



The American Society of
Mechanical Engineers

JACKS

AN AMERICAN NATIONAL STANDARD

ASME B30.1-1998
(Revision of ASME B30.1-1992)



The American Society of
Mechanical Engineers

A N A M E R I C A N N A T I O N A L S T A N D A R D

JACKS

ASME B30.1-1998
(Revision of ASME B30.1-1992)

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

Date of Issuance: April 24, 1998

The 1998 edition of this Standard is being issued with an automatic addenda subscription service. The use of an addenda allows revisions made in response to public review comments or committee actions to be published on a regular yearly basis; revisions published in addenda will become effective 1 year after the Date of Issuance of the addenda. The next edition of this Standard is scheduled for publication in 2003.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. The interpretations will be included with the above addenda service. Interpretations are not part of the addenda to the Standard.

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AN AMERICAN NATIONAL STANDARD

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

ASME B30.1a-1999

ADDENDA

to

ASME B30.1-1998
JACKS

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Three Park Avenue • New York, NY 10016

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ASME B30.1a-1999

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.1a-1999 was approved by the American National Standards Institute on May 12, 1999.

Addenda to the 1998 edition of ASME B30.1 are issued in the form of replacement pages. Revisions, additions, and deletions are incorporated directly into the affected pages. It is advisable, however, that this page, the Addenda title and copyright pages, and all replaced pages be retained for reference.

SUMMARY OF CHANGES

This is the first Addenda to be published to ASME B30.1-1998.

Replace or insert the pages listed. Changes given below are identified on the pages by a margin note, **(a)**, placed next to the affected area. Changes made in ASME B30.1-1998 are indicated by **(98)**. The pages not listed are the reverse sides of the listed pages and contain no changes.

<i>Page</i>	<i>Location</i>	<i>Change</i>
1, 2	General	(1) B30 volume listing updated (2) In ninth paragraph, ASME address updated
	Footnote 1	Revised
	Section III	In first paragraph, ASME address updated
5	1-0.2	Definition for <i>qualified person</i> revised
7	Fig. 4	Corrected by Errata

SPECIAL NOTE

The interpretations to ASME B30.1 are included as a separate section for the user's convenience.

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FOREWORD

(This Foreword is not part of ASME B30.1-1998.)

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

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

In March 1926, invitations were issued to 50 organizations to appoint representatives to a Sectional Committee. The call for organization of this Sectional Committee was sent out October 2, 1926, and the committee organized November 4, 1926, with 57 members representing 29 national organizations. The Safety Code for Cranes, Derricks, and Hoists, ASA B30.2-1943, was created from the eight-page document referred to in the first paragraph. This document was reaffirmed in 1952 and widely accepted as a safety standard.

Due to changes in design, advancement in techniques, and general interest of labor and industry in safety, the Sectional Committee, under the joint sponsorship of ASME and the Naval Facilities Engineering Command, U.S. Department of the Navy, was reorganized as an American National Standards Committee on January 31, 1962, with 39 members representing 27 national organizations.

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

In 1982, the Committee was reorganized as an Accredited Organization Committee, operating under procedures developed by the ASME and accredited by the American National Standards Institute.

This Standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment falling within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees.

In case of practical difficulties, new developments, or unnecessary hardship, the administrative or regulatory authority may grant variances from the literal requirements or permit the use of other devices or methods, but only when it is clearly evident that an equivalent

degree of protection is thereby secured. To secure uniform application and interpretation of this Standard, administrative or regulatory authorities are urged to consult the B30 Committee, in accordance with the format described in Section III, before rendering decisions on disputed points.

This volume of the Standard, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated as an American National Standard on March 12, 1998.

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

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

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

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P. S. Zorich, RZP International Ltd.

ASME B30.1-1998 SUMMARY OF CHANGES

The 1998 Edition of ASME B30.1 includes editorial changes, revisions, and corrections introduced in B30.1a-1994 and B30.1b-1995, as well as the following changes identified by (98).

<i>Page</i>	<i>Location</i>	<i>Change</i>
1, 2	General	(1) B30 volume listing updated (2) Sixth and seventh paragraphs added
5	Section 1-0.2	Term, and definition of, <i>designated</i> revised

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

INTRODUCTION

(98) General

(a)

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

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

- B30.1 Jacks
- B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
- B30.3 Construction Tower Cranes
- B30.4 Portal, Tower, and Pedestal Cranes
- B30.5 Mobile and Locomotive Cranes
- B30.6 Derricks
- B30.7 Base Mounted Drum Hoists
- B30.8 Floating Cranes and Floating Derricks
- B30.9 Slings
- B30.10 Hooks
- B30.11 Monorails and Underhung Cranes
- B30.12 Handling Loads Suspended From Rotorcraft
- B30.13 Storage/Retrieval (S/R) Machines and Associated Equipment
- B30.14 Side Boom Tractors
- B30.15 Mobile Hydraulic Cranes
Note: B30.15-1973 has been withdrawn.
The revision of B30.15 is included in the latest edition of B30.5.
- B30.16 Overhead Hoists (Underhung)
- B30.17 Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
- B30.18 Stacker Cranes (Top or Under Running Bridge, Multiple Girder With Top or Under Running Trolley Hoist)
- B30.19 Cableways
- B30.20 Below-the-Hook Lifting Devices

- B30.21 Manually Lever Operated Hoists
- B30.22 Articulating Boom Cranes
- B30.23 Personnel Lifting Systems
- B30.24 Container Cranes¹
- B30.25 Scrap and Material Handlers

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.

The use of cableways, cranes, derricks, hoists, hooks, jacks, and slings is subject to certain hazards that cannot be met by mechanical means but only by the exercise of intelligence, care, and common sense. It is therefore essential to have personnel involved in the use and operation of equipment who are competent, careful, physically and mentally qualified, and trained in the safe operation of the equipment and the handling of the loads. Serious hazards are overloading, dropping or slipping of the load caused by improper hitching or slinging, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed.

The Standards Committee fully realizes the importance of proper design factors, minimum or maximum sizes, and other limiting dimensions of wire rope or chain and their fastenings, sheaves, sprockets, drums, and similar equipment covered by the Standard, all of which are closely connected with safety. Sizes, strengths, and similar criteria are dependent on many different factors, often varying with the installation and uses. These factors depend on the condition of the equipment or material; on the loads; on the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums; on the type of attachments; on the number, size, and arrangement of sheaves or other parts; on environmental conditions causing corrosion or wear; and on many variable factors that must be considered in each individual case. The rules given in the Standard must be interpreted accordingly, and judgment used in determining their application.

¹ B30.24 is in the developmental stage.

Some of the provisions of this Standard require compliance with information found in manuals or other documents with the equipment supplied by the manufacturer. The information includes recommendations, requirements, and instructions (e.g., “the reeving shall be checked for compliance with the recommendations of the manufacturer”).

Compliance with the provisions should not preclude the possibility of consulting a qualified person. This is true particularly when: the equipment has been altered, repaired, or modified; the manuals or documents supplied by the manufacturer are no longer available; or the manufacturer or a successor is no longer in business and the manuals are no longer available. However, the purpose of consulting a qualified person shall not be to avoid contacting the manufacturer and using the information supplied by the manufacturer.

The Standards Committee will be glad to receive criticisms of this Standard’s requirements and suggestions for its improvement, especially those based on actual experience in application of the rules.

