

(18)

Chapter 9-7

High Performance Roundslings: Selection, Use, and Maintenance

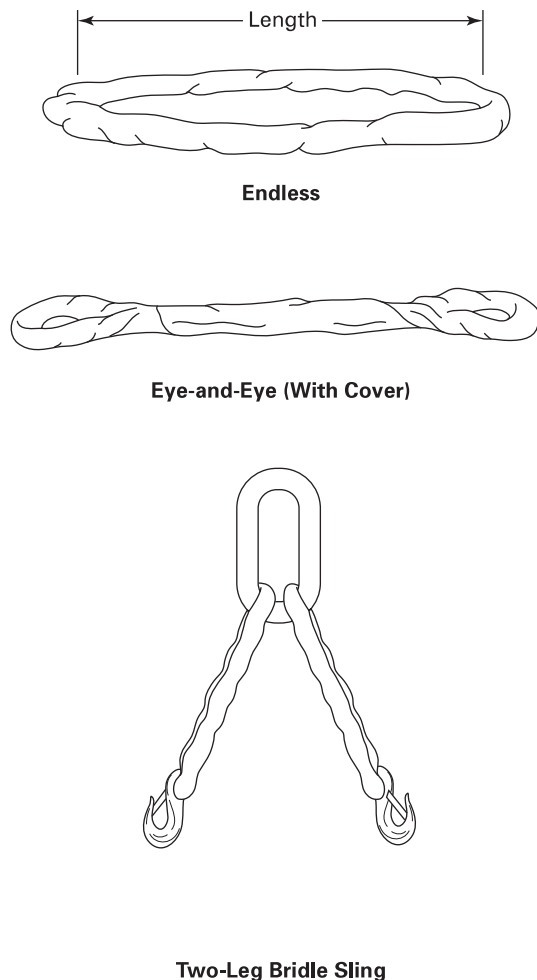
SECTION 9-7.0: SCOPE

Chapter 9-7 includes provisions that apply to high performance (HP) roundslings (see [Figure 9-7.0-1](#)).

SECTION 9-7.1: TRAINING

HP roundsling users shall be trained in the selection, inspection, cautions to personnel, effects of environment, and rigging practices as covered by this Chapter.

Figure 9-7.0-1 High Performance Roundsling Types



SECTION 9-7.2: COMPONENTS

9-7.2.1 Core

The finished core shall be comprised of a majority of high tenacity fiber as described in CI 1905.

9-7.2.2 Fittings

(a) Fittings shall have sufficient strength to sustain twice the rated load of the sling without permanent deformation.

(b) All fitting surfaces in contact with the sling shall be finished to remove all edges that could potentially damage the sling.

(c) When employed, hooks shall meet the requirements of ASME B30.10.

(d) When employed, rigging hardware shall meet the requirements of ASME B30.26.

9-7.2.3 Other Components

Slings that employ core yarns or fittings other than those listed in [paras. 9-7.2.1](#) and [9-7.2.2](#) may be used. When other components are employed, the sling manufacturer or a qualified person shall provide specific data regarding deviations from the applicable sections of this Chapter. These slings shall comply with all other requirements of this Chapter.

SECTION 9-7.3: FABRICATION AND CONFIGURATIONS

9-7.3.1 Fabrication

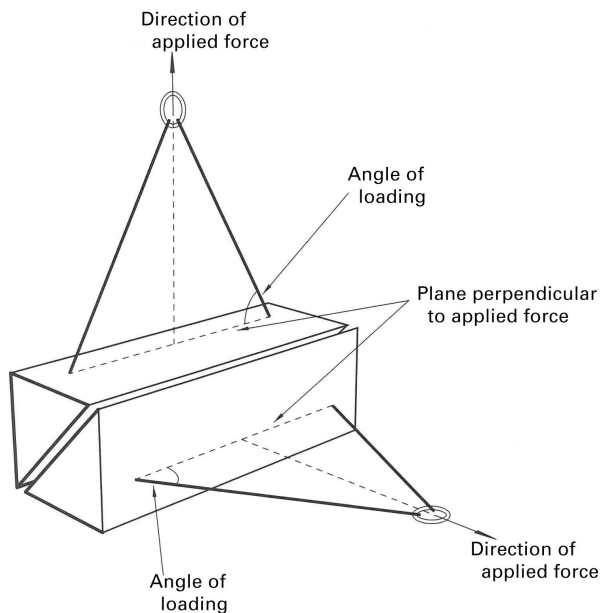
HP roundslings shall be fabricated from core yarns wound together with multiple turns and enclosed in a cover(s). Covers shall be made from synthetic material.

