.

container, load: a conveyance used to transport material with attachments points used to secure itself and cargo to the rigging.

contractor: the company, firm, individual, other business enterprise, or entity that contracts with a commercial operator to perform work.

copilot: a pilot who is designated to be second in command of an aircraft during flight time.

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

designed breaking load: the minimum load at which a newly fabricated and unused sling is expected to break when loaded to destruction in direct tension.

design factor: ratio between nominal or minimum breaking force and rated load of the component.

dynamic rollout: a situation that can occur when loads are hooked up to certain hoist or longline hooks not currently under a load. Also called *ring rollout*.

external lift or load operation: any operation involving a rotorcraft carrying an external load.

external load: a load that is carried or extends outside of the aircraft fuselage.

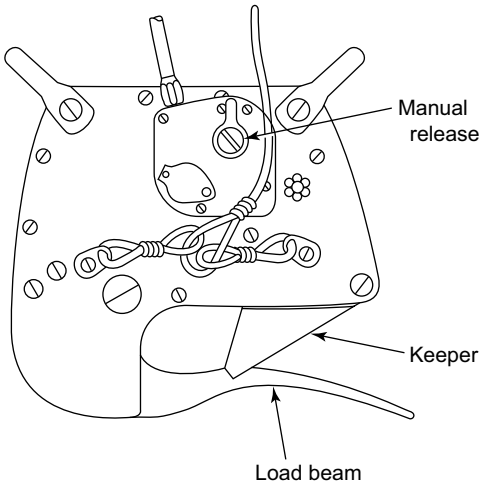
external load attaching means: the structural components used to attach an external load to an aircraft, including external load containers, the backup structure at the attachment points, and any quick-release device used to jettison the external load. This includes any structure, mounts, hooks, hoists, and lines used to connect the external load.

flexible intermediate bulk container (FIBC): a fluid (solid in the granulated or suspension form) handling container whose contents conform to its shape, and whose contents exert a pressure on the supporting surfaces of the container. Also called a *super sack*.

flight crew member: a person assigned to perform duty in an aircraft during flight time.

flight visibility: the average forward, horizontal distance from the cockpit of an aircraft in flight at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.

Figure 12-0.3.2-2
Hook With Open-Throat Load Beam



ground crew: a group of designated persons specifically required to be on or near the job site in support of the load handling activity.

helicopter: a rotorcraft that derives its horizontal and vertical flight ability primarily from its engine-driven rotors. In this Volume, it will be the basic vehicle for lifting, hoisting, pulling, towing, and moving cargo.

hoist (noun): a powered, airframe-mounted device for raising or lowering a rotorcraft external load.

hoist (verb): to raise or lower a load with a rotorcraft-mounted hoist.

hook, primary cargo: a device attached to or suspended from an aircraft that is used to connect an external load to the aircraft through direct coupling or by leadlines; this unit features both a primary (electrical) quick-release device and a backup (nonelectric) quick-release device.

hook cage enclosure: a guard placed around the remote cargo hook to prevent accidental contact with adjacent objects or structures.

human external cargo (HEC): a person or persons that at some point in the operation is carried external to the rotorcraft.

jettison, emergency: the intentional, instantaneous release of nonhuman external cargo or human external cargo in a preset sequence by the quick-release system that is normally performed to achieve safer operation of the rotorcraft in an emergency. Also called *complete load release.*

jettison, normal: the intentional release, normally at optimum jettison conditions, of nonhuman external cargo. Also called *selective load release.*

jettisonable load: a Class B, C, or D rotorcraft external load that can be intentionally released by the pilot in command or designated flight crew member in flight, using either a primary quick-release system or backup quick-release subsystem.

keeper: a device, usually spring loaded, that prevents the apex fitting of a sling from slipping off the load beam of the cargo hook (see Figure 12-0.3.2-2).

kilovolt (kV): equal to 1,000 V of electricity.

large aircraft: an aircraft of more than 12,500 lb maximum certificated takeoff weight.

leadline: an external load attachment sling system in which any combination of load and line causes the external load to extend 50 ft or less beneath the aircraft fuselage when suspended from the aircraft's primary cargo hook, or hoist.

lift: to raise the load by flight of the rotorcraft.

lift director: the person designated to direct the load handling activity. Also called *load handling director.*

lifting attachment: a load-supporting device that is bolted or permanently attached to the lifted load, such as lifting lugs, padeyes, trunnions, and similar appurtenances.

limit load: the maximum load to be expected in service.

limit switch: a device that, by predetermined adjustment, limits the rotational or linear movement of a mechanism.

load: the static weight of the object being lifted or lowered, including the sling and any other ancillary attachments, not included as part of the rotorcraft or rotorcraft hoist system.

load factors:

load factor, bank angle (BLF): the static equilibrium derived from the angle of loading between the rigging equipment (e.g., longline and a horizontal plane through rigging the attachment point to the rotorcraft).

load factor, combined (CLF): the product of the drag load factor × bank load factor × *g*s where "*g*s" is a multiple to the acceleration due to gravity.

load factor, drag (DLF): the static equilibrium derived from the angle of loading between the rigging equipment (e.g., longline and a vertical rigging attachment point to the rotorcraft).

load ratings: the maximum load that a rotorcraft or other item of lifting equipment is authorized to lift, as specified by the manufacturer, the Federal Aviation Administration, or the applicable regulatory authority.

longline: an external load attachment sling system in which any combination of load and line causes the external load to extend greater than 50 ft beneath the aircraft fuselage when suspended from the aircraft's primary cargo hook, or hoist.

main rotor: one or more rotors that supplies the principal lift to a rotorcraft.

manual-release device: a cargo hook-mounted, mechanical release mechanism typically used by ground crews to open the cargo hook independent from the rotorcraft's primary quick-release subsystem or backup quick-release subsystem (see Figure 12-0.3.2-2).

maximum gross weight: the maximum approved gross weight of the rotorcraft and its load in any configuration.

nonhuman external cargo (NHEC): any external cargo operation that does not, at any time, involve a person carried external to the rotorcraft.

open-throat load beam: that load-bearing member of a cargo hook designed so that in its normal operating position, it is possible to slide the apex fitting of a sling directly onto the load beam without opening the hook (see Figure 12-0.3.2-2).

operation: the use of a rotorcraft lifting loads outside its fuselage to accomplish various lifting and placing tasks. The task may consist of just one lift or may be of long or indefinite duration. (See also *external lift or load operation*.)

operator (rotorcraft): the company, firm, individual, or other business enterprise owning or leasing the rotorcraft that is responsible for its operation and airworthiness.

pilot in command (PIC): the person who has the final authority and responsibility for the operation and safety of the flight, has been designated as pilot in command before or during the flight, and holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight.

primary quick-release subsystem: the first-choice subsystem used to perform a normal or emergency jettison of external cargo.

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

quick-release system: the entire release system for jettisonable external cargo (i.e., the sum total of both the primary quick-release subsystem and basic quick-release subsystem), which consists of all components, including the controls, the release devices, and any other associated components.

rated load: the maximum allowable working load established by the lifting component manufacturer.

rated load, rotorcraft: the maximum allowable gross weight of the rotorcraft and any external load combination established by the rotorcraft manufacturer, and regulated by the Federal Aviation Administration or authority having jurisdiction.

rating: a statement that, as a part of a certificate, sets forth special conditions, privileges, or limitations.

rescue hook: a hook that can be rated for both human external cargo and nonhuman external cargo. It is typically used in conjunction with a winch or hoist or equivalent system.

rope: a wire rope, unless otherwise specified.

rotorcraft: a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors.

rotorcraft flight manual: the Federal Aviation Administration- or other regulatory authority-approved flight manual issued by the rotorcraft manufacturer that defines the operating limitations for each aircraft.

rotorcraft ground crew: those personnel designated by a rotorcraft operator or the pilot in command to support and assist the pilot in command in the conduct of an external load operation.

rotorcraft load combination (RLC): the combination of a rotorcraft and an external load, including the external load-attaching means. Rotorcraft load combinations are designated as Classes A, B, C, and D.

rotorcraft load combination operation and flight manual: the Federal Aviation Administration- or other regulatory authority-approved manual prepared and used by the aircraft operator, designating each rotorcraft model's limitations, performance, and procedures for which the airworthiness of the rotorcraft has been demonstrated.

rotorcraft owner: one who has custodial control of a rotorcraft by virtue of lease or ownership.

rotorcraft user: one who has physical control of a rotorcraft by virtue of lease or rental.

second in command: a pilot who is designated to be second in command of an aircraft during flight time. (See also *copilot*.)