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

(a) cite the specific paragraph designation of the pertinent volume;

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

(c) briefly state the reason and/or evidence for the suggested change;

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

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

Section I: Scope

This Standard applies to the construction, installation, operation, inspection, and maintenance of jacks; power-operated cranes, monorails, and crane runways; power-operated and manually operated derricks and hoists; lifting devices, hooks, and slings; and cableways.

This Standard does not apply to track and automotive jacks, railway or automobile wrecking cranes, shipboard cranes, shipboard cargo-handling equipment, well-drilling derricks, skip hoists, mine hoists, truck body hoists, car or barge pullers, conveyors, excavating equipment, or equipment coming within the scope of the

following Committees: A10, A17, A90, A92, A120, B20, B56, and B77.

Section II: Purpose

This Standard is designed to:

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

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

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

Section III: Interpretations

(a)

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

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

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

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

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

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

ASME procedures provide for reconsideration of any interpretation when or if additional information which might affect an interpretation is available. Further,

persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

Section IV: New and Existing Installations

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

(b) *New Installations.* Construction, installation, inspection, testing, maintenance, and operation of equipment manufactured and facilities constructed after the effective date of this volume shall conform with the mandatory requirements of this volume.

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

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

Section V: Mandatory and Advisory Rules

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

Section VI: Metric Conversions

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

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JACKS

Chapter 1-0 Scope and Definitions

Section 1-0.1: Scope of B30.1

Within the general scope defined in Section I of the Introduction, B30.1 applies to general purpose, portable jacks of the following categories: hand- or power-operated hydraulic jacks, mechanical ratchet jacks, and hand- or power-operated mechanical screw jacks.

Jacks designed for automotive service, trip-lowered jacks, and those that are an integral part of other equipment are not included in the scope of this Standard. Devices designed for static support rather than lifting are not included.

1-0.1.1 Illustrations. Figures 1 through 7, on the pages that follow, show typical jacks covered by this Standard. They are not intended to be all inclusive.

Section 1-0.2: Definitions

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

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

controlled conditions: where the jack is evenly supported on a solid foundation, operating a gravity load only, protected against wind and other external forces such as shock loads or vibrations, and at an ambient temperature range of -20°F to 140°F (-29°C to 60°C).

control parts: parts which the operator must manipulate in extending or retracting the jack.

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

extender: a device that increases the jack's closed length.

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

jack, double-acting hydraulic: a jack which 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.

load: the total superimposed weight or force to be overcome by the jack.

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.

load rating, auxiliary: rated load of the jack, as determined by the manufacturer, when load is applied at the auxiliary load point.

overload: any load greater than the rated load.

overtravel: movement beyond maximum travel for which the jack was designed.

power: any means other than manual of actuating a jack.

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. **(a)**

rated load (hydraulic jacks): maximum load, applied at a specified point, for which the jack is designed and built by a manufacturer for its specified travel.

rated load, lifting (mechanical jacks): maximum load, applied at a specified point, which the jack is designed to lift with the specified operating lever.

rated load, sustaining (mechanical jacks): maximum load, applied at a specified point, which the jack was designed to sustain.

service, normal: the use of jacks to raise or lower known axial loads at or less than 85% rated capacity, under controlled conditions.

service, severe: use of jacks under conditions which are not rated normal service.

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.

travel: linear extending or retracting movement of the jack.

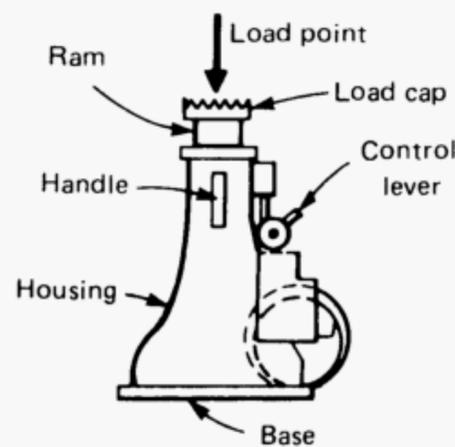
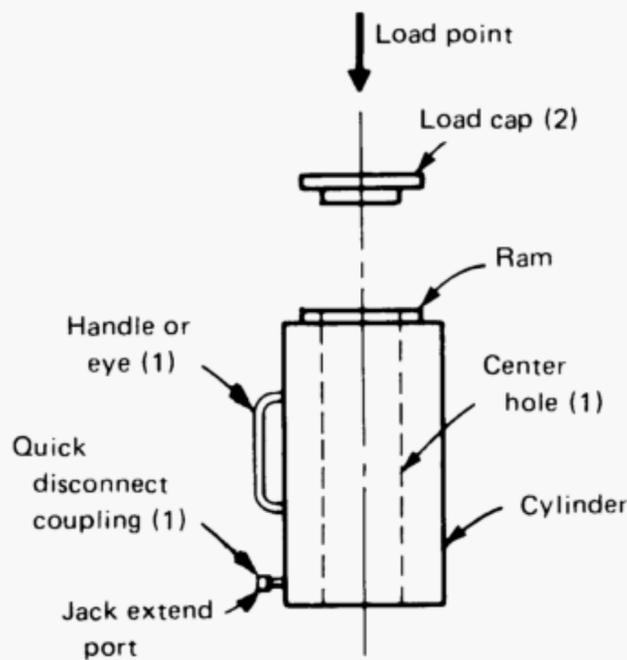
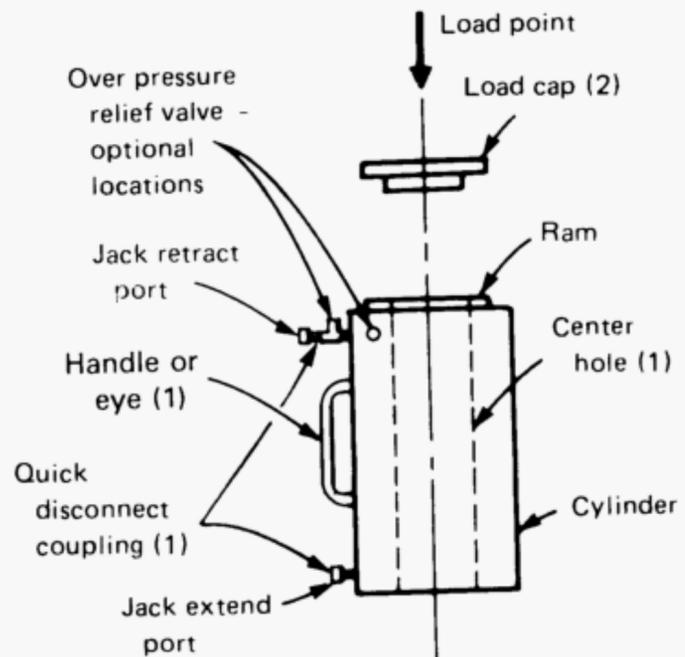


