

**ASME B30.1-2015**  
(Revision of ASME B30.1-2009)

# Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries

**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  
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# FOREWORD

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

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

In March 1926, invitations were issued to 50 organizations to appoint representatives to a Sectional Committee. The call for organization of this Sectional Committee was sent out October 2, 1926, and the committee organized November 4, 1926, with 57 members representing 29 national organizations. Commencing June 1, 1927, and using the eight-page code published by ASME in 1916 as a basis, the Sectional Committee developed the "Safety Code for Cranes, Derricks, and Hoists." The early drafts of this safety code included requirements for "Jacks" but, due to inputs and comments on those drafts, the Sectional Committee decided in 1938 to make the requirements for "Jacks" a separate code. In January 1943, ASA B30.2-1943 was published addressing a multitude of equipment types and in August 1943, ASA B30.1-1943 was published just addressing "Jacks." Both documents were reaffirmed in 1952 and widely accepted as safety standards.

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

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

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



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

B30.1 Jacks has been in existence since 1926, with new editions published in 1943, 1967, 1981, 1986, 1992, 1998, and 2004. The 2009 revision of this Volume revised the title to Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries. The Volume was reformatted to incorporate the requirements for jacks, air-lifting bags, industrial rollers, air casters, and telescopic hydraulic gantry systems into Chapters 1-1 through 1-6. The 2015 edition adds Chapter 1-7 on strand jack systems. It also addresses responsibilities of personnel, personnel competence, and translations.

This Volume of the Standard, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated as an American National Standard on April 15, 2015.



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

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

(15)

## 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 Standard 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
- B30.12 Handling Loads Suspended From Rotorcraft
- B30.13 Storage/Retrieval (S/R) Machines and Associated Equipment
- B30.14 Side Boom Tractors
- B30.15 Mobile Hydraulic Cranes (withdrawn 1982 — requirements found in latest revision of B30.5)
- B30.16 Overhead 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 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<sup>1</sup>

### 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.

### 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.

<sup>1</sup> This volume is currently in the development process.



Construction, installation, inspection, testing, maintenance, and operation of equipment manufactured and facilities constructed after the effective date of this Volume shall conform to the mandatory requirements of this Volume.

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

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

## SECTION VI: REQUIREMENTS AND RECOMMENDATIONS

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

## SECTION VII: USE OF MEASUREMENT UNITS

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

## SECTION VIII: REQUESTS FOR REVISION

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

Secretary, B30 Standard Committee  
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Two Park Avenue  
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Requests should be in the following format:

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

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

## SECTION IX: REQUESTS FOR INTERPRETATION

The B30 Standard Committee will render an interpretation of the provisions of the B30 Standard. Such requests should be directed to

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ASME Codes and Standards  
Two Park Avenue  
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Requests should be in the following format:

Volume: Cite the designation and title of the volume.  
Edition: Cite the applicable edition of the volume.  
Subject: Cite the applicable paragraph number(s) and the relevant heading(s).  
Question: Phrase the question as a request for an interpretation of a specific provision suitable for general understanding and use, not as a request for approval of a proprietary design or situation. Plans or drawings that explain the question may be submitted to clarify the question. However, they should not contain any proprietary names or information.

Upon receipt by the Secretary, the request will be forwarded to the relevant B30 Subcommittee for a draft response, which will then be subject to approval by the B30 Standard Committee prior to its formal issuance.

Interpretations to the B30 Standard will be published in the subsequent edition of the respective volume, and will be available online at <http://cstools.asme.org/>.

## SECTION X: ADDITIONAL GUIDANCE

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



The B30 Standard 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 B30.1-2015 SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.1-2015 was approved by the American National Standards Institute on April 15, 2015.

ASME B30.1-2015 includes editorial changes, revisions, and corrections introduced in ASME B30.1-2009, as well as the following changes identified by a margin note, (15).