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.

signalperson: a designated individual who, through radio, intercom, or standardized hand signals, can direct the pilot in command when a load is being lifted or set into place.

site supervisor: the person who exercises supervisory control over the worksite on which the rotorcraft is being used and over the work that is being performed on that site.

small aircraft: an aircraft of maximum certificated takeoff weight of 12,500 lb or less.

suspended load drag angle: the angle formed between a vertical line passing through the suspension point of the load and trailing line suspending the load.

tagline: a line attached to a load used as a guide or restraint by the ground or erecting crew.

tail rotor: a small, horizontally positioned auxiliary rotor system located at the rear (tail) of the helicopter that provides anti-torque thrust in the appropriate direction to neutralize the main rotor torque effect inherent in single-rotor helicopters.

vertical acceleration: the change in velocity vertically during the ascent or descent of a body and is expressed as a factor of the gravitational acceleration, *g*.

vertical reference: the pilot in command technique of controlling the aircraft while look in g down vertically at the load attached to the cargo hook.

SECTION 12-0.4: ABBREVIATIONS AND ACRONYMS

BLF = bank angle load factor
BQRS = backup quick-release subsystem
BTH = below the hook
CLF = combined load factor
DLF = drag angle load factor
FAA = Federal Aviation Administration
FAR = Federal Aviation Regulations
FIBC = flexible intermediate bulk containers
LHA = load handling activities
LHE = load handling equipment
NHEC = nonhuman external cargo
PIC = pilot in command
RLC = rotorcraft load combination

SECTION 12-0.5: REFERENCES

The following is a list of publications referenced in this Volume:

ASME B30.9-2021. Slings. The American Society of Mechanical Engineers.
ASME B30.10-2019. Hooks. The American Society of Mechanical Engineers.
ASME B30.20-2021. Below-the-Hook Lifting Devices. The American Society of Mechanical Engineers.
ASME B30.26-2015 (R2020). Rigging Hardware. The American Society of Mechanical Engineers.
ASME BTH-1–2023. Design of Below-the-Hook Lifting Devices. The American Society of Mechanical Engineers.
ASTM A391-2021. Specifications for Alloy Steel Chain. ASTM International.
FAR Part 1. Definitions and Abbreviations. https://www.ecfr.gov/current/title-14/part-1
FAR Part 21. Certification Procedures for Products and Articles. https://www.ecfr.gov/current/title-14/part-21
FAR Part 27. Airworthiness Standards: Normal Category Rotorcraft. https://www.ecfr.gov/current/title-14/part-27
FAR Part 29. Airworthiness Standards: Transport Category Rotorcraft. https://www.ecfr.gov/current/title-14/part-29
FAR Part 43. Maintenance, Preventive Maintenance, Rebuilding, and Alteration. https://www.ecfr.gov/current/title-14/part-43
FAR Part 61. Certification: Pilots, Flight Instructors, and Ground Instructors. https://www.ecfr.gov/current/title-14/part-61
FAR Part 63. Certification: Flight Crewmembers Other Than Pilots. https://www.ecfr.gov/current/title-14/part-63
FAR Part 65. Certification: Airmen Other Than Flight Crewmembers. https://www.ecfr.gov/current/title-14/part-65
FAR Part 67. Medical Standards and Certification. https://www.ecfr.gov/current/title-14/part-67
FAR Part 91. General Operating and Flight Rules. https://www.ecfr.gov/current/title-14/part-91
FAR Part 133. Rotorcraft External-Load Operations. https://www.ecfr.gov/current/title-14/part-133
IHOG, NFES 001885 (2013). Interagency Helicopter Operations Guide. National Wildfire Coordinating Group.
ISO 21898:2004. Packaging — Flexible intermediate bulk containers (FIBCs) for non-dangerous goods. International Organization for Standardization.
NFPA 10 (2010). Standard for Portable Fire Extinguishers. National Fire Protection Association.
NFPA 407 (2007). Standard for Aircraft Fuel Servicing. National Fire Protection Association.
UPAC Safety Guide for Helicopter Operators (2015). Helicopter Association International.
USAAMRDL Technical Report 72-36 (1972). Design Guide for Load Suspension Points, Slings, and Aircraft Hard Points. Department of the Army.

Chapter 12-1
External Load Ratings and Characteristics

SECTION 12-1.1: LOAD RATINGS

12-1.1.1 Rotorcraft

The rotorcraft load combination (RLC) may only be operated within the limitation parameters as established by the rotorcraft manufacturer.

12-1.1.2 External Load Attaching Means

The rotorcraft shall be certified by the Federal Aviation Administration (FAA) or authority having jurisdiction for specific external load classifications for non-human external cargo (NHEC). The users and owners shall provide and use rotorcraft and components for NHEC operations that are compliant with the requirements of the FAA or other authority having jurisdiction.

12-1.1.3 Primary Hooks

The primary hook's rated capacity on the rotorcraft for NHEC shall be as specified by the manufacturer. Load handling activities (LHA) shall not exceed the hook manufacturer's rating or the certification of the FAA or other authority having jurisdiction.

12-1.1.4 Hoist

The hoist rated capacity on the rotorcraft for NHEC shall be as specified by the manufacturer. LHA shall not exceed the hoist manufacturer's rating or the certification of the FAA or other authority having jurisdiction.

SECTION 12-1.2: LOAD CHARACTERISTICS AND CONTROL

During NHEC operations, abnormal operating conditions as well as the load's size, composition, and weight shall, in the judgment of the pilot in command (PIC), not adversely affect the airworthiness and safety of the rotorcraft. The PIC shall refuse to undertake any LHA that in the PIC's judgement will adversely affect the airworthiness and safety of the rotorcraft.

Recommendations of the PIC for the use of additional load handling control means (such as drogue chutes) to assist in the airworthiness of the rotorcraft shall be implemented prior to commencing NHEC operations.

Chapter 12-2
Lifting — Rigging Components

SECTION 12-2.1: HOOK WITH OPEN-THROAT LOAD BEAM

12-2.1.1 Rotorcraft External-Load Attaching Means

Rotorcraft external-load attaching means shall be specified by the rotorcraft manufacturer and approved by the FAA or authority having jurisdiction.

12-2.1.2 Remote Cargo Hook Arrangements (Non-External-Load Attaching Means)

Only cargo hooks of the self-locking type, having a quick-release system operable by the flight crew during flight, shall be used as remote cargo hooks. See Figure 12-2.1.2-1.

NOTE: The remote cargo hook is typically attached to the rotorcraft main structure or other features designed into the rotorcraft that meet FAA regulations or authority having jurisdiction.

SECTION 12-2.2: IMPACT OF ROTORCRAFT MANEUVERING ON RESULTANT FORCES ON RIGGING COMPONENTS

12-2.2.1 Combined Maneuvering Forces, Tension, or Load on Rigging Components

(a) The effects of bank angle (see Figure 12-2.2.2-1), drag angle (see Figure 12-2.2.3-1), and acceleration shall be considered and applied by the PIC or a qualified person when sizing the rigging components for load handling activities. The calculated combined forces of maneuvering (bank, drag, acceleration, environment) on rigging components shall be evaluated and approved by the PIC.

