

# Hooks

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

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**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

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**ASME B30.10-2014**  
(Revision of ASME B30.10-2009)

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Cranes, Derricks, Hoists, Hooks,  
Jacks, and Slings**

**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

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The next edition of this Standard is scheduled for publication in 2019. This Standard will become effective 1 year after the Date of Issuance.

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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 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 ANSI in 1969, which resulted in B30 volumes from 1943 to 1968 being designated as 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.

The 2009 edition of B30.10 was rewritten entirely to improve the clarity of the Standard. This 2014 edition incorporates many global B30 changes, including the addition of personnel competence and translation requirements, as well as other revisions made throughout the document.

This edition of the B30.10 Volume was approved by the B30 Committee and ASME and was approved by ANSI and designated as an American National Standard on May 23, 2014.



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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

## B30 STANDARD INTRODUCTION

(14)

### 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  | B30.23 | Personnel Lifting Systems   |
| B30.2  | Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist) | B30.24 | Container Cranes            |
| B30.3  | Tower Cranes  | B30.25 | Scrap and Material Handlers |
| B30.4  | Portal and Pedestal Cranes  | B30.26 | Rigging Hardware            |
| B30.5  | Mobile and Locomotive Cranes  | B30.27 | Material Placement Systems  |
| B30.6  | Derricks  | B30.28 | Balance Lifting Units       |
| B30.7  | Winches   | B30.29 | Self-Erecting Tower Cranes  |
| B30.8  | Floating Cranes and Floating Derricks   | B30.30 | Ropes <sup>1</sup>          |
| 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<br>(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  |        |                             |

### 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  
ASME Codes and Standards  
Two Park Avenue  
New York, NY 10016-5990

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

Secretary, B30 Standard Committee  
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 B30.10-2014

## SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.10-2014 was approved by the American National Standards Institute on May 23, 2014.

ASME B30.10-2014 includes the following changes identified by a margin note, **(14)**.

<i>Page</i>	<i>Location</i>	<i>Change</i>
ix–xi	B30 Standard Introduction	Updated
1, 2	Chapter 10-0	Title revised
	Section 10-0.1	Revised
	Section 10-0.2	(1) Definition of <i>designated person</i> deleted (2) Definition of <i>load handling</i> added
	Section 10-0.3	Revised
	Section 10-0.4	Added
	Section 10-0.5	Added
3	Section 10-1.2	(1) First paragraph revised (2) Paragraph 10-1.2.1 added
	Section 10-1.3	Subparagraph (d) revised
	Section 10-1.6	Revised
	Section 10-1.7	Subparagraph (a) revised
4, 5	Section 10-1.8	Revised
	10-1.10.1	Revised
	10-1.10.2	Revised
	10-1.10.3	(1) Subparagraphs (a) and (c)(3) revised (2) Subparagraph (b) deleted, and remaining subparagraphs redesignated
	10-1.10.4	Subparagraphs (a) and (b)(3) revised
	10-1.10.6	Subparagraph (h) revised
6	10-1.11.1	Subparagraphs (a), (d), (e), and (i) revised
	10-1.11.2	(1) New subparagraph (a) added, and remaining subparagraphs redesignated (2) Subparagraphs (d) and (h) revised
10	Section 10-2.2	(1) First paragraph revised (2) Paragraph 10-2.2.1 added
	Section 10-2.3	Subparagraph (d) revised
	Section 10-2.6	Revised

<i>Page</i>	<i>Location</i>	<i>Change</i>
	Section 10-2.8	Revised
11	10-2.10.1	Revised
	10-2.10.2	Revised
	10-2.10.3	(1) Subparagraphs (a) and (c)(3) revised (2) Subparagraph (b) deleted, and remaining subparagraphs redesignated
	10-2.10.4	Subparagraphs (a) and (b)(3) revised
12	10-2.10.6	Subparagraph (h) revised
	Section 10-2.11	Subparagraphs (a) and (f) revised

**SPECIAL NOTE:**

The interpretations to ASME B30.10 are included in this edition as a separate section for the user's convenience.

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# HOOKS

## Chapter 10-0

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

(14)

#### (14) SECTION 10-0.1: SCOPE OF ASME B30.10

Volume B30.10 includes provisions that apply to the fabrication, attachment, use, inspection, and maintenance of hooks shown in Chapters 10-1 and 10-2 used for load handling purposes, in conjunction with equipment described in other volumes of the B30 Standard. Hooks supporting a load in the base (bowl/saddle or pinhole) of the hook are covered in Chapter 10-1. Hooks that may be loaded in other than the base (bowl/saddle or pinhole) are covered in Chapter 10-2.

#### (14) SECTION 10-0.2: DEFINITIONS

*abnormal operating conditions:* environmental conditions that are unfavorable, harmful, or detrimental to or for the use of a hook.

*crack:* a crevice-type discontinuity in the material.

*design factor:* ratio between nominal or minimum breaking strength and rated load of the hook.