9-7.3.2 Thread

The stitching that is used to secure the cover and tag and to separate load-bearing paths in multipart slings shall be synthetic thread.

9-7.3.3 Coatings

Finishes and coatings shall be compatible with the other components and not impair the performance of the sling.

Figure 9-7.5-1 Angle of Loading

9-7.3.4 Configurations

(a) Single-leg slings and two-leg, three-leg, and four-leg bridle slings used in straight-line, choker, and basket hitches are covered in this Chapter.

NOTE: A straight-line hitch is commonly referred to as a vertical hitch.

(b) Other configurations may be used. When used, the sling manufacturer or a qualified person shall provide specific data. These slings shall comply with all other requirements of this Chapter.

SECTION 9-7.4: DESIGN FACTOR

The design factor for HP roundslings shall be a minimum of 5.

SECTION 9-7.5: RATED LOAD

(a) The sling manufacturer shall establish the sling's rated load.

(b) At a minimum, the rated load shall be based on the following factors:

- (1) component strength
- (2) number of legs
- (3) design factor
- (4) type of hitch
- (5) angle of loading (see [Figure 9-7.5-1](#))
- (6) fabrication efficiency
- (7) pin size limits used for testing as stated by CI 1905

SECTION 9-7.6: PROOF TEST REQUIREMENTS

9-7.6.1 General

(a) Prior to initial use, all HP roundslings incorporating previously used or welded fittings and all repaired slings shall be proof tested by the sling manufacturer or a qualified person.

(b) All other new HP roundslings and fittings are not required to be proof tested unless specified by the purchaser.

9-7.6.2 Proof Load Requirements

(a) For single- or multiple-leg slings and endless slings, each leg shall be proof loaded to a minimum of 2 times the single-leg straight-line hitch rated load.

(b) The proof load for fittings attached to single legs shall be a minimum of 2 times the single-leg straight-line hitch rated load.

(c) Master links for two-leg bridle slings shall be proof loaded to a minimum of 4 times the single-leg straight-line hitch rated load.

(d) Master links for three-leg bridle slings shall be proof loaded to a minimum of 6 times the single-leg straight-line hitch rated load.

(e) Master links for four-leg bridle slings shall be proof loaded to a minimum of 8 times the single-leg straight-line hitch rated load.

SECTION 9-7.7: SLING IDENTIFICATION

9-7.7.1 Identification Requirements

Each sling shall be marked to show

- (a) name or trademark of manufacturer, or if repaired, the entity performing repairs
- (b) manufacturer's code or stock number
- (c) rated load for at least one hitch type and the angle upon which it is based
- (d) core yarn — fiber type(s) or blend
- (e) cover material, if different from core material
- (f) number of legs, if more than one

9-7.7.2 Initial Sling Identification

Sling identification shall be done by the sling manufacturer.

9-7.7.3 Maintenance of Sling Identification

Sling identification should be maintained by the user so as to be legible during the life of the sling.

9-7.7.4 Replacement of Sling Identification

Replacement of the sling identification shall be considered a repair as specified in [paras. 9-7.9.6\(a\)](#) and [9-7.9.6\(b\)](#). Additional proof testing is not required.

SECTION 9-7.8: EFFECTS OF ENVIRONMENT

9-7.8.1 Temperature

Some synthetic yarns do not retain their published breaking strength above 140° F (60° C). The HP roundsling manufacturer should be consulted for the temperature range of the roundsling selected for use.

9-7.8.2 Chemically Active Environments

The strength of HP roundslings may be degraded by chemically active environments. This includes exposure to chemicals in the form of solids, liquids, gases, vapors, or fumes. The sling manufacturer or qualified person should be consulted before slings are used in chemically active environments.

SECTION 9-7.9: INSPECTION, REMOVAL, AND REPAIR

9-7.9.1 General

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, and if so, what additional steps need to be taken to address the hazard.

9-7.9.2 Initial Inspection

Prior to use, all new, altered, modified, or repaired slings shall be inspected to verify compliance with the applicable provisions of this Chapter. Written records are not required for initial inspections.

9-7.9.3 Frequent Inspection

(a) A visual inspection for damage shall be performed each day or shift before the sling is used. Slings used in severe or special service should be inspected before each use.