FIG. 1 POWER-DRIVEN SCREW JACK



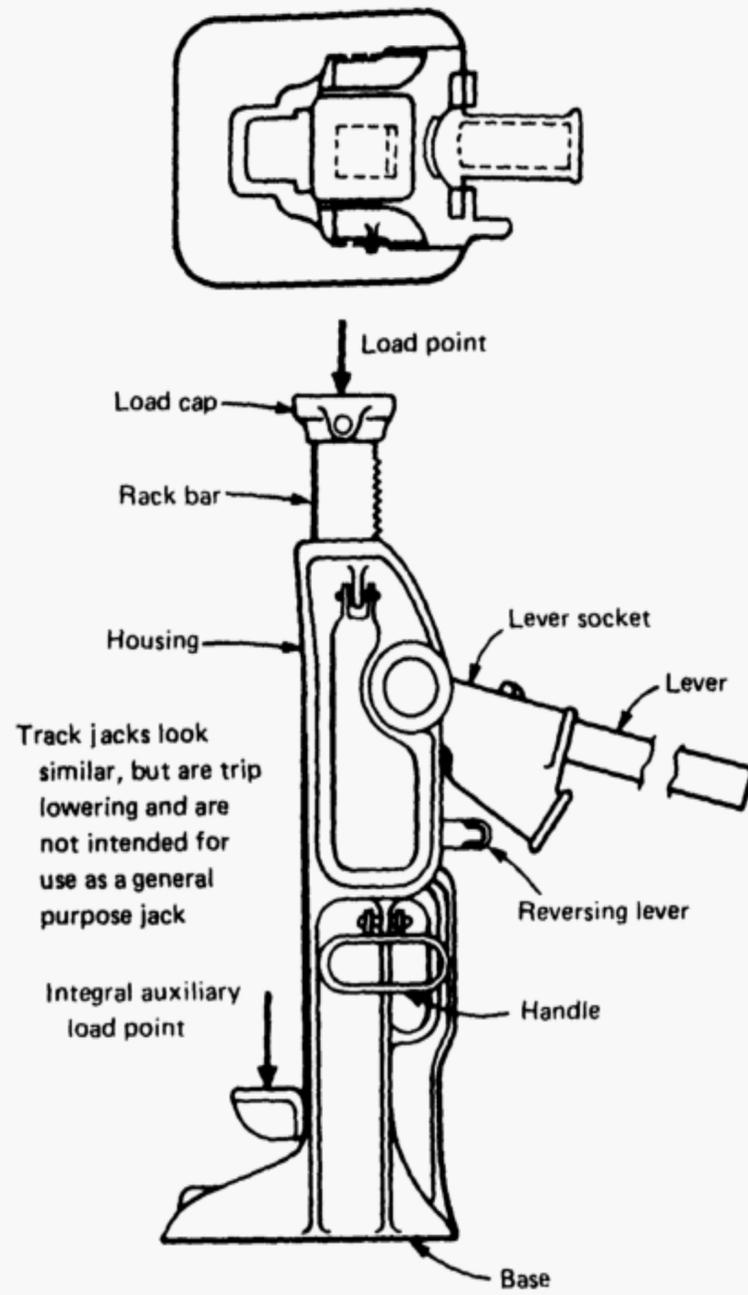
NOTES:
 (1) Optional.
 (2) If required by jack manufacturer.

FIG. 2 SINGLE-ACTING HYDRAULIC JACK



NOTES:
 (1) Optional.
 (2) If required by jack manufacturer.

FIG. 3 DOUBLE-ACTING HYDRAULIC JACK



(a)