<i>Page</i>	<i>Location</i>	<i>Change</i>
x–xii	B30 Standard Introduction	Updated
1, 2	Chapter 1-0	Title revised
	Section 1-0.1	(1) Revised (2) Paragraph 1-0.1.2 added
	Section 1-0.2	(1) Definitions of <i>appointed</i> and <i>designated person</i> deleted (2) Definitions of <i>birdcaging</i> , <i>LHE</i> , <i>strand jack</i> , <i>strand jack system</i> , and <i>tube guide</i> added (3) Definition of <i>load</i> revised
3–5	Section 1-0.3	Added
	Section 1-0.4	Added
	Section 1-0.5	Redesignated and revised
6	Figure 1-0.4.4-1	Added (moved from para. 1-6.9.5.2)
7	1-1.1.1	Subparagraph (c) deleted
10	1-1.7.2	Revised
	Section 1-1.8	Revised
11	1-1.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-1.9.4	Subparagraph (a) revised
12	1-1.9.5.2	Figure designator in subpara. (b) revised
13	1-2.1.1	Subparagraph (c) deleted
15	1-2.7.2	Revised
	Section 1-2.8	Revised
16	1-2.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-2.9.4	Subparagraph (a) revised
17	1-2.9.5.2	Figure designator in subpara. (b) revised



<i>Page</i>	<i>Location</i>	<i>Change</i>
19	1-3.1.1	Subparagraph (a) designator and subpara. (b) deleted
	1-3.1.2	(1) Revised (2) Subparagraph (b) added and subsequent subparagraphs redesignated
21	1-3.6.3	Revised
	1-3.7.2	Revised
	Section 1-3.8	Revised
22	1-3.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-3.9.4	Subparagraph (a) revised
	1-3.9.5	(1) Title revised (2) Subparagraph 1-3.9.5.1(b) revised
23	1-3.9.5.2	Revised
24	1-4.1.1	Subparagraph (a) designator and subpara. (b) deleted
	1-4.4.1	Subparagraph (b) revised
26	1-4.7.2	Revised
	Section 1-4.8	Revised
27	1-4.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-4.9.4	Subparagraph (a) revised
28	1-4.9.5.2	Figure designator in subpara. (b) revised
29	1-5.1.1	Subparagraph (a) designator and subpara. (b) deleted
	1-5.1.2	Revised
	1-5.1.3	(1) Revised (2) Subparagraph (e) added and subsequent subparagraph redesignated
	Section 1-5.4	Revised
31	1-5.7.2	Revised
	Section 1-5.8	Revised
32, 33	1-5.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-5.9.4	Subparagraph (a) revised
	1-5.9.5	Revised
34	1-6.1.1	Subparagraph (c) deleted



<i>Page</i>	<i>Location</i>	<i>Change</i>
36–38	1-6.5.1	(1) Paragraph designator 1-6.5.1.1 and title added, and remaining paragraph designators revised (2) Titles added to revised designators
	1-6.7.2	Revised
	Section 1-6.8	Revised
	1-6.9.2	Subparagraph (a) added and subsequent subparagraphs redesignated
	1-6.9.5	Revised
40–45	Chapter 1-7	Added



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# JACKS, INDUSTRIAL ROLLERS, AIR CASTERS, AND HYDRAULIC GANTRIES

## Chapter 1-0

(15)

### Scope, Translations, Definitions, Personnel Competence, Responsibilities, and References

#### (15) SECTION 1-0.1: SCOPE OF B30.1

Volume B30.1 includes provisions that apply to the construction, operation, inspection, testing, and maintenance of mechanical ratchet jacks, hand- or power-operated mechanical screw jacks, hand- or power-operated hydraulic jacks, air-lifting bags, industrial rollers, air casters, telescopic hydraulic gantry systems, and strand jacks.

Not included in this Volume are jacks designed for automotive service, trip-lowered jacks, jacks designed for static support rather than load handling, and jacks, industrial rollers, air-lifting bags or air casters that are an integral part of other equipment.

##### 1-0.1.1 Illustrations

Figures 1-0.4.4-1 through 1-7.1.1-1 show typical equipment and hand signals addressed in this Volume. They are not intended to be all-inclusive.

##### 1-0.1.2 Translations

(a) Translation of non-English documentation into English

(1) The wording of written non-English safety information and manuals regarding use, inspection, and maintenance shall be translated into English by professional translation industry standards, which include, but are not limited to the following:

- (-a) translation of the complete paragraph message, instead of word by word
- (-b) grammatical accuracy
- (-c) respectfulness of the source document content without omitting or expanding the text
- (-d) accurate translation of the terminology
- (-e) reflection of the level of sophistication of the original document

(2) The finished translation shall be verified for compliance with paragraphs 1-0.1.2(a)(1)(-a) through 1-0.1.2(a)(1)(-e) by a qualified person having an understanding of the technical content of the subject matter.