(b) Slings found with conditions such as those listed in [para. 9-7.9.5](#) shall be removed from service. Slings shall not be returned to service until approved by a qualified person.

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

9-7.9.4 Periodic Inspection

(a) A complete inspection of the sling shall be performed. Inspection shall be conducted on the entire length including fittings. Slings found with conditions such as those listed in [para. 9-7.9.5](#) shall be removed from service. Slings shall not be returned to service until approved by a qualified person.

(b) *Periodic Inspection Frequency.* Periodic inspection intervals shall not exceed 1 yr [see (d)]. The frequency of periodic inspections should be based on

(1) frequency of sling use
 (2) severity of service conditions
 (3) nature of load-handling activities
 (4) experience gained on the service life of slings used in similar circumstances

(c) Guidelines for the time intervals are

(1) normal service — yearly

(2) severe service — monthly to quarterly

(3) special service — as recommended by a qualified person

(d) Periodic inspection is not required for a sling that is in storage or idle. However, if more than 1 yr has passed since the last periodic inspection, the sling shall be inspected in accordance with the requirements listed in (a), (b), and (e), and [para. 9-7.9.5](#) before being placed back into service.

(e) Documentation that the most recent periodic inspection was performed shall be maintained.

(f) Inspection records of individual slings are not required.

9-7.9.5 Removal Criteria

An HP roundsling shall be removed from service if any of the following conditions are present:

(a) missing or illegible sling identification (see [Section 9-7.7](#))

(b) acid or caustic burns

(c) evidence of heat damage

(d) holes, tears, cuts, abrasive wear, or snags that expose the core yarns

(e) broken or damaged core yarns

(f) weld splatter that exposes core yarns

(g) knots in the roundsling, except for core yarn knots inside the cover installed by the manufacturer during the fabrication process

(h) fittings that are pitted, corroded, cracked, bent, twisted, gouged, or broken

(i) for hooks, removal criteria as stated in ASME B30.10

(j) for rigging hardware, removal criteria as stated in ASME B30.26

(k) other conditions, including visible damage, that cause doubt as to the continued use of the sling

9-7.9.6 Repair

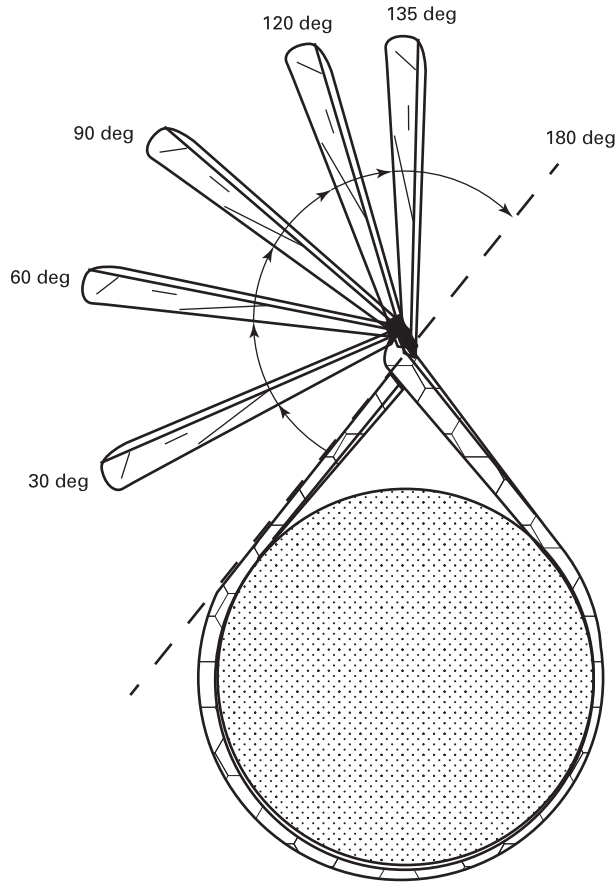
(a) Slings shall be repaired only by the sling manufacturer or a qualified person.

(b) A repaired sling shall be marked to identify the repairing entity per [Section 9-7.7](#).

(c) Components used for sling repair shall comply with the provisions of this Chapter.

(d) Repair of hooks shall be as specified in ASME B30.10. Repair of below-the-hook lifting devices shall be as specified in ASME B30.20. Repair of all other fittings shall be as specified by the sling manufacturer, the fitting manufacturer, or a qualified person.