FIG. 4 RATCHET JACK

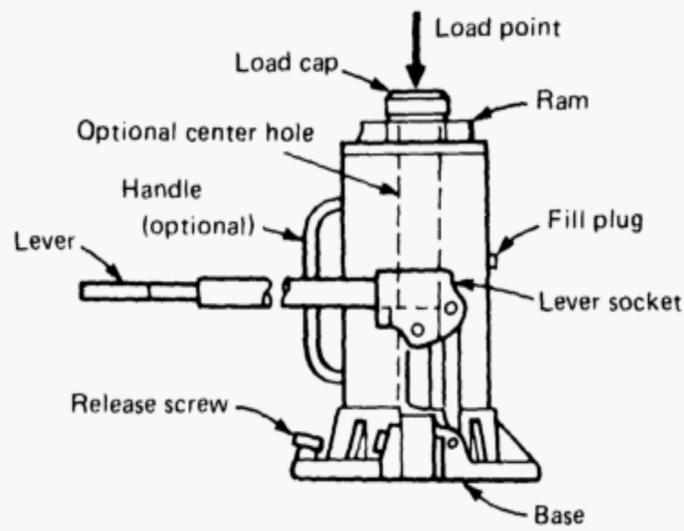


FIG. 5 SELF-CONTAINED HYDRAULIC JACK

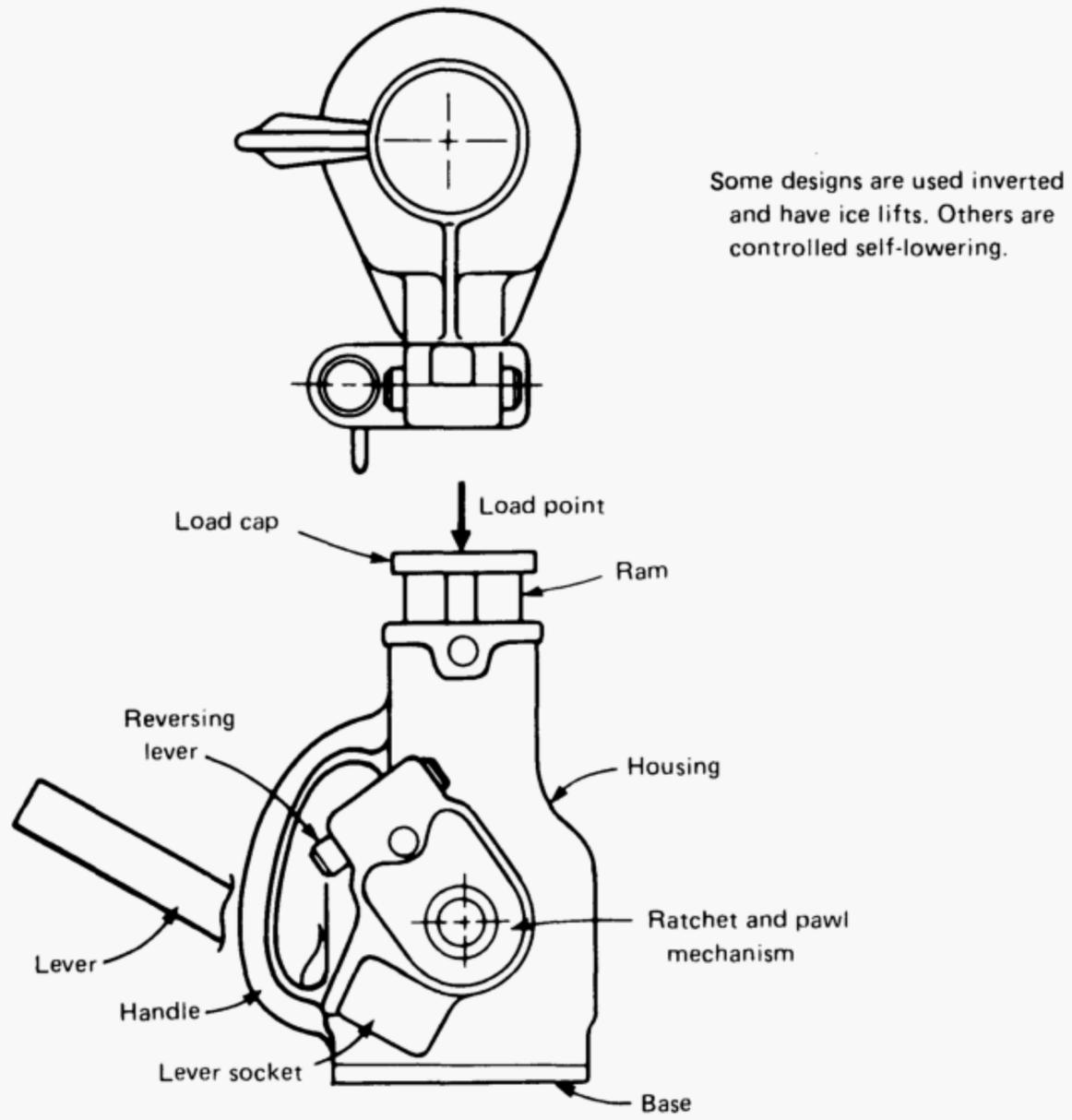


FIG. 6 SCREW JACK WITH RATCHET

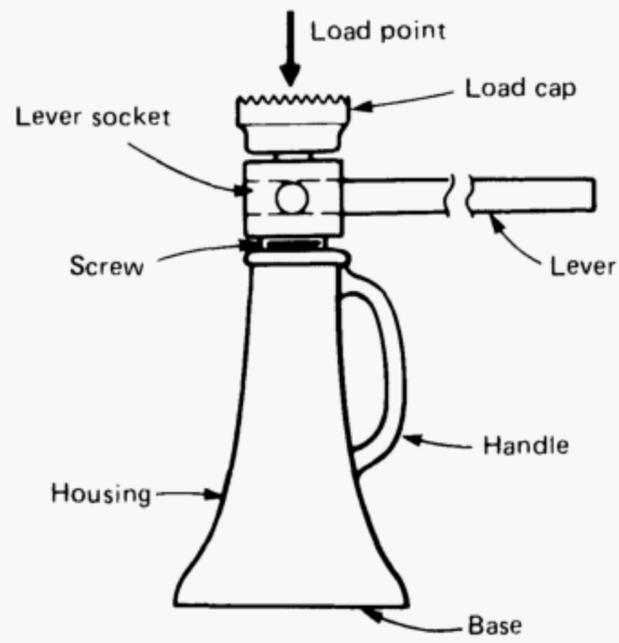


FIG. 7 SCREW JACK

Chapter 1-1 Construction

Section 1-1.1: General

1-1.1.1 Control Parts. Control parts shall be designed to provide a means of operation and adjustment which will minimize exposure of the operator to injury.

1-1.1.2 Overtravel. The general construction of every jack shall incorporate a positive stop or method to prevent overtravel, but such a stop shall not alter the operating characteristics of the jack.

1-1.1.3 Features of General Design. All features of general design should be such as to minimize hazard(s) in the use, handling, and operation of the jack, and should conform to applicable industrial standards.

The jack shall be designed to meet either of the following two criteria.

(a) *Design Qualification Testing.* Each design or modification shall be proof tested in accordance with the following procedures.

(1) *Hydraulic Jacks*

(a) *Dynamic Test.* The jack shall be operated through ten cycles of full travel at 110% of rated load.

(b) *Static Load Test.* The jack or cylinder shall be pressurized at 150% of pressure at rated load three times, with the ram extended to approximately 90% of full extension. After this test, the jack shall be functional at rated load for full extension and be free of leaks.

(c) *Integral Auxiliary Load Points.* The tests as described in (a)(1)(a) and (b) above shall be performed for each integral auxiliary load point, using appropriate rated loads as defined in Section 1-0.2 (see *load rating, auxiliary*).

(2) *Mechanical Jacks*

(a) *Dynamic Load Test.* The jack shall be loaded to 110% of its lifting rated load and operated to its full length of travel through ten cycles.

(b) *Static Load Test.* The jack shall be loaded three times to 150% of its sustaining rated load, with the lifting member at approximately 90% of full extension. After this test, the jack shall be functional for full extension under 100% of lifting rated load.

(c) *Auxiliary Load Points.* Tests corresponding to (a)(2)(a) and (b) above shall be performed for each auxiliary load point, using appropriate rated loads as defined in Section 1-0.2 (see *load rating, auxiliary*).

(b) *Static Design*

(1) The computed stress in the structural components of the jack shall not exceed 50% of the yield strength of the material at the appropriate rated load for the components. Any degradation of physical properties caused by welding handles or eyes to stressed hydraulic ram cylinders shall be taken into account in determining the yield strength.

(2) Each double-acting hydraulic jack shall be fitted with a relief valve on the retract circuit which bleeds the smaller effective area of the jack. A flow-restricting component shall not be present between the relief valve and the smaller area.

(3) Carrying handles, if provided, shall be capable of statically supporting 200% of the weight of the jack. If a handle or eye is welded to a stressed hydraulic ram cylinder, welding shall conform to current industrial welding standards.

Section 1-1.2: Marking and Instructions

1-1.2.1 Marking. The rated load shall be legibly and durably marked in a prominent location. Mechanical jacks which have two ratings (sustaining and lifting) shall be so marked. The brand name or trademark, and hydraulic pressure or lever arm length and force, shall be legibly marked on the jack. Each hydraulic jack should be marked to indicate that only recommended jack hydraulic fluid shall be used. Double-acting hydraulic jacks shall be marked to indicate the need for a relief valve, as indicated in para. 1-1.1.3(b)(2).

1-1.2.2 Integral Auxiliary Rated Load Marking. If integral auxiliary load-supporting points are provided and have different ratings from the major

load support points, the manufacturer shall mark the jack with the rated load for such operation in accordance with para. 1-1.2.1.

1-1.2.3 Instructions. The manufacturer shall furnish printed operating, inspection, and maintenance instructions with each jack.

Chapter 1-2

Inspection, Testing, and Maintenance

Section 1-2.1: Inspection

The inspection classifications in this Section are minimum requirements and should be augmented when experience from operating conditions so indicates. (See Table 1.)

1-2.1.1 Inspection Classification

(a) *Initial Inspection.* Prior to initial use, all new, altered, modified, or repaired jacks shall be visually inspected by the user to verify compliance with the applicable provisions of this volume.

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

(1) *Frequent Inspection.* This consists of visual examinations by the operator or other designated personnel with records not required.

(a) normal service: monthly

(b) severe service: daily to weekly

(c) infrequent service: as recommended by a qualified person before and after each occurrence

(2) *Periodic Inspection.* This consists of visual inspection by an appointed person who makes records of apparent external conditions to provide the basis for a continuing evaluation. An external coded mark on the jack is an acceptable identification in lieu of records.

(a) normal service: equipment in place — yearly

(b) severe service: as in normal service, unless external conditions indicate that disassembly should be done to permit detailed inspection — quarterly

(c) infrequent service: as recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences

1-2.1.2 Frequent Inspection. Items such as those listed in (a) through (j) below shall be inspected at intervals as defined in para. 1-2.1.1(b)(1). Frequent inspection shall include observations during operation. A designated person shall determine if conditions found during the inspection constitute a hazard and if a more detailed inspection is required:

(a) improper engagement or extreme wear of pawl and rack;

(b) chipped, cracked, or broken rack teeth;

(c) cracked or damaged housing;

(d) excessive wear, bending, or other damage to threads;

(e) leaking hydraulic fluid;

(f) scored or damaged plunger;

(g) improperly functioning swivel heads and caps;

(h) loose bolts or rivets;

(i) damaged or improperly assembled accessory equipment;

(j) other items as specified in manufacturer's instructions which may affect operation.