(3) Pictograms used to identify controls shall be described in the manuals. The pictograms should comply with ISO 7000, ISO 7296, or other recognized source, if previously defined. The text of the description shall meet the criteria of paras. 1-0.1.2(a)(1) and 1-0.1.2(a)(2).

(b) Any non-English documentation provided in addition to English shall be translated and reviewed in accordance with the requirements listed above.

#### SECTION 1-0.2: DEFINITIONS

(15)

*air bladder (air caster)*: a monofilm or fabric-reinforced material enclosure that directs air flow beneath the air caster's module structure.

*air caster*: a device that can provide lift and travel of a load using air flow as the support medium, often referred to as air skates or air bearings.

*air caster, gap crossing*: a fabricated module that contains a load support plate, a landing pad, and a perforated air bladder that provides the ability to travel across gaps and steps in the operating surface.

*air caster, high lift*: a fabricated module that contains a load support plate, a landing pad, and an air bladder that provides approximately twice the effective lift height of a low-lift air caster and inflates without requiring contact with the operating surface for inflation.

*air caster, low lift*: a fabricated module that contains a load support plate, a landing pad, and an air bladder that provides approximately half the effective lift height of a high-lift air caster and requires contact with the operating surface for inflation.

*air caster system*: consists of air supply, air hoses, pressure control console, and air casters.

*air-lifting bag*: a reinforced, flat, rubberized single-chamber inflatable bag designed to contain air at pressures above 100 psi.



*air-lifting bag system*: consists of air supply, air hoses, pressure control unit, and air-lifting bag.

*authorized service center*: an independent service facility designated by the manufacturer to repair and test equipment of their manufacture.

*birdcaging*: the permanent deformation of a section of strand in which the wires spread apart.

*drift*: horizontal displacement of the top of a telescopic lift boom that results from clearances between boom sections.

*industrial roller*: a structural frame containing interlinked rollers or wheels designed to support and transport a load, often referred to as skates or dollies.

*jack*: a portable hand or a power-operated mechanism with a base and a load point designed for controlled linear movement.

*jack, double-acting hydraulic*: a jack that is extended and retracted under hydraulic pressure.

*jack, hydraulic*: a jack using liquid to move the load.

*jack, mechanical*: a jack using any means other than fluid to move the load.

*jack, self-contained*: a hydraulic jack whose hydraulic reservoir and pump are contained within the jack's housing.

*jack, single-acting hydraulic*: a jack that is extended under hydraulic pressure and retracted by release of the hydraulic pressure.

*landing pads*: structural spacer(s) mounted below an air caster module structure, which provides support while the air bladder is deflated.

*lateral*: the horizontal direction perpendicular to the length of the gantry system track.

*LHE (load handling equipment)*: all equipment covered by ASME B30.1.

*load*: the total superimposed weight or force to be overcome by the load handling equipment.

*load point*: the point of load application.

*load point, auxiliary*: any point of load application other than the load point.

*load point, integral auxiliary*: any nonremovable point of load application other than the load point.

*longitudinal*: the horizontal direction parallel to the length of the gantry system track.

*module structure (air caster)*: the load support platform that interfaces between the load and the air bladder.

*overload*: any load greater than the rated load.

*overtravel*: movement beyond maximum travel (mechanical jack) or stroke (hydraulic jack) for which the jack was designed.

*ply separation*: a delamination of at least two layers of rubber and/or reinforcement material.

*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.

*rated load*: the maximum allowable working load established by the equipment manufacturer. The terms *rated capacity* and *working load limit* are commonly used to describe rated load.

*screw extension*: a device that increases the hydraulic jack's closed length.

*service, normal*: service that involves use of loads at or below the rated load.

*service, severe*: service that involves normal service coupled with abnormal rigging or operating conditions.

*service, special*: service that involves operation, other than normal or severe, which is approved by a qualified person.