(b) The rigging components rated capacities shall be sufficient for the load combination creating the highest rigging component tension during LHA, and shall have addressed at least

(1) load weight and bank angle load factor (BLF)

(2) load weight and drag angle load factor (DLF)

(3) load weight and vertical acceleration (*gs*)

(4) sling angle to the line of action of the longline or leadline in use

(5) any other factors that impose additional forces on the rigging components including environmental conditions

12-2.2.2 Rotorcraft Bank Angle Impact on Rigging Components Strength

The tension in the load's rigging components will increase due to forces imposed by a rotorcraft's bank angle while in flight. The PIC shall evaluate the rated load of the rigging components to ensure they are of sufficient capacity to meet both the effects of the load's weight and any anticipated bank angle (see Figure 12-2.2.2-1). BLFs can be found in Nonmandatory Appendix A along with a calculation method.

12-2.2.3 Rotorcraft Drag Angle Impact on Rigging Components Strength

The tension in the load's rigging components will increase due to forces imposed by the load's drag angle while in flight. The PIC shall evaluate the rated load of the rigging components used to ensure they are of sufficient capacity to meet both the effects of the load's weight and any anticipated drag angle. Drag forces may be reduced by increasing the length of longline or leadline in use (see Figure 12-2.2.3-1). DLFs can be found in Nonmandatory Appendix A along with a calculation method.

12-2.2.4 Changes in Acceleration

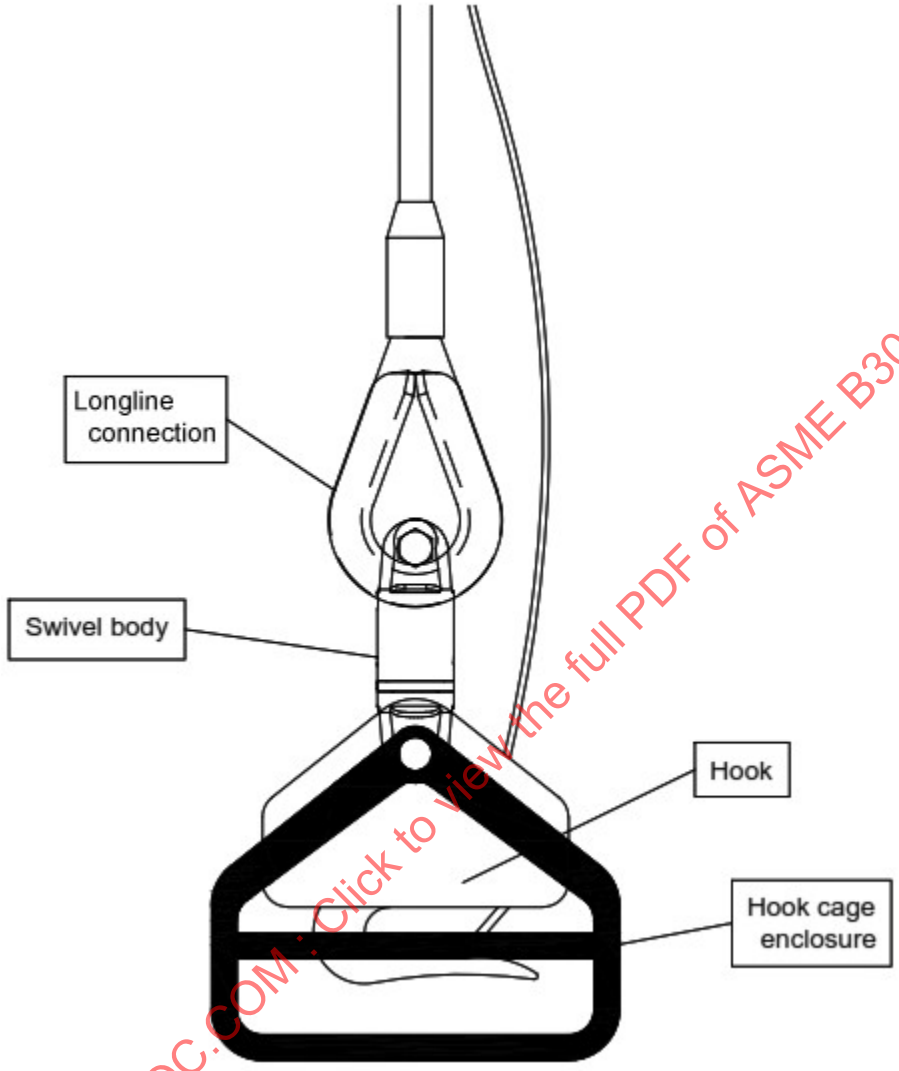
The tension in the load's rigging components will increase due to forces imposed by changes in vertical acceleration of a rotorcraft while in flight. The PIC shall evaluate the rated load of the rigging components used to ensure they are of sufficient capacity to accept both the effects of the load's weight and any expected vertical acceleration. Vertical acceleration factors used shall be those provided in the rotorcraft manufacturer's operation documentation or by communication with the rotorcraft manufacturer, or as specified by the PIC.

SECTION 12-2.3: LONGLINES AND LEADLINES

12-2.3.1 Longline

Figure 12-2.3.1-1 represents an in-field assembly of a longline consisting of compatible structural assemblies. Electrical components used in any longline assembly

Figure 12-2.1.2-1
Remote Cargo Hook Including Hook Cage Enclosure, Swivel Electrical Connection, and Connection for Longline



shall be compatible with the rotorcraft and the assembled longline shall be operationally tested prior to use.

12-2.3.1.1 Synthetic Rope Longline. Longlines shall be constructed using high performance synthetic ropes in accordance with ASME B30.30, Chapter 30-2.

(a) Longlines shall have a minimum length of 50 ft including end fittings.

(b) Synthetic longlines shall be sized not less than ½ in. diameter.

(c) Synthetic longlines, including rope terminations, shall have a minimum design factor of 5 based on para. 12-2.2.1.

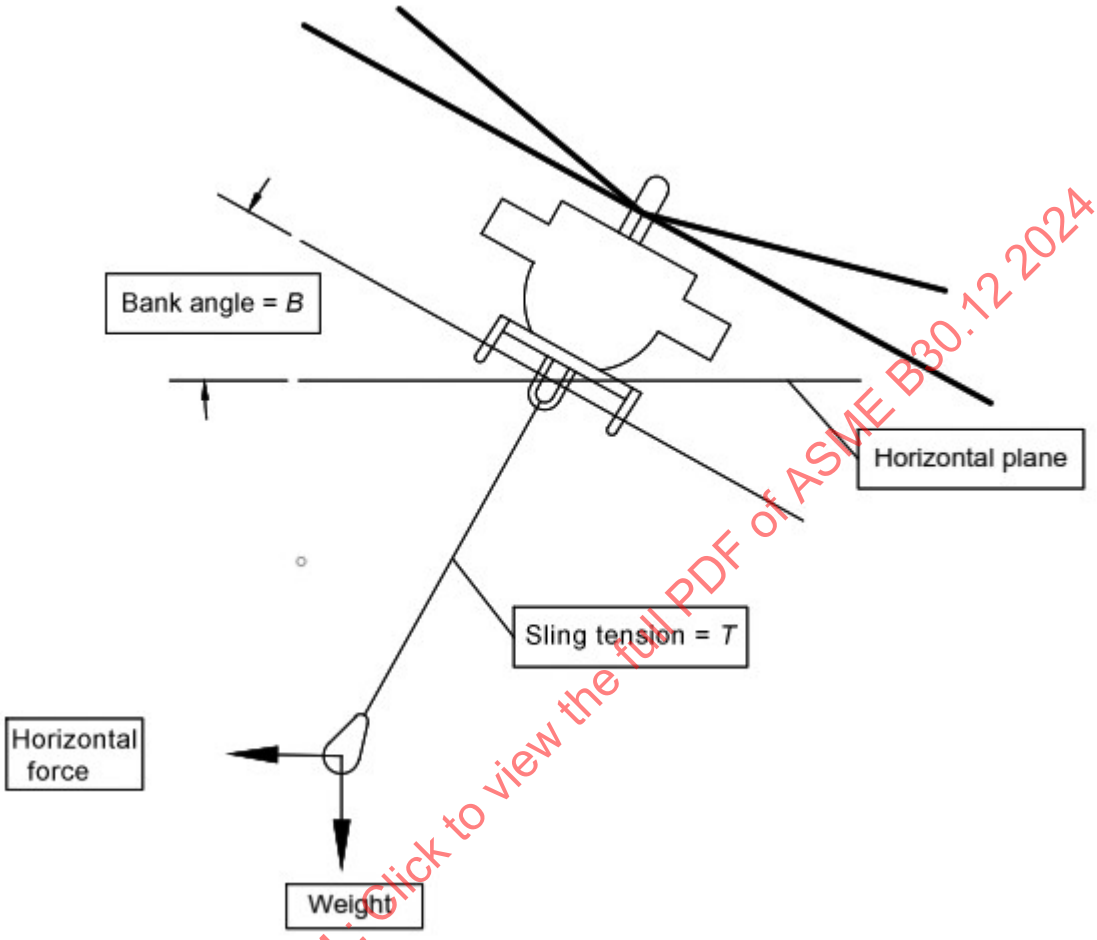
(d) Longlines designed, constructed, and selected based on (c) shall be proof tested to two times its rated load by the longline manufacturer. The proof tested longline shall be inspected in accordance with the manufacturer's inspection criteria for removal from service.

