
Standard Specification for Wire Rope and Sockets for Movable Bridges

AASHTO Designation: M 277-06 (2023)

Technically Revised: 2006

Reviewed but Not Updated: 2023

Technical Subcommittee: 4f, Metals



American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This specification covers steel wire rope for use in movable bridges. Both operating and counterweight ropes are included in nominal 6 × 19 rope construction. Suitable sockets are also included.
- 1.2. The values stated in SI units are to be regarded as the standard.
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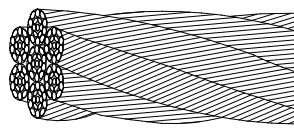
2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- < M 102M/M 102, Steel Forgings, Carbon and Alloy, for General Industrial Use
 - < T 65M/T 65, Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- 2.2. *ASTM Standards:*
- < A29/A29M, Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought
 - < A148/A148M, Standard Specification for Steel Castings, High Strength, for Structural Purposes
 - < A709/A709M, Standard Specification for Structural Steel for Bridges
 - < B6, Standard Specification for Zinc
- 2.3. *ANSI Standard:*
- < B4.1, American National Standards Institute—Sockets, Pinholes, Pins
- 2.4. *Military Standard:*
- < MIL-P-24216, Military Specifications—Fiber Polypropylene Cores for Wire Rope
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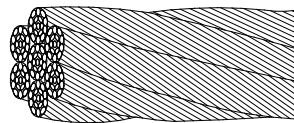
3. TERMINOLOGY

- 3.1. *acceptance breaking strength*—the minimum ultimate strength value on which conformance to the specification shall be based.
- 3.2. *bright wires*—wires in ropes that are uncoated.
- 3.3. *center*—the inner or foundation member (wire or twisted fibrous material) in a strand around which the wires are laid.
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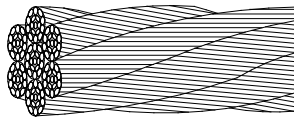
- 3.4. *circumference*—the measured perimeter of a circle circumscribing the wires of a strand or the strands of a wire rope.
- 3.5. *core*—the foundation member (a twisted fibrous material) of a wire rope around which strands are laid.
- 3.6. *fibers*—the material of which the centers or cores are made.
- 3.7. *filler wires*—small diameter auxiliary wires for supporting and positioning main wires. Filler wires are included in the actual wire count and identification of the rope construction.
- 3.8. *lang lay* (See Figure 1.)—the direction of lay of the wires in the strand and of the strand in the rope is the same. As a result, the rope has an appearance that the wires are diagonal to the axis of the rope. The wires and the strands may run to the right, “right lang lay” (commonly called “lang lay”) or to the left, “left lang lay” (on specific orders only).



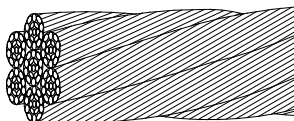
Right Regular Lay



Right Lang Lay



Left Regular Lay



Left Lang Lay

Figure 1—Lays in Wire Rope

- 3.9. *lay*—used by the wire rope industry in two different ways as follows:
- 3.9.1. The lay is the manner in which the wires in a strand or the strands in a wire rope lay (twisted). (See Figure 1.)
- 3.9.2. The lay is the distance parallel to the longitudinal axis in which a wire makes a complete turn (spiral or helix) about the axis of the rope. It is also called the lay length or the pitch. (See Figure 2.)

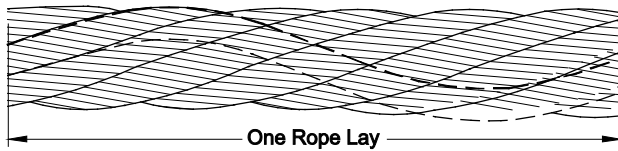


Figure 2—Lay as a Unit of Measure

- 3.10. *nominal breaking strength*—the value on which designs should be based.
- 3.11. *ordered diameter*—the nominal diameter of the circumscribing circle of a wire rope or strand.
(See Figure 3.)

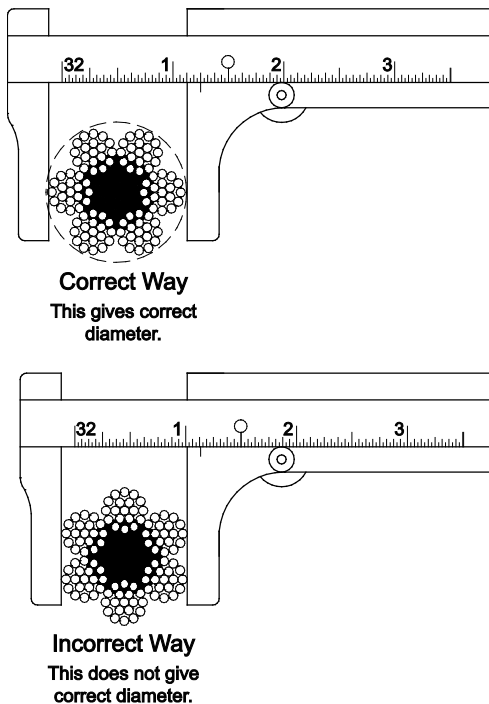


Figure 3—Determination of the Wire Rope Diameter

- 3.12. *pitch (lay length)*—the distance parallel to the longitudinal axis in which a wire makes a complete turn about the axis of the rope.
- 3.13. *preformed strand*—a strand in which the wires are permanently shaped to the spiral form they assume in the strand.
- 3.14. *preformed wire rope*—a wire rope in which the strands are permanently shaped to the spiral form they assume in the wire rope.
- 3.15. *prestretching*—stretching is the result of two components: the structural stretch, caused by the lengthening of the rope lay, compression of the core, and adjustment of the wires and strands to the load; and the elastic stretch caused by elongation of the wires. Prestretching is the application of a prescribed tensile force prior to delivery (see Section 5.2.4) intended to permanently adjust the rope for most of the structural stretch component, so that when it is placed in service the elastic stretch will be the only significant cause of additional elongation.