*hook, self-closing:* a hook with a throat opening that is closed by a spring-loaded latch, gate, or bail that is manually opened for loading and closes upon release. It may be locked in the closed position (see Figs. 10-1.1-8 through 10-1.1-14).

*hook, self-locking:* a hook with a throat opening that will close and lock when a load is applied and will not open until unloaded and the lock released (see Figs. 10-1.1-6 and 10-1.1-7).

*latch:* a mechanical device used to close the throat opening of a hook (see Figs. 10-1.1-1 through 10-1.1-5 and 10-1.1-17). A rigging aid, not intended to support the load.

*load:* the total force or weight imposed on the hook.

*load handling:* the act of lifting or pulling a load from one location to another by using a hook as the connector between the load and the load handling equipment.

*load, proof:* the specific load applied in performance of the proof test.

*load, rated:* the maximum allowable working load. The terms *rated capacity* and *working load limit* are commonly used to describe rated load.

*mouse:* a method to close the throat opening of a hook using a device such as rope, wire, or other suitable means.

*nick or gouge:* sharp notch in hook surface that may act as stress riser in the area of the notch.

*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 problems relating to the subject matter and work.

*rated load identification:* actual rated load information or a designation provided by the manufacturer for grade and type or size to allow determination of hook rated load.

*service, heavy:* service that involves operating at 85% to 100% of rated load as a regular specified procedure.

*service, normal:* service that involves operating at less than 85% of rated load except for isolated instances.

*service, severe:* heavy service coupled with abnormal operating conditions.

*test, nondestructive:* a test that does not destroy the functional use of the hook, such as, but not limited to, dye-penetrant, magnetic particle, radiography, and ultrasonic tests.

*test, proof:* a nondestructive load test made to verify the manufacturing integrity of the hook.

#### SECTION 10-0.3: REFERENCES

(14)

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

ISO 7000, Graphical symbols for use on equipment — Registered symbols

ISO 7296, Cranes — Graphic symbols — Parts 1–3

Publisher: International Organization for Standardization (ISO), Central Secretariat, 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Genève 20, Switzerland/Suisse (www.iso.org)

**(14) SECTION 10-0.4: 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.

**(14) SECTION 10-0.5: 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 paras. 10-0.5(a)(1)(a) through (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. 10-0.5(a) and (b).

(b) Any non-English documentation provided in addition to English shall be translated and reviewed in accordance with the requirements listed in para. 10-0.5(a).

# Chapter 10-1

## Hooks: Selection, Use, and Maintenance

### SECTION 10-1.1: SCOPE

This Chapter applies to all hooks specifically shown in Figs. 10-1.1-1 through 10-1.1-17 that support the load in the base (bowl/saddle or pinhole — see Figs. 10-1.1-3 and 10-1.1-4) of the hook.

### (14) SECTION 10-1.2: TRAINING

When the hook is a component of equipment addressed by another B30 volume, the user (operator) and maintenance training requirements of that volume shall apply in addition to the requirements of this Volume.

Hook users and maintenance personnel shall be trained in the selection, inspection, cautions to personnel, effects of environment, and operating practices, as covered by this Chapter and other volumes of the B30 Standard, where hooks are used.

#### 10-1.2.1: Sources of User (Operator) and Maintenance Training

Examples of training material sources are as follows:

- (a) information provided by the equipment manufacturer
- (b) information available from trade associations
- (c) government training resources, such as the Department of Labor
- (d) organized labor groups
- (e) courses, seminars, and literature offered by manufacturers of hooks, consultants, trade schools, continuing education schools, and employers
- (f) requirements and recommendations found in national consensus standards, such as this Volume

### (14) SECTION 10-1.3: MATERIALS AND COMPONENTS

(a) The hook material shall have sufficient ductility to permanently deform before losing the ability to support the load at the temperatures at which the specific hook will be used.

(b) The hook and hook-securing device shall be of sufficient strength and design factor for the rated load and application.

(c) When a latch is provided, it shall be designed to retain such items as, but not limited to, slings and rigging hardware under slack rigging conditions only. The latch is not intended to support the load.

(d) Attachments, such as handles, latch supports, etc., shall not be welded to a finished hook in field applications. If welding of an attachment is required, it shall be done in manufacturing or fabrication prior to any required final heat treatment.

### SECTION 10-1.4: FABRICATION AND CONFIGURATIONS

(a) Hooks shall be forged, cast, stamped or welded, and heat treated by the manufacturer.

(b) Shank hook-securing devices shall have thread or shank diameter and length as recommended by the manufacturer or qualified person.

### SECTION 10-1.5: DESIGN FACTOR

The hook shall be designed to withstand all stresses imposed under normal operating conditions while handling loads within the rated load. Hook design factor shall, as a minimum, conform to those specified for the equipment or system in which the hook is a component.

### SECTION 10-1.6: RATED LOADS

(14)

Rated load for hooks shall be in accordance with the requirements as defined for the equipment or system in which the hook is being utilized or as recommended by a qualified person.