(e) Synthetic longline certification and identification markings shall comply with ASME B30.30, para. 30-2.5.5.

(f) Longlines should be weighted to reduce the hazards from excess line movement caused by rotor wash and turbulence.

12-2.3.1.2 Wire Rope Longline. External loads should be lifted with longlines manufactured using rotation-resistant wire rope. Alternative wire rope selection for

Figure 12-2.2.2-1
Diagram Showing the Effects of Rotorcraft Bank Angle on Rigging



longline fabrication and use shall be evaluated by a qualified person for hazards related to the types of LHA planned. These hazards may include unlaying of the wire rope strands caused by rotation.

Wire rope longline shall have a minimum design factor of 5 including rope terminations based on para. 12-2.2.1.

12-2.3.2 Synthetic and Wire Rope Leadlines

Leadlines shall be approved by the PIC for use in LHA. Figure 12-2.3.2-1 shows an example of a standard leadline. Leadline particulars shall include the following:

(a) a minimum length of 12 ft

(b) a maximum length that shall not exceed 50 ft, including end fittings

(c) a minimum of ½ in. diameter

12-2.3.2.1 Synthetic Rope Leadline. Leadlines shall be constructed using high performance synthetic ropes in accordance with ASME B30.30, Chapter 30-2.

(a) Synthetic leadlines, including rope terminations, shall have a minimum design factor of 5 based on para. 12-2.2.1.

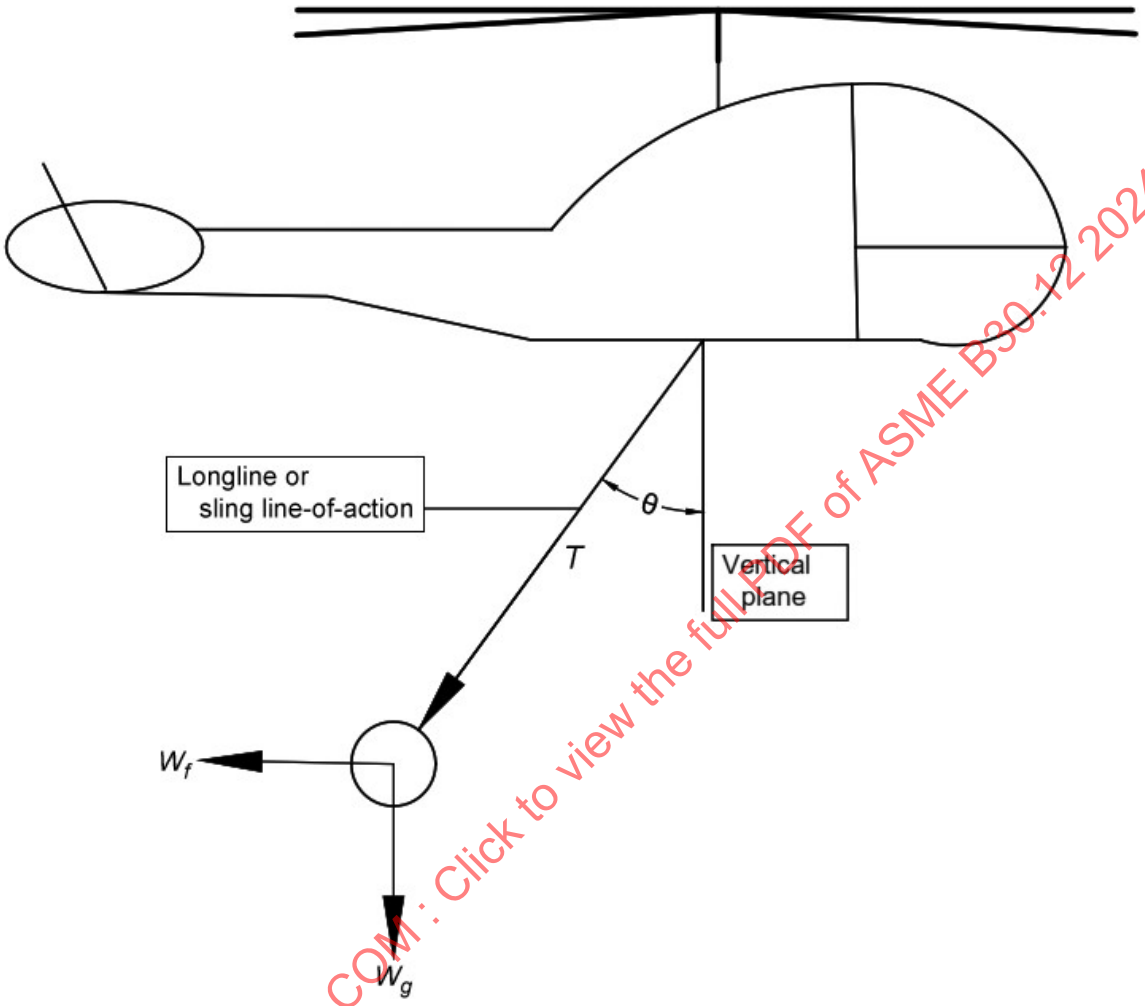
(b) Leadlines shall be weighted to eliminate the hazard of entanglement with rotorcraft rotors, and any other rotorcraft structure.

(c) Leadlines designed, constructed, and selected based on (a) shall be proof tested to two times its rated load. The proof-tested leadlines shall be inspected in accordance with manufacturer's inspection criteria for removal from service, and the end fitting manufacturer criteria for removal from service.

(d) Synthetic leadline certification and identification markings shall comply with ASME B30.30, para. 30-2.5.5.

12-2.3.2.2 Wire Rope Leadline. External loads should be lifted with leadlines manufactured using rotation-resistant wire rope. Alternative wire rope selection for leadline fabrication and use shall be evaluated by a qualified

Figure 12-2.2.3-1
Diagram Showing the Effects Rotorcraft Travel Speed Drag on Rigging



person for hazards related to the types of LHA planned. These hazards may include unlaying of the wire rope strands caused by rotation.