*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 shift*: lateral movement of a suspended load along the header beams of a telescopic hydraulic gantry system.

*strand jack*: hydraulic cylinder(s) configured to sequentially grip and release single or multiple strands to move a load.

*strand jack system*: one or more strand jacks, strands, anchors, a hydraulic power unit, control console, hoses, rigging, and accessories required to guide and manage the strands to move a load.

*stroke*: linear extending or retracting movement of the hydraulic jack (Chapter 1-2) or gantry leg (Chapter 1-6).

*telescopic hydraulic gantry leg*: a structural base that is supported on wheels or a frame and that has one or more vertical lift cylinders or boom.

*telescopic hydraulic gantry system*: two or more telescopic hydraulic gantry legs, a hydraulic power unit, control console, hoses, and one or more header beams that span between the legs.

*travel*: linear extending or retracting movement of the mechanical jack (Chapter 1-1); horizontal movement of the telescopic hydraulic gantry system along the track (Chapter 1-6).

*tube guide*: component of a strand jack that reduces the unsupported length of strand inside the jack to decrease the occurrence of birdcaging inside the jack.

**(15) SECTION 1-0.3: PERSONNEL COMPETENCE**

Persons performing the functions identified in this Volume shall meet the applicable qualifying criteria stated in this Volume and shall, through education, training, experience, skill, and physical fitness, as necessary, be competent and capable to perform the functions as determined by the employer or employer's representative.

**(15) SECTION 1-0.4 RESPONSIBILITIES**

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

*LHE Operator:* directly controls the LHE's functions.

*LHE Owner:* has custodial control of the LHE by virtue of lease or ownership.

*LHE User:* arranges the LHE's presence on a worksite and controls its use there.

*LHE Director:* directly oversees the work being performed by the LHE and the associated crew.

*Site Supervisor:* exercises supervisory control over the work site on which the LHE is being used and over the work that is being performed on that site.

**1-0.4.1 Responsibilities of the LHE Owner and LHE User**

In some situations, the LHE Owner and the LHE User may be the same entity and is therefore accountable for all of the following responsibilities. In other cases, the LHE User may lease or rent LHE from the LHE Owner without supervisory, operational, maintenance, support personnel, or services from the LHE Owner. In these situations, paras. 1-0.4.1.1 and 1-0.4.1.2 shall apply.

**1-0.4.1.1** The LHE Owner's responsibilities shall include the following:

(a) providing LHE that meets the requirements of this Volume, as applicable, as well as specific job requirements defined by the LHE User.

(b) providing LHE and all necessary components, specified by the LHE manufacturer, that meet the LHE User's requested configuration and capacity.

(c) providing all applicable load/capacity chart(s) and diagrams.

(d) providing additional technical information pertaining to the LHE, necessary for LHE operation, when requested by the LHE User.

(e) providing field assembly, disassembly, operation and maintenance information, and warning decals and placards installed as prescribed by the LHE manufacturer.

(f) establishing an inspection, testing, and maintenance program in accordance with the applicable chapter and informing the LHE User of the requirements of this program.

(g) designating personnel for maintenance, repair, transport, assembly, and disassembly.

(h) designating personnel for inspections as required in the applicable chapter.

**1-0.4.1.2** The LHE User's responsibilities shall include the following:

(a) complying with the requirements of this Volume, LHE manufacturer's requirements, and those regulations applicable at the work site.

(b) Using supervisors for LHE activities that meet the requirements for a qualified person as defined in Section 1-0.2.

(c) ensuring that the LHE is in proper operating condition prior to initial use at the worksite by

(1) verifying that the LHE Owner has provided periodic inspection documentation, if applicable

(2) verifying that a frequent inspection has been performed

(d) verifying that the LHE has the necessary capacity to perform the proposed LHE operations in the planned configuration

(e) ensuring the assigned LHE Operator(s) has been notified of adjustments or repairs that have not yet been completed, prior to commencing LHE operations

(f) designating personnel for inspections as required in the applicable chapter

(g) designating personnel for maintenance, repair, transport, assembly, and disassembly

(h) ensuring that all personnel involved in maintenance, repair, transport, assembly, disassembly, and inspection are aware of their responsibilities, assigned duties, and the associated hazards

(i) ensuring that the inspection, testing, and maintenance programs specified by the LHE Owner are followed

**1-0.4.2 Responsibilities of Site Supervisor and LHE Director**

In some situations, the Site Supervisor and the LHE Director may be the same person.