### SECTION 10-1.7: PROOF TEST REQUIREMENTS

(14)

(a) When proof tests are used to verify manufacturing process, material, or configuration, the hooks shall be able to withstand the proof load application without permanent deformation when the load is applied. This condition shall be considered to have been satisfied if the permanent increase in the throat opening does not exceed 1% or 0.02 in. (0.5 mm), whichever is greater. For such tests, Table 10-1.7-1 states the proof load that shall be applied for a specified rated load.

(b) For a duplex (sister) hook having a pinhole, the proof load for the pinhole shall be in accordance with Table 10-1.7-1. The proof load on the hook shall be shared equally between the two prongs of a sister hook, unless designed for unbalanced loading.

(c) For a quad hook, the proof load shall be in accordance with Table 10-1.7-1. The application of the proof load shall be determined by the manufacturer or a qualified person.

**Table 10-1.7-1 Proof Test Load**

Rated Load		Proof Load, Min.		
Tons (2,000 lb)	kg	Rated Load, %	Tons (2,000 lb)	kN
0.50	453.6	200	1	8.9
1	907.2	200	2	17.8
5	4 536	200	10	89
10	9 072	200	20	178
15	13 608	200	30	267
20	18 144	200	40	356
25	22 680	200	50	445
30	27 216	200	60	534
35	31 752	200	70	623
40	36 288	200	80	712
45	40 824	200	90	801
50	45 360	200	100	890
60	54 432	193	116	1 032.5
75	68 040	183	137	1 219
100	90 720	166	166	1 477
125	113 400	150	188	1 673
150	136 080	133	200	1 780
175	158 760	133	233	2 074
200	181 440	133	266	2 367
250	226 800	133	333	2 964
300	272 160	133	399	3 551
350	317 520	133	465	4 139
400	362 880	133	532	4 735
450	408 240	133	598	5 322
500	453 600	133	665	5 919
Above 500	> 453 600	133	...	...

## GENERAL NOTES:

- (a) 1 ton (short, 2,000 lb) = 8.9 kN (unit of force).  
 (b) For hooks with rated loads not shown in the above table, use the next lower rating for determining the percent of rated load to be applied as a proof load.

(d) Performance testing of component hooks shall not be required except where necessary to conform to the requirements of the equipment or system.

**(14) SECTION 10-1.8: IDENTIFICATION**

The manufacturer's identification and rated load identification shall be forged, cast, or die stamped on a low stress and nonwearing area of the hook. Alternately, if the hook is used in conjunction with equipment described in other volumes of the B30 Standard, the equipment manufacturer's identification and rated load identification shall be forged, cast, or die stamped on a low-stress and nonwearing area of the hook.

**SECTION 10-1.9: EFFECTS OF ENVIRONMENT****10-1.9.1 Temperature**

When hooks are to be used at temperatures above 400°F (204°C) or below -40°F (-40°C), the hook manufacturer or a qualified person should be consulted.

**10-1.9.2 Chemically Active Environments**

The strength of hooks can be affected by chemically active environments, such as caustic or acid substances or fumes. The hook manufacturer or a qualified person should be consulted before hooks are used in chemically active environments.

**SECTION 10-1.10: INSPECTION, REMOVAL, AND REPAIR****10-1.10.1 Inspection****(14)**

All inspections shall be performed by a designated person. Any deficiencies identified shall be examined and a determination made by a qualified person as to whether they constitute a hazard.

Inspection procedure and record keeping requirements for hooks in regular service shall be governed by the kind of equipment in which they are used. When more stringent requirements for hooks are stated in standards for the specific equipment, they shall take precedence over the following. Otherwise, there shall be an initial inspection and two general classifications based upon intervals at which examination shall be performed. The classifications are herein designated as initial, frequent, and periodic, with intervals between examinations defined as follows.

**10-1.10.2 Initial Inspection****(14)**

Prior to use, all new, altered, modified, or repaired hooks shall be inspected to verify compliance with the applicable provisions of this Volume. Written records are not required.

**10-1.10.3 Frequent Inspection****(14)**

(a) Frequent inspections shall include observations during operation. A visual inspection shall be performed for conditions listed in para. 10-1.10.5.

(b) Semipermanent and inaccessible locations where frequent inspections are not feasible shall have periodic inspections performed, at a frequency as determined by a qualified person.

(c) The inspection intervals should be based on

- (1) frequency of hook use
- (2) severity of service conditions
- (3) nature of load handling activities
- (4) experience gained on the service life of hooks used in similar circumstances
- (5) guidelines for the time intervals
  - (a) normal service — monthly

(b) heavy service — weekly to monthly

(c) severe service — daily to weekly

(d) Conditions such as those listed in para. 10-1.10.5 or any other condition that may result in a hazard shall cause the hook to be removed from service. Hooks shall not be returned to service until approved by a qualified person.

(e) Written records are not required.