Wire rope leadline shall

(a) have a minimum design factor of 5, including rope terminations based on para. 12-2.2.1 from rotorcraft maneuvering effects on rigging components

(b) comply with ASME B30.9, Chapter 9-2

SECTION 12-2.4: RIGGING COMPONENTS

The minimum rated load for rigging components attached to the load for rotorcraft LHA shall be determined using the following requirements:

(a) rotorcraft combined load factor (CLF) of 2.5

(b) the total static weight of the load applied

(c) configuration applied, including

(1) hitch

(2) angle of loading

(3) D/d ratios

(4) center of gravity

(d) component material strength

(e) design factor

SECTION 12-2.5: SLINGS

12-2.5.1 Slings Minimum Rated Load

The minimum rated load on slings shall be in accordance with Section 12-2.4.

Figure 12-2.3.1-1
Longline Arrangement Consisting of Two Lines Hooked Together End to End Through End Connections

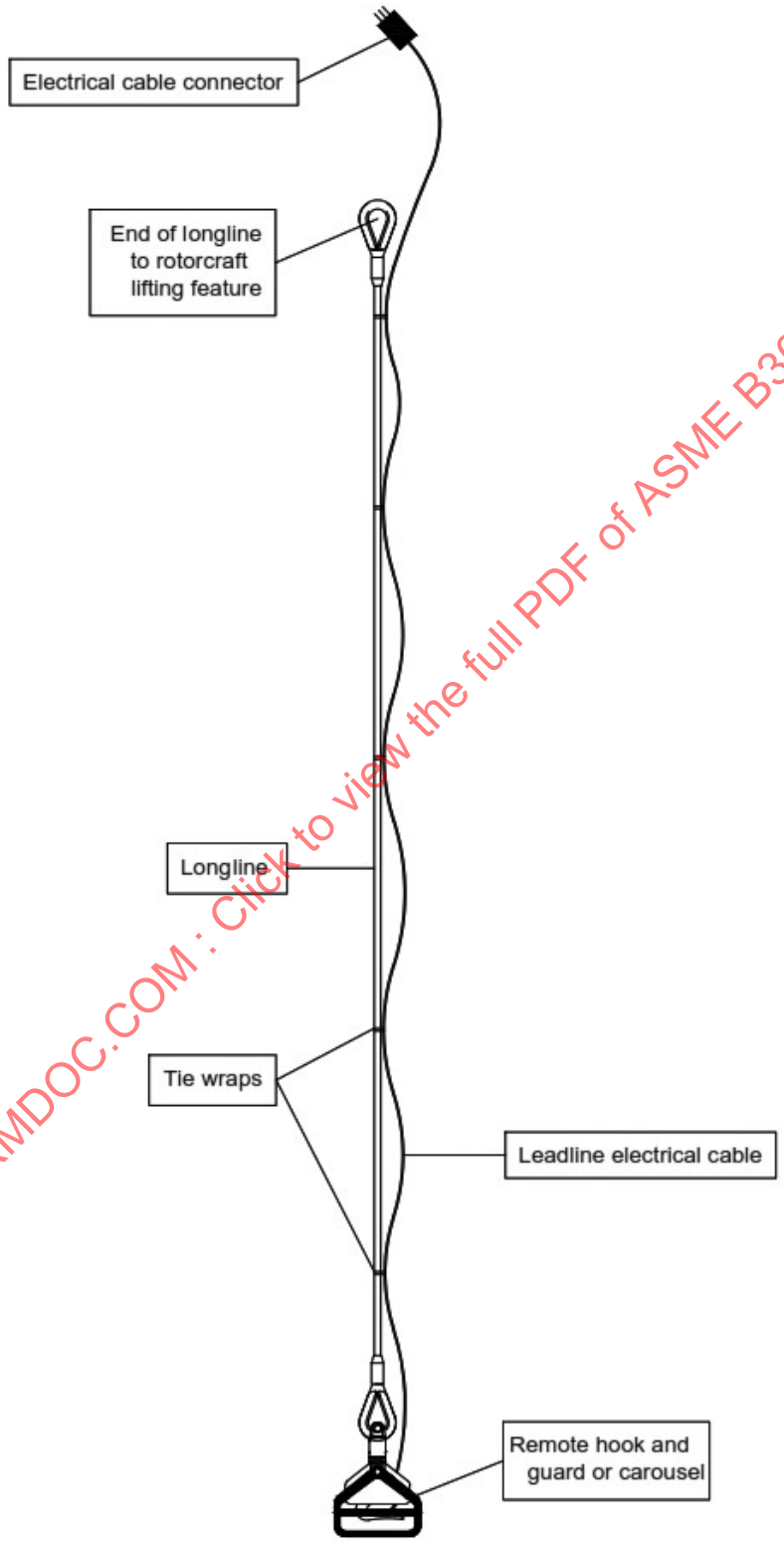
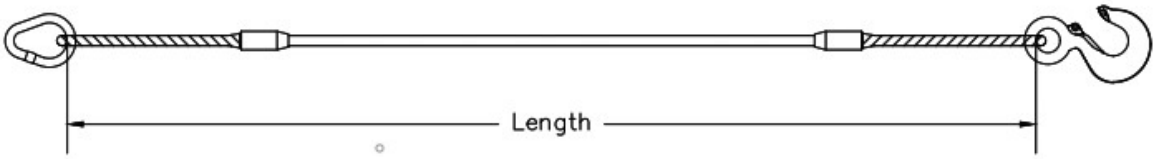


Figure 12-2.3.2-1
The Standard Leadline Length From Bearing Edge to Bearing Edge



12-2.5.2 Sling Selection, Use, and Maintenance

Sling selection, use, and maintenance shall be in accordance with ASME B30.9.

SECTION 12-2.6: RIGGING HARDWARE

12-2.6.1 Rigging Hardware Minimum Rated Load

The minimum rated load on rigging hardware shall be in accordance with Section 12-2.4.

12-2.6.2 Rigging Hardware Selection, Use, and Maintenance

Rigging hardware selection, use, and maintenance shall be in accordance with ASME B30.26.

SECTION 12-2.7: HOOKS

12-2.7.1 Hooks Minimum Rated Load

The minimum rated load on hooks shall be in accordance with Section 12-2.4.

12-2.7.2 Hooks Selection, Use, and Maintenance

Hooks selection, use, and maintenance shall be in accordance with ASME B30.10.

SECTION 12-2.8: BELOW-THE-HOOK DEVICES

12-2.8.1 Below-the-Hook Minimum Rated Load

The minimum rated load on below-the-hook (BTH) devices shall be in accordance with Section 12-2.4.

12-2.8.2 BTH Selection, Use, and Maintenance

BTH selection, use, and maintenance shall be in accordance with ASME B30.20.

SECTION 12-2.9: CARGO NETS

12-2.9.1 Cargo Nets Minimum Rated Load

The minimum rated load for cargo nets shall be in accordance with Section 12-2.4.

12-2.9.2 Cargo Nets Selection, Use, and Maintenance

Cargo net selection, use, and maintenance shall be in accordance with the cargo net manufacturer's instructions.

12-2.9.3 Cargo Net Material

Cargo net construction materials include polyester, polypropylene, nylon, Kevlar, and wire rope [Independent Wire Rope Core (IWRC)].

SECTION 12-2.10: FLEXIBLE INTERMEDIATE BULK CONTAINERS

12-2.10.1 Flexible Intermediate Bulk Containers Minimum Rated Load

The minimum rated load for flexible intermediate bulk containers (FIBC) shall be in accordance with Section 12-2.4.

12-2.10.2 FIBC Selection, Use, and Maintenance

FIBC selection, use, and maintenance shall be in accordance with the FIBC manufacturer's instructions and ISO 21898.

12-2.10.3 FIBC Material

FIBC, material, construction, and design shall comply with ISO 21898, section 4 or a comparable standard for handling nondangerous solid materials in powder, granular, or paste form.