**1-0.4.2.1** The Site Supervisor's responsibilities shall include the following:

(a) ensuring that the LHE meets the requirements of the appropriate chapter prior to initial site usage

(b) determining if additional regulations or requirements are applicable to LHE operations

(c) ensuring that a qualified person is designated as the LHE Director

(d) ensuring that LHE operations are coordinated with other jobsite activities that will be affected by or will affect LHE operations



(e) ensuring that the area for the LHE is adequately prepared. The preparation includes, but is not limited to, the following:

(1) access for the LHE and associated equipment

(2) sufficient room to assemble and disassemble the LHE

(3) an operating area that is suitable for the LHE with respect to levelness, surface conditions, support capability, proximity to power lines, excavations, slopes, underground utilities, subsurface construction, and obstructions to LHE operation

(4) traffic control as necessary to restrict unauthorized access to the LHE's working area

(f) ensuring that work involving the assembly and disassembly of LHE is supervised by a qualified person

(g) ensuring that operators meet the physical, knowledge, and skill requirements of the LHE's applicable chapter

(h) ensuring that conditions that may adversely affect LHE operations are addressed. Such conditions include, but are not limited to, the following:

(1) poor soil or support conditions

(2) wind velocity or gusting winds

(3) weather conditions

(4) extreme temperatures

(5) inadequate lighting

(6) operating surface conditions

(7) excessive noise

(8) proximity to energized sources (e.g., power lines, pressurized lines)

(i) ensuring that work performed by the rigging crew is supervised by a qualified person

(j) ensuring that LHE maintenance is performed by a designated person

**1-0.4.2.2** The LHE Director's responsibilities shall include the following:

(a) being present at the jobsite during LHE operations.

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

(c) ensuring that the preparation of the area needed to support LHE operations has been completed before LHE operations commence.

(d) ensuring necessary traffic controls are in place to restrict unauthorized access to the LHE's work area.

(e) ensuring that personnel involved in LHE operations understand their responsibilities, assigned duties, and the associated hazards.

(f) addressing safety concerns raised by the LHE Operator or other personnel and being responsible if he decides to overrule those concerns and directs LHE operations to continue. In all cases, the manufacturer's criteria for safe operation and the requirements of this Volume shall be followed.

(g) designating the signalperson(s) and conveying that information to the LHE Operator.

(h) evaluating LHE operation in proximity to energized sources.

(i) ensuring precautions are implemented when hazards associated with special load handling operations are present. Such LHE operations may include, but are not limited to, the following:

(1) multiple types of LHE used simultaneously

(2) shifting center(s) of gravity or lifting below the center of gravity

(3) shifting, inclined, or moving surfaces

(4) LHE operating on barges

(j) informing the LHE Operator of the weight and planned movement of the loads to be handled.

(k) obtaining the LHE Operator's verification that this weight does not exceed the LHE's rated load.

(l) ensuring that load rigging personnel have been designated for the LHE.

(m) ensuring that the load is properly rigged and stable.

#### **1-0.4.3 Responsibilities of LHE Operators**

The LHE Operator shall be responsible for the following listed items. The LHE Operator shall not be responsible for hazards or conditions that are not under his direct control and that adversely affect the LHE operations. Whenever the LHE Operator has doubt as to the safety of LHE operations, the LHE Operator shall stop the LHE's functions in a controlled manner. LHE operations shall resume only after safety concerns have been addressed and the continuation of the operation is directed by the LHE Director.

The LHE Operator's responsibilities shall include the following:

(a) reviewing the requirements for the LHE with the LHE Director before LHE operations.

(b) knowing what types of site conditions could adversely affect the operation of the LHE and consulting with the LHE Director concerning the possible presence of those conditions.

(c) understanding and applying the information contained in the LHE manufacturer's operating manual.

(d) understanding the LHE's functions and limitations as well as its particular operating characteristics.

(e) using the LHE's load/capacity chart(s) and diagrams and applying all notes and warnings related to the charts to confirm the correct LHE configuration to suit the load, site, and load handling conditions.

