

(2) Special stevedoring gear provided by the employer that has a SWL of five short tons (10,000 lbs. or 4.54 metric tons) or less shall be inspected and tested as a unit before initial use according to paragraphs (d) and (e) of this section or by a designated person (see Table A in this paragraph (f)(2)).

TABLE A

Safe working load	Proof load
Up to 20 short tons (18.1 metric tons) ..	25 percent in excess.
From 20 through 50 short tons (18.1 to 45.4 metric tons).	5 short tons in excess
Over 50 short tons (45.4 metric tons) ...	10 percent in excess

(g) Every spreader that is not a part of ship's gear and is used for handling intermodal containers shall be inspected and tested before initial use to a proof load equal to 25 percent greater than its rated capacity. In addition, any spreader that suffers damage necessitating structural repair shall be inspected and retested after repair and before being returned to service.

(h) All cargo handling gear covered by this section with a SWL greater than five short tons (10,000 lbs. or 4.54 metric tons) shall be proof load tested according to Table A in paragraph (f) or paragraph (g), as applicable, of this section every four years and in accordance with paragraphs (d) and (e) of this section or by a designated person.

(i) Certificates and inspection and test records attesting to the tests required by this section shall be available for inspection.

[62 FR 40202, July 25, 1997, as amended at 65 FR 40945, June 30, 2000]

#### § 1918.62 Miscellaneous auxiliary gear.

(a) *Routine inspection.* (1) At the completion of each use, loose gear such as slings, chains, bridles, blocks and hooks shall be so placed as to avoid damage to the gear. Loose gear shall be inspected and any defects corrected before reuse.

(2) Defective gear, as defined by the manufacturers' specifications (when available), shall not be used. Distorted hooks, shackles or similar gear shall be discarded.

NOTE TO PARAGRAPH (a): When manufacturers' specifications are not available to deter-

mine whether gear is defective, the employer shall use the appropriate paragraphs of this section to make these determinations.

(b) *Wire rope and wire rope slings.* (1) The employer shall follow the manufacturers' recommended ratings for wire rope and wire rope slings provided for use aboard ship, and shall have such ratings available for inspection. When the manufacturer is unable to supply such ratings, the employer shall use the tables for wire rope and wire rope slings found in appendix II to this part. A design safety factor of at least five shall be maintained for the common sizes of running wire used as falls in purchases, or in such uses as light load slings.

(2) Wire rope with a safety factor of less than five may be used only as follows:

(i) In specialized equipment, such as cranes, designed to be used with lesser wire rope safety factors;

(ii) According to design factors in standing rigging applications; or

(iii) For heavy lifts or other purposes for which a safety factor of five is not feasible and for which the employer can show that equivalent safety is ensured.

(3) Wire rope or wire rope slings provided by the employer and having any of the following conditions shall not be used:

(i) Ten randomly distributed broken wires in one rope lay or three or more broken wires in one strand in one rope lay;

(ii) Kinking, crushing, bird caging or other damage resulting in distortion of the wire rope structure;

(iii) Evidence of heat damage;

(iv) Excessive wear or corrosion, deformation or other defect in the wire or attachments, including cracks in attachments;

(v) Any indication of strand or wire slippage in end attachments; or

(vi) More than one broken wire close to a socket or swaged fitting.

(4) Protruding ends of strands in splices on slings and bridles shall be covered or blunted. Coverings shall be removable so that splices can be examined. Means used to cover or blunt ends shall not damage the wire.

(5) Where wire rope clips are used to form eyes, the employer shall follow

the manufacturers' recommendations, which shall be available for inspection. If "U" bolt clips are used and the manufacturers' recommendations are not available, table 1 of appendix II to this part shall be used to determine the number and spacing of clips. "U" bolts shall be applied with the "U" section in contact with the dead end of the rope.

(6) Wire rope shall not be secured by knotting.

(7) Eyes in wire rope bridles, slings, bull wires, or in single parts used for hoisting shall not be formed by wire rope clips or knots.

(8) Eye splices in wire ropes shall have at least three tucks with a whole strand of the rope, and two tucks with one-half of the wire cut from each strand. Other forms of splices or connections that the employer demonstrates to be equivalently safe may be used.

(9) Except for eye splices in the ends of wires and endless rope slings, each wire rope used in hoisting or lowering, or bulling cargo, shall consist of one continuous piece without knot or splice.

(c) *Natural fiber rope.* (1) The employer shall follow the manufacturers' recommended ratings for natural fiber rope and natural fiber rope slings provided for use aboard ship, and shall have such ratings available for inspection.

