

**American Railway Engineering and Maintenance of Way Association
Letter Ballot**

1. Committee and Subcommittee:

Committee 27, Subcommittee 5

2. Letter Ballot Number: 27-22-4

3. Assignment: 1.3

4. Ballot Item: Approval of 1.3 General Information Associated with Wire Ropes, Slings (Wire Rope, Synthetic, Chain) and Hooks as used on Roadway Work Equipment

5. Rationale: Update

Draft Not Yet Approved

SECTION 1.3 GENERAL INFORMATION ASSOCIATED WITH WIRE ROPES, SLINGS (WIRE ROPE, SYNTHETIC, CHAIN) AND HOOKS AS USED ON ROADWAY WORK EQUIPMENT

- 2016 – Reviewed and approved 07-20-22

1.3.1 INTRODUCTION (2016)

- a. Wire rope is a much more complex mechanism than one generally realizes. But when its fundamentals and capabilities are understood, wire rope can perform with economy, dependability, and safety.
- b. It consists of many wires capable of transmitting dynamic stresses or supporting static loads. Wire rope is one of the strongest products manufactured for its size and weight. Wire rope is made to withstand the demands of tensile and bending stresses and abrasive wear, present in practically all job applications. It is available for a wide variety of applications and ever-expanding number of operating conditions.

1.3.2 GENERAL (2016)

1.3.2.1 Wire Rope

- a. Since wire rope is extremely complicated, listed below are several publications that can be researched for more detail and understanding of the product. When dealing with wire rope always understand these key items below and always research the most current information.
 - (1) Understand the construction of the wire rope, its classifications, and its applications.
 - (2) Understand the capacity of the wire rope.
 - (3) Understand the items that constitute removal of wire rope from service.
 - (a) Broken wires
 - (b) Crushing
 - (c) Kinking
 - (d) Wear
 - (e) Deterioration
 - (f) Appropriate end connections per Original Equipment Manufacturer (OEM) standards
 - (4) Understand end connections and proper torquing requirements.
 - (a) Proper amount of wire rope clips installed for rope size
 - (b) Proper torque for each wire rope clip installed

- (c) Proper dead-end connections
 - 1 Termination socket and wedge
 - 2 Standard socket and wedge with loop back method or extra piece of rope
- (5) Understand proper lubrication of wire rope.
- (6) Current Publications
 - (a) WIRE ROPE USER'S MANUAL
 - 1 Wire Rope Technical Board
 - 2 www.wireropetechnicalboard.org
 - (b) ASME B30.5-2011 (Mobile & Locomotive Cranes) Section 5-1.7
 - 1 ASME (American Society of Mechanical Engineers)
 - 2 www.asme.org
 - (c) OSHA 29 CFR 1926.1400-1441
 - 1 www.osha.gov

1.3.2.2 Slings (Wire Rope, Synthetic and Chain)

- a. Since slings are extremely complicated listed below are several publications that can be researched for more detail and understanding of the product. When dealing with slings always understand these key items below and always research to the most current information.
 - (1) Understand the construction of the slings, its classifications, and its applications.
 - (2) Understand the capacity of the sling (Wire Rope, Synthetic, or Chain).
 - (a) Straight pulls, angles, basket, etc.
 - (3) Understand the items that constitute removal of a sling from service.
 - (a) Wire Rope
 - 1 Broken wires
 - 2 Crushing
 - 3 Kinking
 - 4 Wear
 - 5 Deterioration

6 No identification tag

(b) Synthetic

1 Acidic or caustic burns

2 Melting or charring of any part of the sling

3 Holes, tears, cuts, or snags

4 Broken or worn stitching in load bearing splices

5 Excessive abrasion wear

6 Discoloration and brittle or stiff areas (Chemical or Sunlight Damage)

7 No identification tag

(c) Chains

1 Cracks or breaks

2 Excessive wear, nicks, gouges

3 Stretched links, or components

4 Bent, twisted, or deformed links or components

5 Excessive pitting or corrosion

6 Lack of ability of chain or components to hinge freely

7 Weld splatter

8 No identification tag

(2) Publications

(a) ASME B30.9 (Wire Rope and Slings)

1 ASME (American Society of Mechanical Engineers) www.asme.org

(b) OSHA 29 CFR 1910.184 (Slings)

(c) OSHA 29 CFR 1926.251 (Rigging Equipment for Material Handling) www.osha.gov

1.3.2.3 HOOKS

- a. Since hooks are extremely complicated listed below are several publications that can be researched for more detail and understanding of the product. When dealing with hooks always understand these key items below and always research to the most current information.

- (1) Understand the construction of the hook, its classifications, and its applications.
- (2) Understand the capacity of the hook.
- (3) Understand the items that constitute removal of a hook from service.
 - (a) Missing or illegible rated load identification
 - (b) Excessive pitting or corrosion
 - (c) Cracks, nicks, or gouges
 - (d) Wear - Any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin or as recommended by manufacturer; whichever is most restrictive.
 - (e) Deformation - Any visible apparent bend or twist from the plane of the unbent hook.
 - (f) Throat opening - Any distortion causing an increase in throat opening of 5% not to exceed $\frac{1}{4}$ " or as recommended by the manufacturer; whichever is most restrictive.
 - (g) Inability to lock any self-locking hook
 - (h) Inoperative latch
 - (i) Damage, missing, or malfunctioning hook attachment and securing means
 - (j) Thread wear, damage, or corrosion
 - (k) Evidence of excessive heat exposure or welding
 - (l) Evidence of unauthorized alterations such as drilling, machining, grinding, etc.
- (4) Publications
 - (a) ASME B30.10-200X (Hooks)
 - 1 ASME (American Society of Mechanical Engineers) www.asme.org
 - 2 OSHA 29 CFR 1926.251 (Rigging Equipment for Material Handling) www.osha.gov