#### (14) 10-1.10.4 Periodic Inspection

(a) A complete inspection of the hook shall be performed. Disassembly may be required.

The hook shall be examined for conditions such as those listed in para. 10-1.10.5.

(b) *Periodic Inspection Frequency.* Periodic inspection intervals shall not exceed 1 yr except as approved by a qualified person. The inspection intervals should be based on

(1) frequency of hook use

(2) severity of service conditions

(3) nature of load handling activities

(4) experience gained on the service life of hooks used in similar circumstances

(5) guidelines for the time intervals

(a) normal service — yearly with equipment in place

(b) heavy service — semiannually, with equipment in place unless external conditions indicate that disassembly should be done to permit detailed inspection monthly to quarterly

(c) severe service — quarterly, as in heavy service [see para. 10-1.10.4(b)(5)(b)], except that the detailed inspection may show the need for a nondestructive type of testing

(c) Hooks shall not be returned to service until approved by a qualified person.

(d) Written records are required.

#### 10-1.10.5 Removal Criteria

Hooks shall be removed from service if damage such as the following is visible and shall only be returned to service when approved by a qualified person:

(a) missing or illegible hook manufacturer's identification or secondary manufacturer's identification

(b) missing or illegible rated load identification

(c) excessive pitting or corrosion

(d) cracks, nicks, or gouges

(e) wear — any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin

(f) deformation — any visibly apparent bend or twist from the plane of the unbent hook

(g) throat opening — any distortion causing an increase in throat opening of 5% not to exceed  $\frac{1}{4}$  in. (6 mm) (or as recommended by the manufacturer)

(h) inability to lock — any self-locking hook that does not lock

(i) inoperative latch (if required) — any damaged latch or malfunctioning latch that does not close the hook's throat

(j) damaged, missing, or malfunctioning hook attachment and securing means

(k) thread wear, damage, or corrosion

(l) evidence of excessive heat exposure or unauthorized welding

(m) evidence of unauthorized alterations such as drilling, machining, grinding, or other modifications

#### 10-1.10.6 Repairs and Modifications

(14)

(a) Any conditions disclosed by the inspections performed in accordance with the requirements of para. 10-1.10.3 or 10-1.10.4 shall be corrected by repair or replacement before continuing to use the hook. All repairs and modifications shall be approved by the manufacturer or a qualified person.

(b) Hooks having damage or wear described as follows shall be repaired or replaced:

(1) cracks, nicks, and gouges. Repair of cracks, nicks, and gouges shall be carried out by a designated person by grinding longitudinally, following the contour of the hook, provided no dimension is reduced more than 10% (or as recommended by the manufacturer) of its original value.

(2) wear exceeding 10% (or as recommended by the manufacturer) of the original sectional dimension.

(3) any visibly apparent bend or twist from the plane of the unbent hook.

(4) any distortion causing an increase in throat opening of 5%, not to exceed  $\frac{1}{4}$  in. (6 mm) (or as recommended by the manufacturer).

(5) inability of self-locking hooks to lock.

(c) A hook latch that is inoperative shall be repaired, replaced, or removed if not required.

(d) If a required latch is inoperable and cannot be immediately repaired or replaced, the hook shall be sufficiently moused to retain loose items as defined in para. 10-1.3(c) until the latch is repaired or replaced.

(e) When reassembling shank hooks, original securing methods or manufacturer's recommendations shall be followed.

(f) All replacement parts shall be at least equal to the original manufacturer's specifications.

(g) Hooks without provision for latches may be moused to retain loose items as defined in para. 10-1.3(c).

(h) For special applications where the throat opening is required to be closed, mousing may be used in place of the latch to retain loose items as defined in para. 10-1.3(c), when approved by a qualified person.



**SECTION 10-1.11: OPERATING PRACTICES****(14) 10-1.11.1 Single-Point Hooks**

Personnel using hooks shall be aware of the following:

(a) It shall be determined that the load to be applied does not exceed the lesser of the load rating of the hook or the load rating of the equipment of which the hook is a part.

(b) Shock loading should be avoided.

(c) Load shall be centered in the base (bowl/saddle) of the hook to prevent point loading of the hook.

(d) When multileg slings are placed in the base (bowl/saddle) of the hook, the maximum included angle between sling legs shall be 90 deg or as determined by the hook manufacturer. The maximum sling leg angle with respect to the hook centerline for any rigging arrangement shall be 45 deg.

(e) A collector ring, such as a link or shackle, should be used when more than two legs are placed in a hook or for angles greater than 45 deg with respect to the hook centerline.

(f) Hooks shall not be used in such a manner as to place a side load, back load, or tip load on the hook.

(g) When using a device to close the throat opening of the hook, care shall be taken that the load is not carried by the closing device.

(h) Hands, fingers, and body shall be kept from between hook and load.

(i) The use of a hook with a latch does not preclude the inadvertent detachment of a slack sling or a load from the hook. Hook latches aid in the retention of loose slings under slack rigging conditions only and are not intended to be antifouling devices during load handling or rigging. Visual verification of proper hook engagement is required in all cases.