(2) If the manufacturers' recommended ratings and use recommendations are unavailable, the employer shall use table 2 of appendix II to this part to determine safe working loads of natural fiber rope slings comprising part of pre-slung drafts.

(3) Eye splices shall consist of at least three full tucks. Short splices shall consist of at least six tucks, three on each side of the centerline.

(d) *Synthetic rope.* (1) The employer shall follow the manufacturers' ratings and use recommendations for the specific synthetic fiber rope and synthetic fiber rope slings provided for use aboard ship, and shall have such ratings available for inspection.

(2) If the manufacturers' recommended ratings and use recommendations are unavailable, tables 3A and B of appendix II to this part

shall be used to determine the safe working load of synthetic fiber rope and of synthetic rope slings that comprise this part of pre-slung drafts.

(3)(i) Unless otherwise recommended by the manufacturer, when synthetic fiber ropes are substituted for fiber ropes of less than three inches (7.62 cm) in circumference, the substitute shall be of equal size. Where substituted for fiber rope of three inches or more in circumference, the size of the synthetic rope shall be determined from the formula:

$$C = \pm\sqrt{0.6C_s^2 + 0.4C_m^2}$$

Where C = the required circumference of the synthetic rope in inches, Cs = the circumference to the nearest one-quarter inch of a synthetic rope having a breaking strength not less than that of the size fiber rope that is required by paragraph (c) of this section and Cm = the circumference of the fiber rope in inches that is required by paragraph (c) of this section.

(ii) In making such substitution, it shall be ascertained that the inherent characteristics of the synthetic fiber are suitable for hoisting.

(e) *Removal of natural and synthetic rope from service.* Natural and synthetic rope having any of the following defects shall be removed from service:

- (1) Abnormal or excessive wear including heat and chemical damage;
- (2) Powdered fiber between strands;
- (3) Sufficient cut or broken fibers to affect the capability of the rope;
- (4) Variations in the size or roundness of strands;
- (5) Discolorations other than stains not associated with rope damage;
- (6) Rotting; or
- (7) Distortion or other damage to attached hardware.

(f) *Thimbles.* Properly fitting thimbles shall be used when any rope is secured permanently to a ring, shackle or attachment, where practicable.

(g) *Synthetic web slings.* (1) Slings and nets or other combinations of more than one piece of synthetic webbing assembled and used as a single unit (synthetic web slings) shall not be used to hoist loads greater than the sling's rated capacity.

(2) Synthetic web slings shall be removed from service if they exhibit any of the following defects:

- (i) Acid or caustic burns;
  - (ii) Melting or charring of any part of the sling surface;
  - (iii) Snags, punctures, tears or cuts;
  - (iv) Broken or worn stitches;
  - (v) Distortion or damage to fittings;
- or
- (vi) Display of visible warning threads or markers designed to indicate excessive wear or damage.

(3) Defective synthetic web slings removed from service shall not be returned to service unless repaired by a sling manufacturer or an entity of similar competence. Each repaired sling shall be proof tested by the repairer to twice the sling's rated capacity before its return to service. The employer shall retain a certificate of the proof test and make it available for inspection.

(4) Synthetic web slings provided by the employer shall only be used according to the manufacturers' use recommendations, which shall be available.

(5) Fittings shall have a breaking strength at least equal to that of the sling to which they are attached and shall be free of sharp edges.

(h) *Chains and chain slings used for hoisting.* (1) The employer shall follow the manufacturers' recommended ratings for safe working loads for the size of wrought iron and alloy steel chains and chain slings and shall have such ratings available for inspection. When the manufacturer does not provide such ratings, the employer shall use table 4A of appendix II to this part to determine safe working loads for alloy steel chains and chain slings only.

(2) Proof coil steel chain, also known as common or hardware chain, and other chain not recommended by the manufacturer for slinging or hoisting shall not be used for slinging or hoisting.

(3)(i) Sling chains, including end fastenings, shall be inspected for visible defects before each day's use and as often as necessary during use to ensure integrity of the sling.

(ii) Thorough inspections of chains in use shall be made quarterly to detect wear, defective welds, deformation or increase in length or stretch. The month of inspection shall be shown on

each chain by color of paint on a link or by other equally effective means.

(iii) Chains shall be removed from service when maximum allowable wear, as indicated in table 4B of appendix II to this part, is reached at any point of a link.

(iv) Chain slings shall be removed from service when stretch has increased the length of a measured section by more than 5 percent; when a link is bent, twisted or otherwise damaged; or when a link has a raised scarf or defective weld.

(v) Only designated persons shall inspect chains used for slinging and hoisting.

