

# ATLT-1030: INTRODUCTION TO WIRE ROPE

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## Cuyahoga Community College

**Viewing: ATLT-1030 : Introduction to Wire Rope**

**Board of Trustees:**

2015-06-25

**Academic Term:**

Spring 2019

**Subject Code**

ATLT - AIT-Lifting Technologies

**Course Number:**

1030

**Title:**

Introduction to Wire Rope

**Catalog Description:**

Introductory course covering common types of wire rope used in the lifting and rigging industry. Includes basic understanding of terminology, identification of ropes, construction types as well as proper use, inspection, and maintenance of wire rope. The physical properties of wire rope will also be covered.

**Credit Hour(s):**

1

**Lecture Hour(s):**

1

## Requisites

**Prerequisite and Corequisite**

Departmental approval: admission to Lifting Technologies Apprenticeship program.

## Outcomes

**Course Outcome(s):**

A. Discuss the different characteristics of wire rope and describe the differences associated with each, including various types and classifications.

**Objective(s):**

1. A. List and define the terms related to wire rope.
2. B. List the basic components of wire rope.
3. C. Identify the different wire rope construction types.
4. D. List the various wire rope classifications.
5. E. Differentiate the physical characteristics associated with each classification.

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**Course Outcome(s):**

B. Discuss the specific physical properties of wire rope including elongation and wear and interpret replacement and force tables.

**Objective(s):**

1. A. Describe wire rope stretch characteristics.
  2. B. Recognize the expected wear conditions associated with common rope usage.
  3. C. Explain a wire rope broken wire replacement table.
  4. D. Explain a wire rope minimum force table.
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**Methods of Evaluation:**

1. Participation
2. Assignments
3. Quizzes & Exams
4. Practical Application Projects

**Course Content Outline:**

1. Wire rope
  - a. Terminology
    - i. Wire Rope
    - ii. Lay
    - iii. Strand
    - iv. Core
    - v. Center Wire
    - vi. Modulus of elasticity
    - vii. Rotation Resistance
    - viii. Abrasion Resistance
    - ix. Strand pattern
    - x. Swaged
    - xi. Fleet angle
    - xii. Plow Steel
  - b. Components of wire rope
    - i. Wire
    - ii. Center Wire
    - iii. Strand
    - iv. Core
  - c. Wire rope construction types
    - i. Lay types
    - ii. Core types
    - iii. Strand types
    - iv. Wire types
  - d. Wire rope classifications
    - i. General purpose ropes
      1. 6X7
      2. 6X19
      3. 6X26
      4. 6X36
      5. 6X31
      6. 6X41
      7. 6X61
    - ii. Rotation resistance ropes
      1. 8X19
      2. 8X25
      3. 19X7
      4. 19X19
    - iii. High performance ropes
      1. 35X7
      2. 35X19
    - iv. Compacted ropes
      1. Swaged ropes
      2. Swaged strand ropes
    - v. Plastic coated ropes
      1. Exterior coated rope
      2. Plastic coated core
      3. Plastic filled rope
  - e. Physical characteristics of wire ropes
    - i. Bending
    - ii. Abrasion resistance

- iii. Rotation resistance
- iv. Corrosion resistance
- 2. Physical properties
  - a. Stretch characteristics
    - i. Constructional
    - ii. Elastic
  - b. Wear conditions
    - i. Mashed wires
    - ii. Gouged wires
  - iii. Fatigued wires
  - iv. Twisted wires
- c. Wire rope replacement table
  - i. Running ropes
    - 1. Broken wires in strand
    - 2. Broken wires in rope
    - 3. Broken wires in a lay
  - ii. Standing ropes
- d. Minimum force table
  - i. Nominal diameter
  - ii. Approximate mass
  - iii. Improved plow steel
  - iv. Extra improved plow steel

## Resources

Wire Rope Technical Board. *Wire Rope Users Manual*. 4th ed. Alexandria: VA: Wire Rope Technical Publishing, 2005.

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MacDonald, Joseph, W. Rossnagel, and Lindley Higgins. *Handbook of Rigging: For Construction and Industrial Operations*. 5th ed. Boston, MA: McGraw Hill, 2009.

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Leach, Robert. *Rigger's Bible*. Revised Edition. Springfield, MO: Roark Printing, 1955.

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## Resources Other

1. <https://www.asme.org> (<https://www.osha.com>)
2. <https://www.osha.com> (<https://www.mazzellacompanies.com>)
3. <https://www.mazzellacompanies.com>

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