(j) Self-locking hooks shall be locked during use.

(k) When a latch is equipped with a lock open device to facilitate rigging, the latch shall be closed during operation.

(l) When a hook is equipped with a latch, the load shall not restrict the closure of the latch.

(m) The need for a latch or mousing on any hook is a function of the application of the hook and shall be determined by a qualified person.

**10-1.11.2 Duplex and Quad Hooks****(14)**

Personnel using hooks shall be aware of the following:

(a) For determining allowable sling angles for duplex (sister) and quad hooks, consult the manufacturer or a qualified person.

(b) Duplex (sister) hooks shall be loaded equally on both sides unless the hook is specifically designed for single-point loading. When using an articulated duplex (sister) hook (see Fig. 10-1.1-5), care should be taken because articulation of the hook may cause instability in the slung load.

(c) If the duplex (sister) hook is loaded at the pinhole instead of at the two saddles, the load applied shall not exceed the rated load that would normally be shared by the two saddles or the rated load of the supporting equipment.

(d) Quad hook load handling shall be done with all prongs loaded and rigged to balance prong forces. The hook manufacturer or qualified person shall be consulted for two-prong and unbalanced-prong loading.

(e) Hooks shall not be used in such a manner as to place a side load, back load, or tip load on the hook.

(f) When using a device to close the throat opening of the hook, care shall be taken that the load is not carried by the closing device.

(g) Hands, fingers, and body shall be kept from between hook and load.

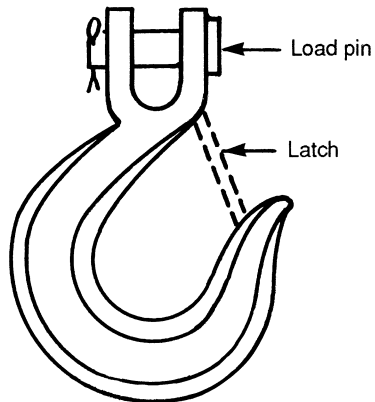
(h) The use of a hook with a latch does not preclude the inadvertent detachment of a slack sling or a load from the hook. Hook latches aid in the retention of loose slings under slack rigging conditions only and are not intended to be antifouling devices during load handling or rigging. Visual verification of proper hook engagement is required in all cases.

(i) When a latch is equipped with a lock open device to facilitate rigging, the latch shall be closed during operation.

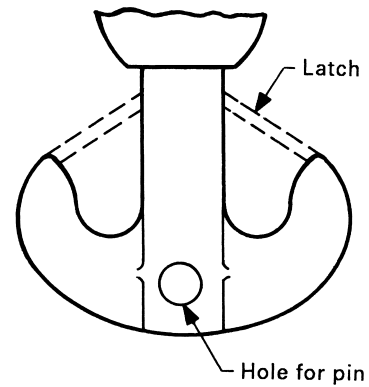
(j) When a hook is equipped with a latch, the load shall not restrict the closure of the latch.

(k) The need for a latch or mousing on any hook is a function of the application of the hook and shall be determined by a qualified person.

**Fig. 10-1.1-1 Clevis Hook (Latch — When Required)**

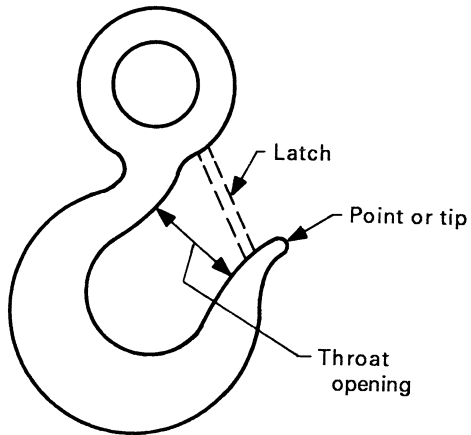


**Fig. 10-1.1-4 Duplex Hook (Sister) (Latch — When Required)**

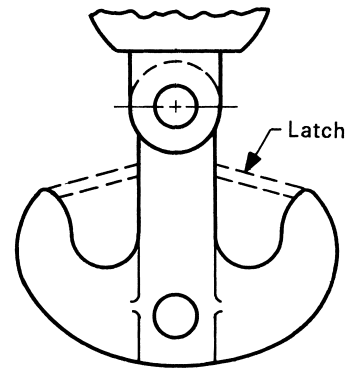


GENERAL NOTE: Hole for pin is optional.