(f) refusing to operate the LHE when any portion of the load or LHE could be adversely affected by proximity to energized sources until evaluated and approved by a qualified person.

(g) performing inspections as specified in the applicable chapter.

(h) promptly reporting the need for any adjustments or repairs.

(i) following applicable lock out/tag out procedures.

(j) not operating the LHE when physically or mentally unfit.

(k) ensuring that all controls are in the off or neutral position and that all personnel are in the clear before energizing the LHE.

(l) not engaging in any practice that will divert his attention while actually operating the LHE controls.

(m) testing the LHE function controls that will be used and operating the LHE only if those function controls respond properly.

(n) operating the LHE's functions, under normal operating conditions, in a smooth and controlled manner.

(o) knowing and following the procedures specified by the LHE manufacturer or approved by a qualified person for assembly, disassembly, and setting up the LHE.

(p) knowing how to travel the LHE, if applicable.

(q) ensuring that the load and rigging weight(s) have been provided.

(r) calculating or determining the rated load for all configurations that will be used and verifying, using the load/capacity chart(s), that the LHE has sufficient capacity for the proposed LHE operation.

(s) considering all factors known that might affect the LHE capacity and informing the LHE Director of the need to make appropriate adjustments.

(t) knowing the standard and special signals as specified in the applicable chapter and responding to such signals from the signalperson. When a signalperson is not required, the LHE Operator is then responsible for

the movement of the LHE. However, the LHE Operator shall obey a stop signal at all times, no matter who gives it.

(u) understanding basic load rigging procedures. For responsibility of rigging the load and ensuring that the load is rigged properly; see paras. 1-0.4.2.2(1) and 1-0.4.2.2(m)

(v) if power fails during LHE operations

(1) set all LHE locking devices

(2) move all LHE power controls to the OFF or neutral position

(3) secure and stabilize the load, if practical

(w) before leaving the LHE unattended

(1) secure and stabilize the load

(2) set all LHE locking devices

(3) put LHE controls in the OFF or neutral position

(4) turn off the LHE power source

(5) follow the recommendations of the LHE manufacturer or a qualified person for securing the LHE

#### 1-0.4.4 Standard Hand Signals


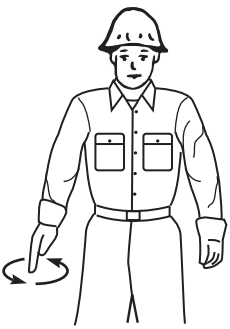
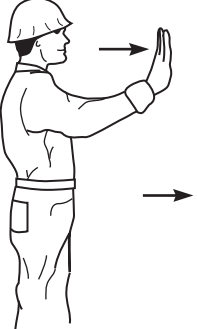

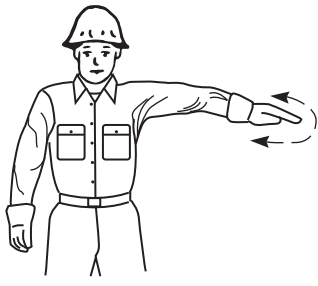


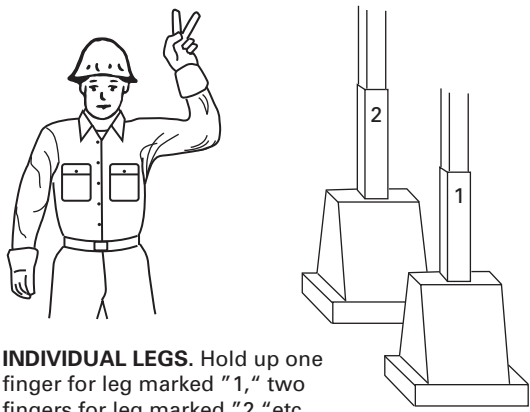
See Fig. 1-0.4.4-1.