1-2.1.3 Periodic Inspection

(a) Same as para. 1-2.1.2, except records should be made in accordance with para. 1-2.1.1(b)(2).

(b) The jack shall be disassembled for cleaning and examination for internal wear or damage if external appearance indicates there may be internal difficulty. It is recommended that the periodic inspection be performed by an authorized service center or a qualified person.

1-2.1.4 Jacks Not in Regular Use. A jack which has been idle for one year or more shall be subject to an inspection prior to use, in accordance with para. 1-2.1.2.

1-2.1.5 Inspection Records. Dated inspection records should be kept on all periodic inspections.

Section 1-2.2: Testing

1-2.2.1 Rated Load Test

(a) All new jacks shall be tested to rated load by the manufacturer.

TABLE 1 MINIMUM INSPECTION SCHEDULE

Item	Normal Service		Severe Service	
	Visual, Monthly [Note (1)]	Record, Yearly [Note (2)]	Visual, Before Use [Note (3)]	Record, Yearly
Frequent Inspection				
Improper pawl engagement	X		X	
Excessive pawl wear	X		X	
Chipped, cracked, or worn rack teeth	X		X	
Cracked or damaged housing	X		X	
Damaged, bent, or worn threads	X		X	
Leaking hydraulic fluid	X		X	
Scored or damaged plunger	X		X	
Improper functioning	X		X	
Free movement of swivel, heads, and caps	X		X	
Loose bolts or rivets	X		X	
Damaged or improperly assembled accessory equipment	X		X	
Other items as specified in manufacturer's instructions	X		X	
Rack wear or bending	X		X	
Periodic Instruction				
Same as frequent inspection		X		X
Disassemble and check for wear		X [Note (4)]		X

NOTES:

- (1) By operator or designated personnel with records not required.
- (2) By appointed person making records of apparent external conditions to provide the basis for continuing evaluation.
- (3) Or daily.
- (4) If external conditions indicate possible internal difficulty.

(b) All altered or modified jacks should be tested at rated load before being placed in service.

(c) The need for load testing of a repaired jack shall be determined by a qualified person. When required, the repaired jack should be tested at rated load.

Section 1-2.3: Maintenance

1-2.3.1 Lubrication. All moving parts of the jack requiring lubrication should be regularly lubricated. Lubricating systems should be checked for proper delivery of lubricant. Care should be taken to follow manufacturer's recommendations as to points and frequency of lubrication, maintenance of lubricant levels, and types of lubricants to be used.

1-2.3.2 Hydraulic Fluid. Only hydraulic jack fluid which is compatible with the jack manufacturer's specification shall be used.

1-2.3.3 Cleaning

(a) Exposed screw threads should be cleaned and relubricated as necessary.

(b) Jacks exposed to rain, sand, or grit-laden air should be cleaned prior to use.

(c) Jack operating lever and load-bearing surfaces should be free of slippery material or fluids.

1-2.3.4 Storage. Jacks should be stored where protected from the elements, abrasive dust, and damage. Hydraulic jacks should be stored in the vertical position.

1-2.3.5 Repair Parts. It is recommended that repair parts be purchased from the original equipment manufacturer or an authorized service center. Jacks that are repaired with parts other than those obtained from the original manufacturer shall conform to para. 1-1.1.3(a). A qualified person shall verify conformance with these requirements.

1-2.3.6 Additional Special Maintenance. If additional special maintenance is required, it shall be done in accordance with the manufacturer's instructions.

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Chapter 1-3 Operation

Section 1-3.1: Operational Requirements

(a) Jacks shall be visually examined for general conditions before each shift or each use, whichever is the less frequent.

(b) A determination of the load shall be made to assure that it is within the load rating of the jack.

(c) The jack shall be firmly supported at the base such that it is stable under load.

(d) Operators shall be instructed in the proper use of the jacks.

(e) When remotely operated hydraulic jacks are used, the jacking system shall have a relief valve set to a maximum of 15% above the lowest pressure rated component of the system.

Section 1-3.2: Operational Procedures

(a) Be familiar with the equipment and the manufacturer's instructions on its operation, maintenance, and inspection.

(b) See that the recommended operating lever is used and properly seated in its socket.

(c) See that operators do not straddle the operating lever of a mechanical jack.

(d) Remove operating levers when not in use to avoid accidental dislocation of the jack and reduce the tripping hazard.

(e) Take precautions to ensure that all personnel are clear of the load before lowering.

(f) Take measures to prevent personnel from working or passing under the load until the load is secured by cribbing, blocking, or other means.

(g) Ensure that there is sufficient swing area for the operating lever(s).

(h) Follow the load with cribbing or blocking where practical.

(i) Ensure that all operators are instructed as to signals and other procedures for multiple jacks or other special lifts.

(j) Off-center loading of jacks should be avoided.

(k) Extenders shall not be used unless authorized by a qualified person.

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ASME B30.1 INTERPRETATIONS

**Replies to Technical Inquiries
October 1997 – September 1998**

FOREWORD

This publication includes all of the written replies issued between the indicated dates by the Secretary, speaking for the ASME B30 Committee, Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings, to inquiries concerning interpretations of technical aspects of ASME B30.1, Jacks.

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

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

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Interpretation: 1-1

Subject: ASME B30.1-1992, Jacks

Date Issued: October 3, 1997

Question (1): Are trip-lowered, railway track jacks covered by the B30.1 volume?

Reply (1): No. Within Section I, Scope, the B30 Standard specifically excludes track jacks. Additionally, within the B30.1 volume, Section 1-0.1, Scope, jacks which allow loads to be trip lowered are excluded.

Question (2): If the answer to Question (1) is no, what are the technical reasons why the volume cannot be revised to address track jacks?

Reply (2): The B30.1 volume is a general industry safety standard that is not intended to govern special use products such as (railway) track jacks.

The types of jacks addressed within ASME B30.1 are defined within Section 1-0.2, Definitions:

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

The key words are “controlled” and “linear.” Railway track jacks are purposely designed to have a trip-lowering feature which permits sudden load release. Therefore, the technical justification for its exclusion are: (1) sudden uncontrolled lowering movement of the load upon release; and (2) application of the track jack to be used in situations where load travel is not linear all the time.

Should you require technical guidance on track jacks, please contact the Federal Railroad Administration. Address follows:

Mr. Doug Taylor
Director of Operating Practices Division
Office of Safety
Federal Railway Administration (RRS-11)
400 7th Street SW
Washington, DC 20590

Interpretation: 1-2

Subject: ASME B30.1-1992, Jacks

Date Issued: March 13, 1998

Question (1): If we use a restrictive theory to calculate jacks, does para. 1-1.1.3(b) require us to use the same safety factor or a less restrictive one?

Reply (1): Paragraph 1-1.1.3(b)(1) states:

“The computed stress in the structural components of the jack shall not exceed 50% of the yield strength of the material at the appropriate rated load for the components. Any degradation of physical properties caused by welding handles or eyes to stressed hydraulic ram cylinders shall be taken into account in determining the yield strength.”

The first sentence of para. 1-1.1.3(b)(1) requires a minimum safety factor of 2:1 based on yield strength of the material.

Question (2): Does ASME B30.1-1992 require any particular theory to calculate the computed stress?

Reply (2): No.