**Fig. 10-1.1-2 Eye Hook (Latch — When Required)**



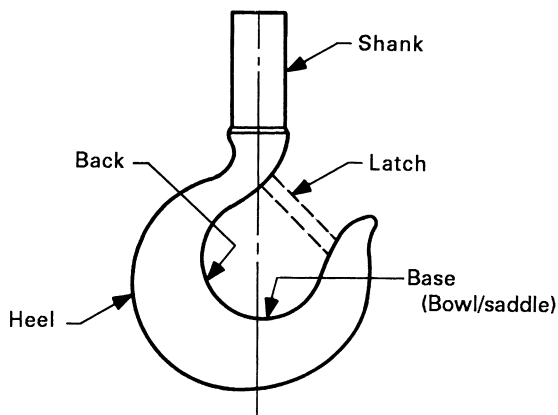
**Fig. 10-1.1-5 Articulated Duplex Hook (Sister) (Latch — When Required)**



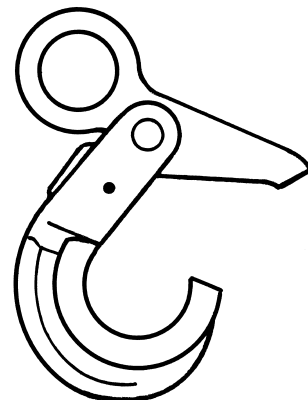
GENERAL NOTES:

- (a) The shape of the bowl of the hook shall be designed such that an unbalanced load positioned directly beneath the pivot point will not allow sling (load attachment) to be dislodged.
- (b) Hole for pin is optional.

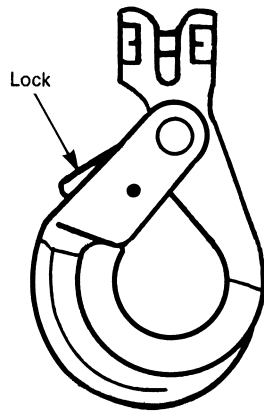
**Fig. 10-1.1-3 Shank Hook (Latch — When Required)**



**Fig. 10-1.1-6 Self-Locking Eye Hook (Open)**



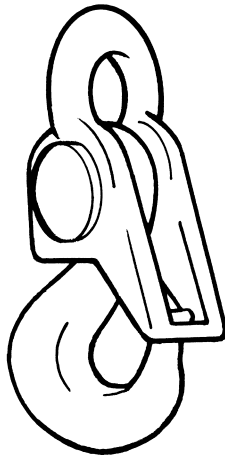
**Fig. 10-1.1-7 Self-Locking Clevis Hook (Closed)**



**Fig. 10-1.1-10 Self-Closing Flapper Latch (Shank Hook)**



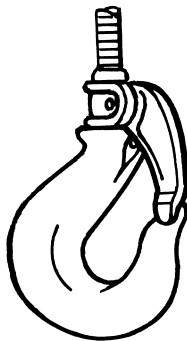
**Fig. 10-1.1-8 Self-Closing Bail (Eye Hook)**



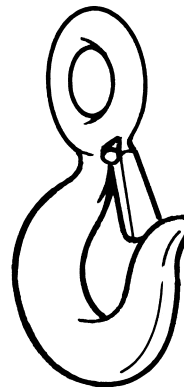
**Fig. 10-1.1-11 Self-Closing Flapper Latch (Swivel Hook)**



**Fig. 10-1.1-9 Self-Closing Gate Latch (Shank Hook)**

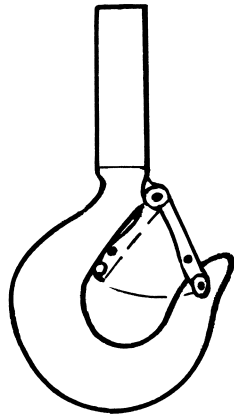


**Fig. 10-1.1-12 Self-Closing Flipper Latch (Eye Hook)**





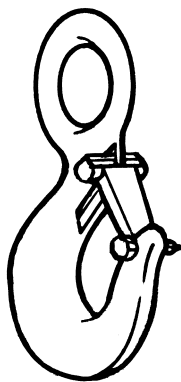
**Fig. 10-1.1-13 Self-Closing Tiplock Latch (Shank Hook)**



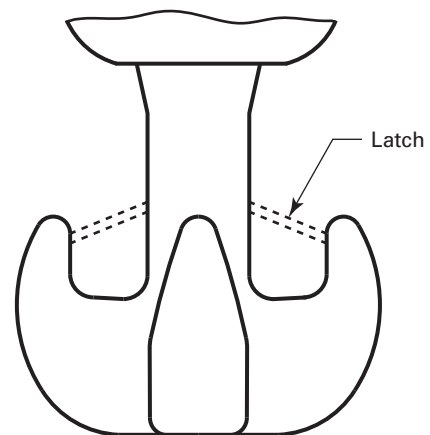
**Fig. 10-1.1-16 Laminated Plate Hook**



**Fig. 10-1.1-14 Self-Closing Tiplock Latch (Eye Hook)**



**Fig. 10-1.1-17 Quad Hook (Latch — When Required)**



**Fig. 10-1.1-15 Single Plate Hook**



## Chapter 10-2

# Hooks — Miscellaneous: Selection, Use, and Maintenance

### SECTION 10-2.1: SCOPE

This Chapter applies to all hooks specifically shown in Figs. 10-2.1-1 through 10-2.1-6 that do not support a load in a direct-pull configuration, such as grab hooks, foundry hooks, sorting hooks, and choker hooks.