#### SECTION 1-0.5: REFERENCE

Recommended Practices for Telescopic Hydraulic Gantry Systems

Publisher: Specialized Carriers & Rigging Association,  
5870 Trinity Parkway, Suite 200, Centreville, VA 20120  
(www.scranet.org)

(15) **Fig. 1-0.4.4-1 Standard Hand Signals When Using Jacks, Industrial Rollers, Air Casters, and Telescopic Hydraulic Gantry Systems**

 <p><b>RAISE.</b> With forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	 <p><b>LOWER.</b> With arm extended downward, forefinger pointing down, move hand in small horizontal circle.</p>	 <p><b>GANTRY TRAVEL.</b> Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.</p>
 <p><b>SIDE SHIFT.</b> Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</p>	 <p><b>STOP.</b> Arm extended, palm down, move arm back and forth horizontally.</p>	 <p><b>EMERGENCY STOP.</b> Both arms extended, palms down, move arms back and forth horizontally.</p>
 <p><b>DOG EVERYTHING.</b> Clasp hands in front of body.</p>	 <p><b>INDIVIDUAL LEGS.</b> Hold up one finger for leg marked "1," two fingers for leg marked "2," etc. Regular signals follow.</p>	

# Chapter 1-1

## Mechanical Jacks

### SECTION 1-1.0: SCOPE

This Chapter applies to mechanical jacks.

### SECTION 1-1.1: TYPES AND DESIGN

#### (15) 1-1.1.1 Types

(a) Types are screw and ratchet style (see Figs. 1-1.1.1-1 through 1-1.1.1-4) and are primarily used in a vertical position.

(b) All jacks covered by this Chapter shall incorporate a positive stop or method to prevent over travel.

#### 1-1.1.2 Design

(a) The load-bearing materials in the jack shall have sufficient strength and ductility to raise, lower, and support the rated load at the temperatures at which it will be used.

(b) The jack shall be designed to meet the proof load requirements in para. 1-1.4.2(a).

(c) The jack should be designed to ensure that the computed stress in the structural components of the jack does not exceed 50% of the yield strength of the material at the appropriate rated load for the components.

(d) Control parts and accessory equipment shall be designed to provide a means of operation and adjustment that will minimize exposure of the operator to injury.

(e) Carrying handles, if provided, shall be capable of statically supporting 200% of the weight of the jack.

(f) Changes in physical properties caused by welding handles, eyes, or other approved attachments to a mechanical jack shall be taken into account.

### SECTION 1-1.2: DESIGN FACTOR

The design factor for mechanical jacks shall be determined by the manufacturer.

### SECTION 1-1.3: RATED LOADS

Rated load shall be established by the mechanical jack manufacturer.

### SECTION 1-1.4: PROOF TEST AND PROOF LOAD

#### 1-1.4.1 Proof Test Requirements

(a) Each newly designed mechanical jack shall be proof tested by the manufacturer.

(b) All newly manufactured mechanical jacks shall be proof tested by the manufacturer with the jack extended to a point of at least 25% of travel.

(c) The manufacturer or a qualified person shall determine if a proof test is required for any altered, modified, or repaired mechanical jack.

(d) After proof testing, the mechanical jack shall be thoroughly inspected for the conditions stated in para. 1-1.8.4.

#### 1-1.4.2 Proof Load Requirements

(a) When proof testing a newly designed mechanical jack

(1) the jack's load point shall be loaded to 110% of its lifting rated load and operated to its full length of travel through ten cycles (dynamic test).

(2) the jack's load point shall be loaded three times to 150% of its rated load. The rack bar or screw shall be at least 90% of full travel. After this test, the jack shall be functional for full extension under 100% of rated load (static test).

(3) each auxiliary load point shall be proof tested in accordance with the same cycles and percentages described in paras. 1-1.4.2(a)(1) and (2).

(b) The proof load for each newly manufactured mechanical jack shall be a minimum of 100% of the rated load.

(c) The proof load for each altered, modified, or repaired mechanical jack shall be a minimum of 100% of the rated load unless otherwise determined by the manufacturer or a qualified person.

### SECTION 1-1.5: IDENTIFICATION

#### 1-1.5.1 Marking

Each new mechanical jack shall have forged, cast, die stamped, etched, or fixed label markings by the manufacturer to show

- (a) name or trademark of manufacturer
- (b) rated load of the load point and auxiliary load point, if different
- (c) model number or tracing code
- (d) jack handle length and force required

#### 1-1.5.2 Maintenance of Identification

Mechanical jack identification should be maintained by the user so as to be legible throughout the life of the jack.