Interpretation: 1-3

Subject: ASME B30.1-1992, Jacks

Date Issued: September 29, 1998

Question: Will a hydraulic jack qualify per the static load test requirement in para. 1-1.1.3(a)(1)(b) if it is necessary to adjust a relief valve in the extended port of the jack's double acting cylinder above the normal setting in order to develop 150% of rated pressure?

Reply: Yes. As stated within Section 1-0.1, Scope, the B30.1 volume is for "general purpose portable jacks" only and is not intended to determine for the manufacturer what safety components, circuit components, or industrial standards are applicable in the system design.

Replaced Pages

The following pages contain the material that was in the original edition that has been replaced by subsequent changes made in an addenda. They are included here for reference.

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

INTRODUCTION

(98) General

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

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

- | | | | |
|--------|--|--------|--|
| B30.1 | Jacks | B30.21 | Manually Lever Operated Hoists |
| B30.2 | Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist) | B30.22 | Articulating Boom Cranes |
| B30.3 | Construction Tower Cranes | B30.23 | Personnel Lifting Systems ¹ |
| B30.4 | Portal, Tower, and Pedestal Cranes | B30.24 | Container Cranes ¹ |
| B30.5 | Mobile and Locomotive Cranes | B30.25 | Scrap and Material Handlers ¹ |
| B30.6 | Derricks | | |
| B30.7 | Base Mounted Drum Hoists | | |
| B30.8 | Floating Cranes and Floating Derricks | | |
| B30.9 | Slings | | |
| B30.10 | Hooks | | |
| B30.11 | Monorails and Underhung Cranes | | |
| B30.12 | Handling Loads Suspended From Rotorcraft | | |
| B30.13 | Storage/Retrieval (S/R) Machines and Associated Equipment | | |
| B30.14 | Side Boom Tractors | | |
| B30.15 | Mobile Hydraulic Cranes
Note: B30.15-1973 has been withdrawn.
The revision of B30.15 is included in the latest edition of B30.5. | | |
| B30.16 | Overhead Hoists (Underhung) | | |
| B30.17 | Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist) | | |
| B30.18 | Stacker Cranes (Top or Under Running Bridge, Multiple Girder With Top or Under Running Trolley Hoist) | | |
| B30.19 | Cableways | | |
| B30.20 | Below-the-Hook Lifting Devices | | |

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.

The use of cableways, cranes, derricks, hoists, hooks, jacks, and slings is subject to certain hazards that cannot be met by mechanical means but only by the exercise of intelligence, care, and common sense. It is therefore essential to have personnel involved in the use and operation of equipment who are competent, careful, physically and mentally qualified, and trained in the safe operation of the equipment and the handling of the loads. Serious hazards are overloading, dropping or slipping of the load caused by improper hitching or slinging, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed.

The Standards Committee fully realizes the importance of proper design factors, minimum or maximum sizes, and other limiting dimensions of wire rope or chain and their fastenings, sheaves, sprockets, drums, and similar equipment covered by the Standard, all of which are closely connected with safety. Sizes, strengths, and similar criteria are dependent on many different factors, often varying with the installation and uses. These factors depend on the condition of the equipment or material; on the loads; on the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums; on the type of attachments; on the number, size, and arrangement of sheaves or other parts; on environmental conditions causing corrosion or wear; and on many variable factors that must be considered in each individual case. The rules given in the Standard must be

¹ B30.23, B30.24, and B30.25 are in the developmental stage.

interpreted accordingly, and judgment used in determining their application.

Some of the provisions of this Standard require compliance with information found in manuals or other documents with the equipment supplied by the manufacturer. The information includes recommendations, requirements, and instructions (e.g., "the reeving shall be checked for compliance with the recommendations of the manufacturer").

Compliance with the provisions should not preclude the possibility of consulting a qualified person. This is true particularly when: the equipment has been altered, repaired, or modified; the manuals or documents supplied by the manufacturer are no longer available; or the manufacturer or a successor is no longer in business and the manuals are no longer available. However, the purpose of consulting a qualified person shall not be to avoid contacting the manufacturer and using the information supplied by the manufacturer.

The Standards Committee will be glad to receive criticisms of this Standard's requirements and suggestions for its improvement, especially those based on actual experience in application of the rules.

Suggestions for changes to the Standard should be submitted to the Secretary of the B30 Committee, ASME, 345 East 47th Street, New York, NY 10017, and should be in accordance with the following format:

- (a) cite the specific paragraph designation of the pertinent volume;
- (b) indicate the suggested change (addition, deletion, revision, etc.);
- (c) briefly state the reason and/or evidence for the suggested change;
- (d) submit suggested changes to more than one paragraph in the order that the paragraphs appear in the volume.

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

Section I: Scope

This Standard applies to the construction, installation, operation, inspection, and maintenance of jacks; power-operated cranes, monorails, and crane runways; power-operated and manually operated derricks and hoists; lifting devices, hooks, and slings; and cableways.

This Standard does not apply to track and automotive jacks, railway or automobile wrecking cranes, shipboard cranes, shipboard cargo-handling equipment, well-drilling derricks, skip hoists, mine hoists, truck body

hoists, car or barge pullers, conveyors, excavating equipment, or equipment coming within the scope of the following Committees: A10, A17, A90, A92, A120, B20, B56, and B77.

Section II: Purpose

This Standard is designed to:

- (a) guard against and minimize injury to workers, and otherwise provide for the protection of life, limb, and property by prescribing safety requirements;
- (b) provide direction to owners, employers, supervisors, and others concerned with, or responsible for, its application; and
- (c) guide governments and other regulatory bodies in the development, promulgation, and enforcement of appropriate safety directives.

Section III: Interpretations

Upon request, the B30 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B30 Committee, ASME, 345 East 47th Street, New York, NY 10017.

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

- Subject: Cite the applicable paragraph number(s) and provide a concise description.
- Edition: Cite the applicable edition of the pertinent volume for which the interpretation is being requested.
- Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for approval of a proprietary design or situation. The inquirer may also include any plans or drawings which are necessary to explain the question; however, they should not contain any proprietary names or information.

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

ASME procedures provide for reconsideration of any interpretation when or if additional information which might affect an interpretation is available. Further,

JACKS

Chapter 1-0 Scope and Definitions

Section 1-0.1: Scope of B30.1

Within the general scope defined in Section I of the Introduction, B30.1 applies to general purpose, portable jacks of the following categories: hand- or power-operated hydraulic jacks, mechanical ratchet jacks, and hand- or power-operated mechanical screw jacks.

Jacks designed for automotive service, trip-lowered jacks, and those that are an integral part of other equipment are not included in the scope of this Standard. Devices designed for static support rather than lifting are not included.

1-0.1.1 Illustrations. Figures 1 through 7, on the pages that follow, show typical jacks covered by this Standard. They are not intended to be all inclusive.

Section 1-0.2: Definitions

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

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

controlled conditions: where the jack is evenly supported on a solid foundation, operating a gravity load only, protected against wind and other external forces such as shock loads or vibrations, and at an ambient temperature range of -20°F to 140°F (-29°C to 60°C).

control parts: parts which the operator must manipulate in extending or retracting the jack.

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

extender: a device that increases the jack's closed length.

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

jack, double-acting hydraulic: a jack which 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.

load: the total superimposed weight or force to be overcome by the jack.