(d) Attachments, such as handles, latch supports, etc., shall not be welded to a finished hook in field applications. If welding of an attachment is required, it shall be done in manufacturing or fabrication prior to any required final heat treatment.

### (14) SECTION 10-2.2: TRAINING

When the hook is a component of equipment addressed by another B30 volume, the user (operator) and maintenance training requirements of that volume shall apply in addition to the requirements of this Volume.

Hook users and maintenance personnel shall be trained in the selection, inspection, cautions to personnel, effects of environment, and operating practices, as covered by this Chapter and other volumes of the B30 Standard, where hooks are used.

#### 10-2.2.1: Sources of User (Operator) and Maintenance Training

Examples of training material sources are as follows:

- (a) information provided by the equipment manufacturer
- (b) information available from trade associations
- (c) government training resources, such as the Department of Labor
- (d) organized labor groups
- (e) courses, seminars, and literature offered by manufacturers of hooks, consultants, trade schools, continuing education schools, and employers
- (f) requirements and recommendations found in national consensus standards, such as this Volume

### (14) SECTION 10-2.3: MATERIALS AND COMPONENTS

(a) The hook material shall have sufficient ductility to permanently deform before losing the ability to support the load at the temperatures at which the specific hook will be used.

(b) The hook and hook-securing device shall be of sufficient strength and design factor for the rated load and application.

(c) When a latch is provided, it shall be designed to retain such items as, but not limited to, slings and chains under slack rigging conditions only. The latch is not intended to support the load.

### SECTION 10-2.4: FABRICATION AND CONFIGURATIONS

Hooks shall be forged, cast, stamped or welded, and heat treated by the manufacturer.

### SECTION 10-2.5: DESIGN FACTOR

The hook shall be designed to withstand all stresses imposed under normal operating conditions while handling loads within the rated load. Hook design factor shall, as a minimum, conform to those specified for the equipment or system in which the hook is a component.

### SECTION 10-2.6: RATED LOADS

(14)

Rated load for hooks shall be in accordance with the requirements as defined for the equipment or system in which the hook is being utilized or as recommended by a qualified person.

### SECTION 10-2.7: PROOF TEST REQUIREMENTS

Performance testing of hooks shall not be required except where necessary to conform to the requirements for the equipment of which they are a part.

### SECTION 10-2.8: IDENTIFICATION

(14)

The manufacturer's identification and rated load identification shall be forged, cast, or die stamped on a low-stress and nonwearing area of the hook. Alternately, if the hook is used in conjunction with equipment described in other volumes of the B30 Standard, the equipment manufacturer's identification and rated load identification shall be forged, cast, or die stamped on a low-stress and nonwearing area of the hook.

### SECTION 10-2.9: EFFECTS OF ENVIRONMENT

#### 10-2.9.1 Temperature

When hooks are to be used at temperatures above 400°F (204°C) or below -40°F (-40°C), the hook manufacturer or a qualified person should be consulted.

### 10-2.9.2 Chemically Active Environments

The strength of hooks can be affected by chemically active environments, such as caustic or acid substances or fumes. The hook manufacturer or a qualified person should be consulted before hooks are used in chemically active environments.

## SECTION 10-2.10: INSPECTION, REMOVAL, AND REPAIR

### (14) 10-2.10.1 Inspection

All inspections shall be performed by a designated person. Any deficiencies identified shall be examined and a determination made by a qualified person as to whether they constitute a hazard.

Inspection procedure and record keeping requirements for hooks in regular service shall be governed by the kind of equipment in which they are used. When more stringent requirements for hooks are stated in standards for the specific equipment, they shall take precedence over the following. Otherwise, there shall be an initial inspection and two general classifications based upon intervals at which examination shall be performed. The classifications are herein designated as initial, frequent, and periodic, with intervals between examinations defined as follows.

### (14) 10-2.10.2 Initial Inspection

Prior to use, all new, altered, modified, or repaired hooks shall be inspected to verify compliance with the applicable provisions of this Volume. Written records are not required.

### (14) 10-2.10.3 Frequent Inspection

(a) Frequent inspections shall include observations during operation. A visual inspection shall be performed for conditions listed in para. 10-2.10.5.

(b) Semipermanent and inaccessible locations where frequent inspections are not feasible shall have periodic inspections performed at a frequency as determined by a qualified person.

(c) The inspection intervals should be based on

- (1) frequency of hook use
- (2) severity of service conditions
- (3) nature of load handling activities
- (4) experience gained on the service life of hooks used in similar circumstances
- (5) guidelines for the time intervals
  - (a) normal service — monthly
  - (b) heavy service — weekly to monthly
  - (c) severe service — daily to weekly

(d) Conditions such as those listed in para. 10-2.10.5 or any other condition that may result in a hazard shall cause the hook to be removed from service. Hooks shall

not be returned to service until approved by a qualified person.