Table 9-7.10.1-1 Angle of Choke: High Performance Roundslings



Angle of Choke, deg	Rated Capacity, % [Note (1)]
Over 120	100
90-120	87
60-89	74
30-59	62
0-29	49

NOTE: (1) Percent of sling rated capacity in a choker hitch.

- (e) All repairs shall comply with the proof test requirements of Section 9-7.6.
- (f) Modifications or alterations to a sling shall conform to all repair provisions of this Chapter.
- (g) There shall be no repairs of core yarns.

SECTION 9-7.10: OPERATING PRACTICES

9-7.10.1 Sling Selection

- (a) Slings that appear to be damaged shall not be used unless inspected and accepted as usable under Section 9-7.9.
- (b) Slings having suitable characteristics for the type of load, hitch, and environment shall be selected in accordance with the requirements of Sections 9-7.5 and 9-7.8.

(c) The rated load of the sling shall not be exceeded. When using a multiple-leg sling, no leg shall be loaded beyond its single-leg rating.

(d) When the choker hitch rating is not identified on the sling, the choker hitch rating shall be 80% of the sling's straight-line hitch rating unless other ratings are provided by the sling manufacturer or a qualified person.

(e) Rated loads for angles of choke less than 120 deg shall be determined by using the values in Table 9-7.10.1-1, the sling manufacturer, or a qualified person.

(f) For multiple-leg slings used with nonsymmetrical loads, an analysis by a qualified person should be performed to prevent overloading of any leg.

(g) Multiple-leg slings shall be selected according to the sling's rated load based on the specific angle(s) as stated on the sling's identification. The rated load for use at other angles shall be provided by the sling manufacturer or a qualified person.

(h) Slings shall not be used at an angle of loading less than 30 deg except as recommended by the sling manufacturer or a qualified person.

(i) When a sling leg is used as a basket hitch with the lower connector (hook) attaching to the master link (upper connector), the basket hitch rating shall be limited to its single-leg rating, unless the master link is rated to accommodate that configuration.

(j) Fittings shall be of a shape and size to ensure that they are properly seated in the hook, shackle, or other load-handling device. Connection fittings or hardware shall be as recommended by the sling manufacturer or a qualified person.

(k) The rated load of a HP roundslings may need to be reduced depending on the shape and size of an attached fitting or other load-handling device.

(l) HP roundslings shall not be used to support suspended personnel platform.

9-7.10.2 Cautions to Personnel

- (a) All portions of the human body shall be kept from between the sling and the load, and from between the sling and the hook, shackle, or other load-handling device.
- (b) Personnel should not stand in line with or next to the leg(s) of a sling that is under tension.
- (c) Personnel shall not stand or pass under a suspended load.
- (d) Personnel shall not ride the sling.

9-7.10.3 Effects of Environment

- (a) Slings should be stored in an area where they will not be subjected to mechanical, chemical, or ultraviolet damage or extreme temperatures (see Section 9-7.8).
- (b) Slings incorporating aluminum fittings shall not be used where fumes, vapors, sprays, mists, or liquids of alkalis or acids are present.

9-7.10.4 Rigging Practices

(a) Slings shall be shortened or adjusted only by methods approved by the sling manufacturer or a qualified person.

(b) Slings shall not be shortened or lengthened by knotting or twisting.

(c) Slings shall be hitched in a manner providing control of the load.

(d) Slings in contact with edges, corners, protrusions, abrasive surfaces, or connecting hardware shall be protected with a material of sufficient strength, thickness, and construction to prevent damage unless the edges are adequately rounded to a radius as recommended by the sling manufacturer or a qualified person.

(e) Shock loading should be avoided.

(f) Loads should not be rested on the sling.

(g) Slings should not be pulled out from under a load if the load is resting on the sling.

(h) Twisting shall be avoided.

(i) During load-handling activities, with or without load, personnel shall be alert for possible snagging.

(j) When using multiple-basket or choker hitches, the load should be rigged to prevent the sling from slipping or sliding along the load.

(k) When lifting with a basket hitch, the legs of the sling should contain or support the load from the sides, above the center of gravity, so that the load remains under control.

(l) Slings should not be dragged on the floor or over an abrasive surface.

(m) In a choker hitch, the choke point should only be on the sling body, not on a cover splice or fitting.

(n) Slings should not be constricted, bunched, or pinched by the load, hook, or any fitting.

(o) The load applied to the hook should be centered in the base (bowl) of the hook to prevent point loading on the hook, unless the hook is designed for point loading.