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.

load rating, auxiliary: rated load of the jack, as determined by the manufacturer, when load is applied at the auxiliary load point.

overload: any load greater than the rated load.

overtravel: movement beyond maximum travel for which the jack was designed.

power: any means other than manual of actuating a jack.

qualified person: a person who, by possession of a recognized degree 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.

rated load (hydraulic jacks): maximum load, applied at a specified point, for which the jack is designed and built by a manufacturer for its specified travel.

rated load, lifting (mechanical jacks): maximum load, applied at a specified point, which the jack is designed to lift with the specified operating lever.

rated load, sustaining (mechanical jacks): maximum load, applied at a specified point, which the jack was designed to sustain.

service, normal: the use of jacks to raise or lower known axial loads at or less than 85% rated capacity, under controlled conditions.

service, severe: use of jacks under conditions which are not rated normal service.

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.

travel: linear extending or retracting movement of the jack.

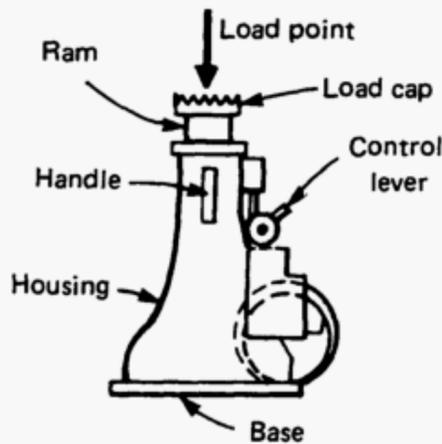
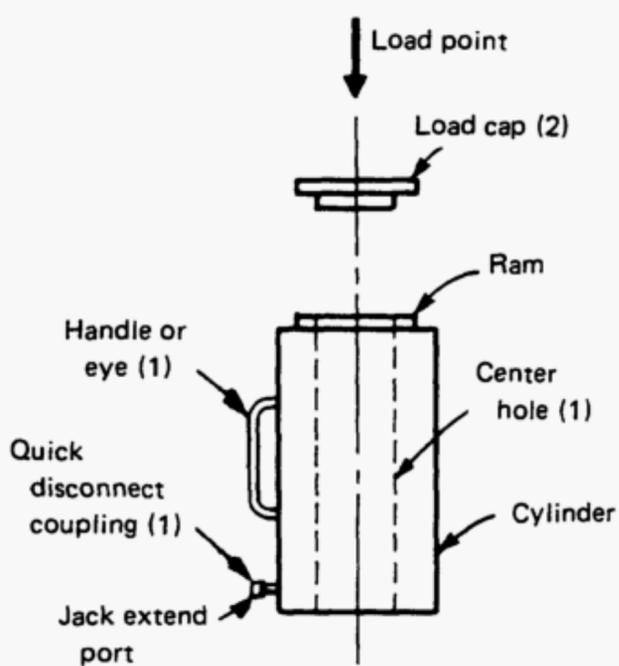
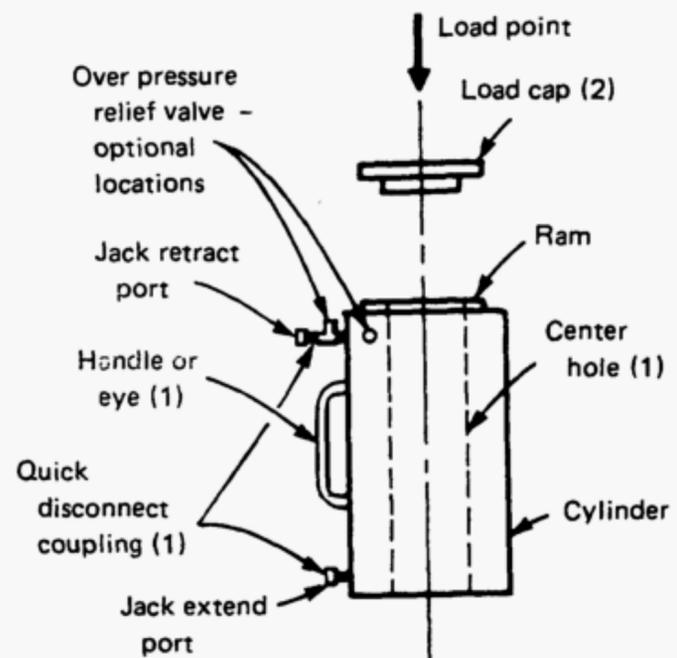


FIG. 1 POWER-DRIVEN SCREW JACK



NOTES:
 (1) Optional.
 (2) If required by jack manufacturer.

FIG. 2 SINGLE-ACTING HYDRAULIC JACK



NOTES:
 (1) Optional.
 (2) If required by jack manufacturer.