SECTION 12-2.11: LOAD ATTACHMENTS POINTS (NON-AIRFRAME)

12-2.11.1 Load Attachments Points Minimum Rated Load

The minimum rated load for load attachments points shall be in accordance with Section 12-2.4.

12-2.11.2 Load Attachments Points: Selection, Use, and Maintenance

Load attachment points selection, use, and maintenance shall be in accordance with the manufacturer's instructions, or qualified person performing the design, review of construction, fabrication, and testing of the load attachment points at final assembly.

12-2.11.3 Load Attachments Points Designed for Lifting

The lift planner shall ensure the calculated load on the load attachment points does not exceed the attachment rated load, as established by the attachment manufacturer.

12-2.11.4 Load Attachments Points Material

Load attachment points, material, construction, and design shall meet the requirements of the load, stresses, configuration, and factor of safety imposed.

Chapter 12-3
Inspection

SECTION 12-3.1: OPEN THROAT LOAD BEAM INSPECTION

12-3.1.1 Primary Hook Inspection

The primary hook shall be inspected in accordance with the manufacturer's recommendations, FAA regulations, or the authority having jurisdiction.

12-3.1.2 Remote Cargo Hook Inspection

The remote operated cargo hook visual inspection shall be performed prior to the beginning of load handling operations and prior to each lift.

The visual and operational inspections shall be in accordance with the manufacturer's recommendations.

SECTION 12-3.2: SYNTHETIC SLINGS AND SYNTHETIC LONGLINE INSPECTION

Synthetic slings and synthetic longlines shall comply with the following sections of ASME B30.9:

(a) synthetic rope slings — Section 9-4.9
(b) synthetic webbing slings — Section 9-5.9
(c) polyester roundslings — Section 9-6.9
(d) high performance roundslings — Section 9-7.9

SECTION 12-3.3: WIRE ROPE SLINGS AND WIRE ROPE LONGLINES

12-3.3.1 Sling Inspection

Wire rope slings shall comply with ASME B30.9, Section 9-2.9 for inspection of wire rope slings.

12-3.3.2 Longline Inspection, Removal, and Repair

Wire rope longline inspections shall comply with the following requirements. All inspections shall be performed by a designated person. Any deficiency identified shall be examined and a determination made by a qualified person as to whether it constitutes a hazard, and if so, what additional steps need to be taken to address the hazard.

12-3.3.2.1 Initial Inspection. Prior to use, all new, altered, modified, or repaired longlines shall be inspected to verify compliance with the applicable provisions. Written records are not required for initial inspections.

12-3.3.2.2 Frequent Inspection

(a) For each shift, visual inspection for damage shall be performed before the longline is used. Longlines used in severe or special service should be inspected before each use.

(b) Longlines found with conditions such as those listed in para. 12-3.3.2.4 shall be removed from service. Longlines shall not be returned to service until approved by a qualified person.

(c) Written records are not required for frequent inspections.

12-3.3.2.3 Periodic Inspection

(a) A complete inspection of the longline shall be performed. Inspection shall be conducted on the entire length, including splices and fittings. Longlines found with conditions such as those listed in para. 12-3.3.2.4 shall be removed from service. Longlines shall not be returned to service until approved by a qualified person.

(b) Periodic Inspection Frequency. Periodic inspection intervals shall not exceed 1 yr [see (d)]. The frequency of periodic inspections shall be determined by the qualified person and should be based on

(1) frequency of longline use
(2) severity of service conditions
(3) nature of LHA
(4) experience gained on the service life of longlines used in similar circumstances

(c) Guidelines for the time intervals are

(1) normal service — yearly
(2) severe service — monthly to quarterly
(3) special service — as recommended by a qualified person

(d) Periodic inspection is not required while the longline is in storage or idle. However, if more than 1 yr has passed since the last periodic inspection, the longline shall be subjected to applicable inspection.

12-3.3.2.4 Removal Criteria. A longline shall be removed from service if any of the following conditions are present:

(a) missing or illegible longline identification
(b) broken wires: 2 randomly broken wires in 6 rope diameters, or 4 broken wires in 30 rope diameters
(c) severe localized abrasion or scraping resulting in a reduction from nominal diameter of more than 5%
(d) kinking, crushing, bird caging, or any other damage resulting in damage to the rope structure
(e) evidence of heat damage
(f) fittings that are cracked, deformed, or worn to the extent that the strength of the longline is substantially affected
(g) severe corrosion of the rope or fittings
(h) for hooks, removal criteria as stated in ASME B30.10
(i) for rigging hardware, removal criteria as stated in ASME B30.26
(j) other conditions, including visible damage, that cause doubt as to the continued use of the longline

Loss of diameter in rotation-resistant rope could indicate core failure. A qualified person shall immediately inspect the affected sections to determine if the rope needs to be removed from service. This condition will likely be characterized by lengthening of lay and diameter reduction in localized areas.

12-3.3.2.5 Repair

(a) Longlines shall be repaired only by the longline manufacturer, or a qualified person.
(b) A repaired longline shall be marked to identify the repairing entity.
(c) Components used for longline repair shall comply with the longline manufacturer's recommendations, or the directions of a qualified person.
(d) Repair of hooks shall be as specified in ASME B30.10. Repair of below-the hook lifting devices shall be as specified in ASME B30.20. Repair of all other components shall be as specified by the longline manufacturer, component manufacturer, or a qualified person.
(e) The wire rope used in the longline shall not be repaired.
(f) Modifications or alterations to a longline shall conform to all repair provisions of the longline manufacturer, or a qualified person.
(g) All repairs shall comply with the proof test requirements of longline manufacturer, or a qualified person.

SECTION 12-3.4: CARGO NETS INSPECTION

Initial, frequent, and periodic inspections shall be performed by a qualified person in accordance with the cargo net manufacturer's instructions.

Cargo nets shall be removed from service in accordance with the manufacturer's removal criteria.

SECTION 12-3.5: STRUCTURAL LOAD ATTACHMENTS POINTS

12-3.5.1 Inspection Deficiencies

Prior to the start of rotorcraft operations all structural load attachments points shall be inspected by a designated person. The inspection shall include the following:
(a) deformation of the structural load attachment points
(b) broken, cracked, or missing welds
(c) missing bolts, and fasteners
(d) loose or improper fit between the structural load attachment and the load to be lifted
(e) damaged or corroded components
(f) excessive wear of components
(g) missing instructions, configuration, and rated load information

12-3.5.2 Deficiency Determination

(a) Deficiencies identified from inspections shall be cause for cancellation of the lift. A manufacturer or qualified person may examine these deficiencies to determine if they constitute a load handling hazard.
(b) The manufacturer or qualified person shall document the deficiencies and return the LHA to service once a determination is made that the deficiencies do not constitute a load handling hazard. A dated record of deficiencies found and disposition of the deficiencies shall be maintained on file by the net owner.

SECTION 12-3.6: BTH DEVICES — INSPECTION AND TESTING

The inspection and testing of structural and mechanical lifting devices shall comply with ASME B30.20, Section 20-1.3.

SECTION 12-3.7: RIGGING HARDWARE AND HOOKS

12-3.7.1 Rigging Hardware

Rigging hardware used in rotorcraft NHEC operations shall be inspected in accordance with the following applicable ASME B30.26 requirement:
(a) shackles — Section 26-1.8
(b) adjustable hardware — Section 26-2.8
(c) compression hardware — Section 26-3.8
(d) links, master link subassemblies, rings, and swivels — Section 26-4.8

Wire rope clips shall not be used in rotorcraft NHEC operations.

12-3.7.2 Hooks

Hooks used in rotorcraft NHEC operations shall be inspected in accordance with ASME B30.10, Section 10-1.10.

SECTION 12-3.8: SELECTION, INSPECTION AND USE OF FIBCS

FIBC should follow the inspection and use requirement such as provided in ISO 21898, Annex D.