(4) Chains shall only be repaired by a designated person. Links or portions of a chain defective under any of the criteria of paragraph (h)(3)(iv) of this section shall be replaced with properly dimensioned links or connections of material similar to that of the original chain. Before repaired chains are returned to service, they shall be tested to the proof test load recommended by the manufacturer for the original chain. Tests shall be done by the manufacturer or shall be certified by an agency accredited for the purpose under part 1919 of this chapter. Test certificates shall be available for inspection.

(5)(i) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months. Heat treatment certificates shall be available for inspection. Alloy chains shall not be annealed.

(ii) Any part of a lifting appliance or item of loose gear installed after January 21, 1998 shall not be manufactured of wrought iron.

(6) Kinked or knotted chains shall not be used for lifting. Chains shall not be shortened by bolting, wiring or knotting. Makeshift links or fasteners such as wire, bolts or rods shall not be used.

(7) Hooks, rings, links and attachments affixed to sling chains shall have rated capacities at least equal to those of the chains to which they are attached.

(8) Chain slings shall bear identification of size, grade and rated capacity.

(i) *Shackles.* (1) If the manufacturers' recommended safe working loads for

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shackles are available, they shall not be exceeded. If the manufacturers' recommendations are not available, table 5 of appendix II to this part shall apply.

(2) Screw pin shackles provided by the employer and used aloft, except in cargo hook assemblies, shall have their pins positively secured.

(j) *Hooks other than hand hooks.* (1) The manufacturer's recommended safe working loads for hooks shall not be exceeded. Hooks other than hand hooks shall be tested before initial use in accordance with the provisions of §1919.31 (a), (c), and (d) of this chapter. *Exception:* Manufacturers' test certificates indicating performance to the criteria in §1919.31 (a), (c) and (d) of this chapter shall be acceptable.

(2) Bent or sprung hooks shall be discarded.

(3) Teeth of case hooks shall be maintained in safe condition.

(4) Jaws of patent clamp-type plate hooks shall be maintained in condition to grip plates securely.

(5) Loads shall be applied to the throat of the hook only.

(k) *Pallets.* (1) Pallets shall be made and maintained to support and carry loads being handled safely. Fastenings of reusable pallets used for hoisting shall be bolts and nuts, drive screws (helically threaded nails), annular threaded nails or fastenings of equivalent holding strength.

(2) Reusable wing or lip-type pallets shall be hoisted by bar bridles or other suitable gear and shall have an overhanging wing or lip of at least three inches (7.6 cm). They shall not be hoisted by wire slings alone.

(3) Loaded pallets that do not meet the requirements of this paragraph shall be hoisted only after being placed on pallets meeting such requirements, or shall be handled by other means providing equivalent safety.

(4) Bridles for handling flush end or box-type pallets shall be designed to prevent disengagement from the pallet under load.

(5) Pallets shall be stacked or placed to prevent falling, collapsing or otherwise causing a hazard under standard operating conditions.

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(6) Disposable pallets intended only for one use shall not be reused for hoisting.

[62 FR 40202, July 25, 1997, as amended at 65 FR 40945, June 30, 2000]

### § 1918.63 Chutes, gravity conveyors and rollers.

(a) Chutes shall be of adequate length and strength to support the conditions of use, and shall be free of splinters and sharp edges.

(b) When necessary for the safety of employees, chutes shall be equipped with sideboards to afford protection from falling objects.

(c) When necessary for the safety of employees, provisions shall be made for stopping objects other than bulk commodities at the delivery end of the chute.

(d) Chutes and gravity conveyor roller sections shall be firmly placed and secured to prevent displacement, shifting, or falling.

(e) Gravity conveyors shall be of sufficient strength to support the weight of materials placed upon them safely. Conveyor rollers shall be installed in a way that prevents them from falling or jumping out of the frame.

(f) Frames shall be kept free of burrs and sharp edges.

### § 1918.64 Powered conveyors.

(a) *Emergency stop.* Readily accessible stop controls shall be provided for use in an emergency. Whenever the operation of any power conveyor requires personnel to work close to the conveyor, the conveyor controls shall not be left unattended while the conveyor is in operation.

(b) *Guarding.* All conveyor and trimmer drives that create a hazard shall be adequately guarded.

(c) *Approved for location.* Electric motors and controls on conveyors and trimmers used to handle grain and exposed to grain dust shall be of a type approved by a nationally recognized testing laboratory for use in Class II, Division I locations. (See §1910.7 of this chapter.)

(d) *Grain trimmer control box.* Each grain trimmer shall have a control box on the weather deck close to the spout feeding the trimmer.