FIG. 3 DOUBLE-ACTING HYDRAULIC JACK

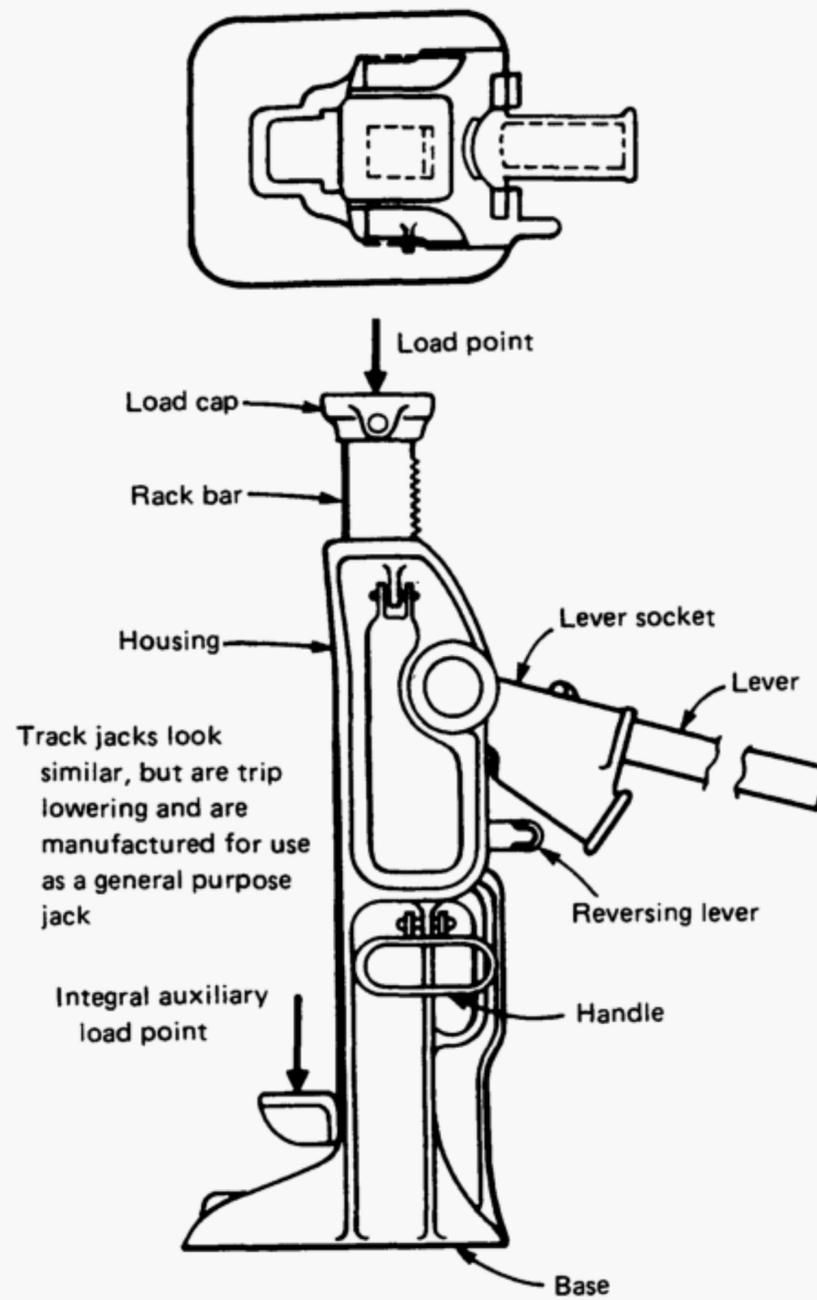


FIG. 4 RATCHET JACK

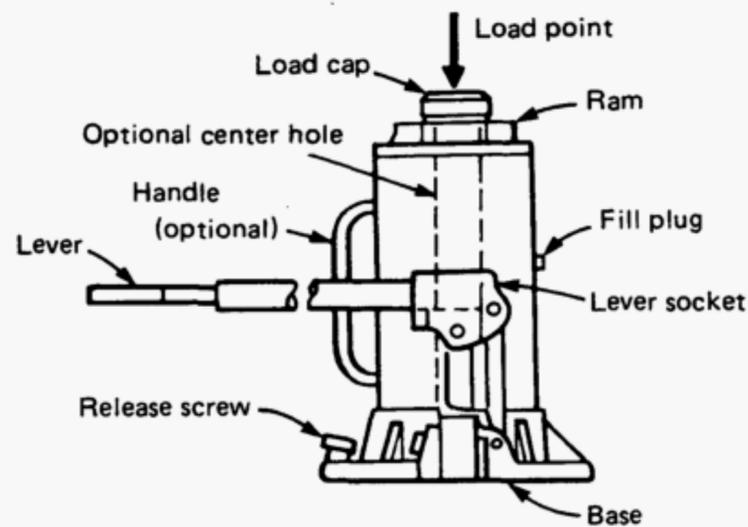


FIG. 5 SELF-CONTAINED HYDRAULIC JACK

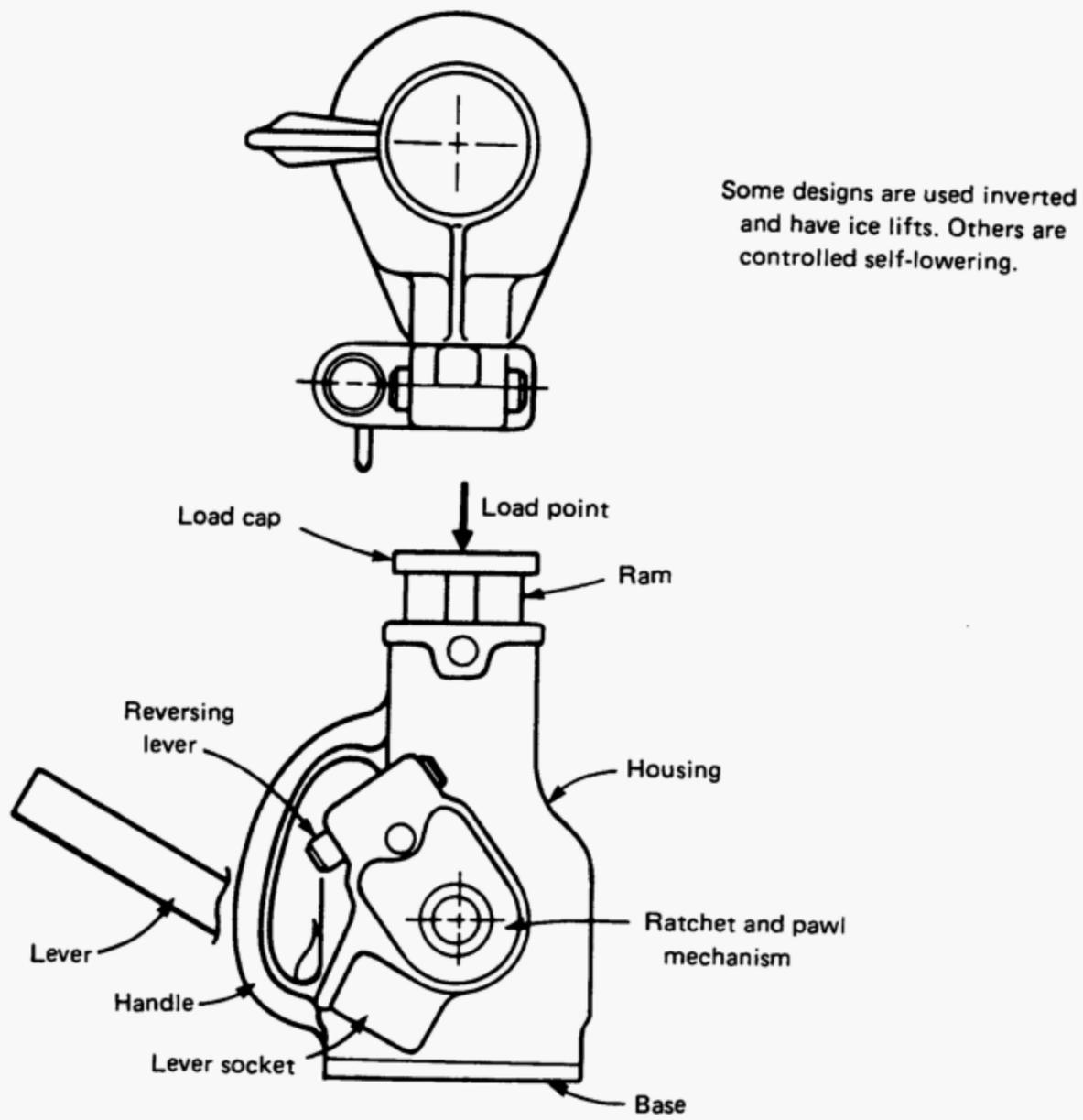


FIG. 6 SCREW JACK WITH RATCHET

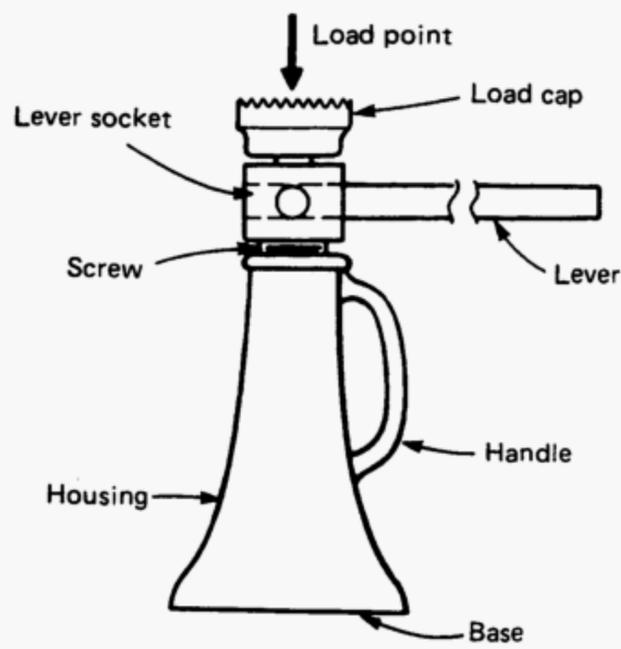


FIG. 7 SCREW JACK

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