Chapter 12-4
Operations

SECTION 12-4.1: PRE-JOB COORDINATION: ROTORCRAFT OPERATOR AND CONTRACTOR

Where applicable, the rotorcraft operator's representative and responsible contractor's representative shall have a pre-job conference or communication for coordination.

This conference or communication shall cover, as a minimum, the following:

(a) precautions to be in effect at the rotorcraft landing area, pickup area, route to be flown, and delivery (setting) area, and arrangements for compliance with any other mutual requirements, including preparation, submission, and FAA or other regulatory approval of any required lift plan

(b) design, strength, and quantity of rigging, and how it will attach to the load

(c) accuracy of weights; structural strength of the load, including lift points, size, and number of loads; and number of ground crews and personnel required for the operation

(d) assignment of responsibility for clearing and securing pickup and setting sites (see para. 12-4.4.17)

(e) maximum time that the rotorcraft can hover while ground crews are working beneath it

(f) type and quantity of personal protective gear provided for the ground crews

(g) type of scaffolding, if necessary, to be erected for ground crews to provide stable footing when attaching and unhooking the loads at elevated sites

(h) working conditions that could be hazardous to ground crews, such as rotor wash, rain, dust, static electricity discharge, and gusty winds

(i) if applicable, operations of the rotorcraft in proximity to electrical power lines (see Section 12-4.5)

(j) clearance of nonessential personnel from pickup site, setting site, and along the route of flight

(k) procedures for wetting down dusty and sandy areas

(l) provisions for a point of reference when the rotorcraft is hovering

(m) provisions for determining wind direction

(n) regular signalpersons who are part of the rotorcraft operators crew should be used for difficult or otherwise precision-setting airlifts to make certain that the load is properly rigged, attached, and set before lifting or releasing

(o) suspending operations

The PIC can suspend external load operations at any time, when, in the PIC's opinion, unsafe or unfavorable conditions exist.

SECTION 12-4.2: PRE-JOB COORDINATION

Instructions to ground crews directly participating in the operation shall be provided by the rotorcraft crew and include at least the following:

(a) "Maintain in view the load and rotorcraft at all times."

(b) "Avoid working directly under any suspended load, except, when necessary, to the operation."

(c) "To avoid injury, avoid being caught between the load and rotorcraft. Keep hands clear and in view when steadying the load, and grasp rigging from the sides or top, not underneath or between, the rigging and load."

(d) "Verify installation and operation of keepers on all rigging hooks."

(e) "Verify proper application of all hooks used for rigging."

(f) "Wear all required personal protective equipment. Ensure personal protective gear fits properly."

(g) "When using taglines, avoid entanglement. Do not wrap around any limbs or portions of the body."

(h) "Use railings, lifelines, or fall-protection devices to prevent falling. Be aware of obstacles on the ground or deck that may be a trip or fall hazard. Take special care on slippery and wet surfaces."

(i) "Pull cinch lines on cargo nets and rigging tight to prevent any objects from falling when the load is airborne. Avoid sharp objects protruding from cargo nets."

(j) "Be alert for loads with damaged lifting provisions or rigging. Notify the rotorcraft crew immediately of suspected damage to rigging or lifting components."

(k) "Position hooks so that when the strain is taken, the slings or cables will not damage or otherwise break keepers and slip out."

(l) "Verify that all sling legs are free of detrimental twists or knots."

(m) "Hold hook up during load attachment, and, when possible, load detachment so it can be seen by the signalperson and will not snag objects on the ground when the rotorcraft is moving."

(n) "Always watch the rotorcraft and be ready to move quickly out of the way in the event of an emergency. Know the emergency signals and procedures to be used and the need for rapid response."

(o) "Report any mishaps or near mishaps to the rotorcraft crew immediately."

(p) "To prevent being pinned and injured, do not stand or work between the load and other objects."

(q) "Stay clear of swinging cargo hooks, rigging, and cargo suspended from rotorcraft."

(r) "Do not grasp the load or tagline if it is rotating or swinging too fast."

(s) "Loads connected to the rotorcraft shall be discharged electrostatically before and during contact by ground personnel."

SECTION 12-4.3: PRE-LIFT MEETING

(a) At a minimum, the following elements should be reviewed with all LHA personnel:

(1) overview of the LHA

(2) LHE, rigging, and other equipment involved in the LHA

(3) the sequence of events and step-by-step procedures for the entire LHA

(4) safety measures, as required (e.g., job safety analysis action items)

(5) LHA personnel assignments, addressing

(-a) individual responsibilities (e.g., location, time, task)

(-b) work location hazards

(-c) communication methods (primary and backup communications methods)

(-d) personal protective equipment requirements

(-e) qualifications of assigned personnel

(6) contingency measures as required for the LHA

(7) emergency action plan as required for the LHA

(b) Concerns raised during this meeting shall be addressed prior to proceeding with the LHA.

(c) At the completion of the pre-lift meeting, the lift director should confirm that the attendees understand the plan and their roles and responsibilities during the LHA.

SECTION 12-4.4: RESPONSIBILITIES

12-4.4.1 Roles

While the organizational structure of various projects may differ, the following roles are described here for purposes of delineating responsibilities. All responsibilities listed shall be assigned in the worksite organization. (A single individual may perform one or more of these roles.)

(a) Rotorcraft Owner. The rotorcraft owner has custodial control of a rotorcraft by lease or ownership (see para. 12-4.4.2.1).

(b) Rotorcraft User. The rotorcraft user arranges the rotorcraft's presence on a worksite and determines its use there (see para. 12-4.4.2.2).

(c) Site Supervisor. The site supervisor exercises supervisory control over the worksite on which the rotorcraft is being used, and over the work that is being performed on that site (see para. 12-4.4.3.1.1).

(d) Lift Director. The lift director directly oversees the work being performed by the rotorcraft and the associated rigging crew (see para. 12-4.4.3.1.2).

(e) PIC. The PIC directly controls the rotorcraft functions and aircrew (see para. 12-4.4.3.2).

(f) Rigger. See para. 12-4.4.3.4.

(g) Signalperson. See para. 12-4.4.3.5.

(h) Static Electricity Discharge Person. See para. 12-4.4.3.6.

(i) Ground Crew. In addition to lift director and site supervisor, the ground crew consists of the following personnel: riggers, signalpersons, and static electricity discharge person.

12-4.4.2 Responsibilities of the Rotorcraft Owner or Operator and Rotorcraft User

In some situations, the owner and the user may be the same entity and is therefore accountable for all the following responsibilities. In other cases, the user may lease or rent a rotorcraft from the owner without supervisory, operational, maintenance, and support personnel, or services from the owner. In these situations, paras. 12-4.4.2.1 and 12-4.4.2.2 shall apply.

12-4.4.2.1 Rotorcraft Owner Operator. The rotorcraft owner's responsibilities shall include the following:

(a) providing a rotorcraft that meets the requirements of all FAA guidelines and regulations or authority having jurisdiction, as well as specific job requirements defined by the user

(b) providing a rotorcraft and all necessary components, specified by the manufacturer, that meet the user's requested configuration and capacity

(c) providing additional technical information pertaining to the rotorcraft, necessary for rotorcraft operation, when requested by the rotorcraft user

(d) conducting site visits and risk assessment in advance of the operation

(e) selecting and approving the staging area, flight plan, refueling area, and emergency landing location

(f) identifying load and lift information required

(g) specifying ground crew identification needed from contractor such as colored hard hats, vests, or coveralls

(h) providing ground crew operation-lift briefing

(i) supporting actions and judgments of aircrew

(j) explaining flight limitations

12-4.4.2.2 Rotorcraft User. The rotorcraft user's responsibilities shall include the following:

(a) complying with the requirements of this Standard, manufacturer's requirements, and regulations applicable at the worksite

(b) clearly identifying and defining needs, tasks, and schedule

(c) working with lifting subcontractor to locate and size an appropriate staging area, developing lift and flight plans, and making lift and laydown arrangements

(d) complying with other requirements such as security along flight path and limiting access of non-essential personnel

(e) using supervisors for rotorcraft activities that meet the requirements for a qualified person

(f) verifying that the rotorcraft has the necessary lifting capacity to perform the proposed lifting operations in the planned configuration

(g) ensuring that all personnel involved with the lifting operation are aware of their responsibilities, assigned duties, and associated hazards

12-4.4.3 Ground Crew Responsibilities

12-4.4.3.1 Responsibilities of the Site Supervisor and Lift Director. In some situations, the site supervisor and the lift director may be the same person and is therefore accountable for all of the following responsibilities.