(e) Written records are not required.

### 10-2.10.4 Periodic Inspection

(14)

(a) A complete inspection of the hook shall be performed. Disassembly may be required.

The hook shall be examined for conditions such as those listed in para. 10-2.10.5.

(b) *Periodic Inspection Frequency.* Periodic inspection intervals shall not exceed 1 yr except as approved by a qualified person. The inspection intervals should be based on

- (1) frequency of hook use
- (2) severity of service conditions
- (3) nature of load handling activities
- (4) experience gained on the service life of hooks used in similar circumstances
- (5) guidelines for the time intervals
  - (a) normal service — yearly with equipment in place

(b) heavy service — semiannually, with equipment in place unless external conditions indicate that disassembly should be done to permit detailed inspection monthly to quarterly

(c) severe service — quarterly, as in heavy service [see para. 10-2.10.4(b)(5)(b)], except that the detailed inspection may show the need for a nondestructive type of testing

(c) Hooks shall not be returned to service until approved by a qualified person.

(d) Written records are required.

### 10-2.10.5 Removal Criteria

Hooks shall be removed from service if damage such as the following is visible and shall only be returned to service when approved by a qualified person:

- (a) missing or illegible hook manufacturer's identification or secondary manufacturer's identification
- (b) missing or illegible rated load identification
- (c) excessive pitting or corrosion
- (d) cracks, nicks, or gouges
- (e) wear — any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin
- (f) deformation — any visibly apparent bend or twist from the plane of the unbent hook
- (g) throat opening — any distortion causing an increase in throat opening of 5% not to exceed  $\frac{1}{4}$  in. (6 mm) (or as recommended by the manufacturer)
- (h) inability to lock — any self-locking hook that does not lock
- (i) inoperative latch (if provided) — any damaged latch or malfunctioning latch that does not close the hook's throat

- (j) damaged, missing, or malfunctioning hook attachment and securing means
- (k) thread wear, damage, or corrosion
- (l) evidence of excessive heat exposure or unauthorized welding
- (m) evidence of unauthorized alterations, such as drilling, machining, grinding, or other modifications

**(14) 10-2.10.6 Repairs and Modifications**

(a) Any conditions disclosed by the inspections performed in accordance with the requirements of para. 10-2.10.3 or 10-2.10.4 shall be corrected by repair or replacement before continuing to use the hook. All repairs and modifications shall be approved by the manufacturer or a qualified person.

(b) Hooks having damage or wear described as follows shall be repaired or replaced:

(1) cracks, nicks, and gouges. Repair of cracks, nicks, and gouges shall be carried out by a designated person by grinding longitudinally, following the contour of the hook, provided no dimension is reduced more than 10% (or as recommended by the manufacturer) of its original value.

(2) wear exceeding 10% (or as recommended by the manufacturer) of the original sectional dimension.

(3) any visibly apparent bend or twist from the plane of the unbent hook.

(4) any distortion causing an increase in throat opening of 5%, not to exceed  $\frac{1}{4}$  in. (6 mm) (or as recommended by the manufacturer).

(5) inability of self-locking hooks to lock.

(c) A hook latch that is inoperative shall be repaired, replaced, or removed if not required.

(d) If a required latch is inoperable and cannot be immediately repaired or replaced, the hook shall be sufficiently moused to retain loose items as defined in para. 10-2.3(c) until the latch is repaired or replaced.

(e) When reassembling hooks, original securing methods or manufacturer's recommendations shall be followed.

(f) All replacement parts shall be at least equal to the original manufacturer's specifications.

(g) Hooks without provision for latches may be moused to retain loose items as defined in para. 10-2.3(c).

(h) For special applications where the throat opening is required to be closed, mousing may be used in place of the latch to retain loose items as defined in para. 10-2.3(c), when approved by a qualified person.

**SECTION 10-2.11: OPERATING PRACTICES**

**(14)**

Personnel using miscellaneous hooks shall be aware of the following:

(a) It shall be determined that the load to be applied does not exceed the rated load of the hook's assembly, especially when special conditions, such as choking or grabbing, are considered.

(b) Shock loading should be avoided.

(c) A hook shall not be used in a manner other than that for which it is intended.

(d) Hands, fingers, and body shall be kept away from between the load and the hook.

(e) When using a device to close the throat opening of the hook, care shall be taken that the load is not carried by the closing device.

(f) The use of a hook with a latch does not preclude the inadvertent detachment of a slack sling or a load from the hook. Hook latches aid in the retention of loose slings under slack rigging conditions only and are not intended to be antifouling devices during load handling or rigging. Visual verification of proper hook engagement is required in all cases.

(g) When a latch is equipped with a lock open device, the latch shall be closed during operation.

(h) When a hook is equipped with a latch, the load shall not restrict the closure of the latch.

(i) The need for a latch or mousing on any hook is a function of the application of the hook and shall be determined by a qualified person.