12-4.4.3.1.1 Site Supervisor. The site supervisor's responsibilities shall include the following:

(a) ensuring that the rotorcraft meets the requirements prior to initial site staging

(b) working with the lifting subcontractor and owner to plan and schedule moves

(c) ensuring that rigging equipment is selected and approved, and plans are prepared and approved

(d) ensuring that a qualified person is designated as the lift director

(e) ensuring that rotorcraft operations are coordinated with other jobsite activities that will be affected by or will affect lift operations

(f) ensuring that the area for the rotorcraft is adequately prepared

(g) restricting unauthorized access to the rotorcraft working area

(h) coordinating risk assessment activities, including site visits at staging area, along flight path, and at laydown area

(i) ensuring that necessary local, state, and federal permits are obtained, authorities notified, and lifts are coordinated

(j) ensuring that ground crew is trained and receives pre-job briefing

(k) ensuring proper safety equipment is available for the ground crew

12-4.4.3.1.2 Lift Director. The lift director's responsibilities shall include the following:

(a) being present at the jobsite during lifting operations

(b) stopping rotorcraft operations if alerted to an unsafe condition affecting those operations

(c) ensuring that the preparation of the area needed for rotorcraft operations has been completed prior to operations

(d) ensuring that necessary ground-based traffic control is in place to restrict unauthorized access to the rotorcraft's work area

(e) ensuring that personnel involved with rotorcraft operations understand their responsibilities, assigned duties, and the associated hazards

(f) identifying the signalperson and conveying that information to the rotorcraft operator

(g) ensuring that the signalperson appointed meets the requirements of para. 12-4.4.3.6

(h) allowing rotorcraft operation near electric power lines only when the requirements of Section 12-4.5 and any additional requirements determined by the site supervisor have been met

(i) informing the rotorcraft operator of the weight of loads to be lifted, as well as the lifting, moving and placing locations for these loads

(j) verifying that the stated weight does not exceed the rotorcraft rated capacity

(k) ensuring that a rotorcraft's load rigging is performed by personnel that meet the competence requirements in para. 12-4.4.3.5

(l) ensuring that the load is properly rigged and balanced before it is lifted more than a few inches

12-4.4.3.2 PIC. The PIC's responsibilities shall include the following:

(a) confirming any changes in load specifications

(b) conducting and review risk assessment

(c) ensuring all parties are briefed

(d) being well-rested before the LHA

(e) not putting the aircraft or others at unnecessary risk

(f) inspecting all equipment before job- hooks, electrical and manual releases

(g) confirming communication methods, signals, and equipment

(h) confirming load sequence and orientation markings

(i) preparing and communicating emergency plans

12-4.4.3.3 Ground Crew. The ground crew responsibilities shall include the following:

(a) knowing and checking out communication equipment and signaling methods

(b) knowing the procedures for emergency preparedness

(c) knowing the load weights and all lift requirements

(d) ensuring there is a briefing on load rigging, load sequence, and the flight plan (direction of approach)

(e) knowing and following load-handling procedures

(f) knowing the load orientation requirements and markings

(g) wearing appropriate protective clothing and safety equipment

12-4.4.3.4 Rigger Responsibilities and Qualifications

12-4.4.3.4.1 Rigger Responsibilities. Riggers assigned to a rotorcraft LHA shall at a minimum be responsible for the following:

(a) ensuring the weight of the load and its approximate center of gravity have been obtained, provided, or calculated

(b) selecting the proper rigging equipment, inspecting it, and complying with the applicable operating practices according to the criteria of the applicable ASME volume (i.e., B30.9, B30.10, B30.20, B30.26)

(c) ensuring the rated load of the rigging equipment as selected and configured is sufficient for the load to be handled, based on the number of legs, hitch configuration, effects of angles, and effects of rotorcraft maneuvering load factors and vertical acceleration

(d) ensuring the rigging equipment is properly attached to the hook, shackle, or other load-handling device

(e) ensuring that rigging equipment is adequately protected from abrasion, cutting, or other damage, during LHA

(f) ensuring the load is rigged in a manner to ensure stability during LHA

(g) knowing and understanding the applicable signals for the equipment in use

(h) ensuring a tag line is installed and used when additional load control is required

(i) ensuring drogue chutes or equivalent devices are safely installed, when necessary, for load control during flight conditions, in consultation with the PIC

12-4.4.3.4.2 Rigger Qualifications. Prior to rotorcraft activities, riggers shall be tested by a designated person and demonstrate their qualifications through written and practical examination in the following areas:

(a) the requirements for slings, rigging hardware, and BTH lifting devices, including their limitations, rigging practices, associated hazards, inspection requirements, and effects of rotorcraft maneuvering load factors and vertical acceleration on selection of rigging components attached to the load

(b) the application of the type of hitches used

(c) load weight estimation, center of gravity, and effect of angle on rigging components

(d) the applicable operating practices according to the criteria of the applicable ASME volume (i.e., B30.9, B30.10, B30.20, B30.26)

(e) personnel performing rigging tasks who do not meet qualifications (a) through (d) (i.e., rigger trainees) shall be directly supervised by a qualified rigger while performing rigging activities

(f) rigging personnel shall be competent in the use, application, configuration, and inspection of equipment, included in the following ASME B30 volumes listed in Table 12-4.4.3.4.2-1

12-4.4.3.5 Signalperson Responsibilities and Qualifications

12-4.4.3.5.1 General Requirements. A signalperson assigned to a LHA shall at a minimum be responsible for the following:

(a) identifying themselves as the signalperson to the PIC before commencing a LHA

(b) confirming with the PIC the method of primary and backup communications and the associated signals to be used during the LHA

(c) ensuring that standard, discernible hand or voice signals provided to the PIC are in accordance with paras. 12-4.4.3.5.2.1 through 12-4.4.3.5.2.3

(d) ensuring that telephones, radios, or other equipment intended for use as the primary signal system are tested prior to the LHA

(e) ensuring that a form of communication is maintained with the PIC during all LHA

(f) ensuring that all directions given to the PIC shall be given from the PIC's perspective

(g) ensuring that each series of voice signals contains three elements stated in the following order:

(1) function and direction

(2) distance, speed, or both

(3) function stop

(h) ensuring that special signals (when needed) that are not covered by para. 12-4.4.3.5.2.1 do not conflict with standard signals

(i) avoiding giving signal commands that would result in loads being lifted over personnel whenever possible

12-4.4.3.5.2 Standard Signals

12-4.4.3.5.2.1 Hand Signals. See Figure 12-4.4.3.5.2.1-1.

12-4.4.3.5.2.2 Voice Signals. Prior to beginning lifting operations using radio communications, the communication terminology shall be discussed and agreed upon by the person directing lifting operations, the PIC, and the qualified signalperson. A dedicated channel shall be used for radio communications.

Table 12-4.4.3.4.2-1
Applicable ASME B30 Volumes

Designator	Title
B30.9	Slings
B30.10	Hooks
B30.20	Below-the-Hook Lifting Devices
B30.26	Rigging Hardware