

# ATLT-1040: SAFETY IN LIFTING AND RIGGING I

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## Cuyahoga Community College

**Viewing: ATLT-1040 : Safety in Lifting and Rigging I**

**Board of Trustees:**

2015-06-25

**Academic Term:**

Spring 2019

**Subject Code**

ATLT - AIT-Lifting Technologies

**Course Number:**

1040

**Title:**

Safety in Lifting and Rigging I

**Catalog Description:**

Introductory course covering common types of slings used in the rigging industry. Includes basic understanding of terminology, proper use, and maintenance of slings. In addition, the relationship of the rated load, including design factors and efficiency using sling charts and applied math concepts, for sling selection and proper lifting procedures will 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 American Society of Mechanical Engineers ASME standards for the lifting and rigging industry, list the types of slings and respective uses and describe maintenance procedures as they relate to the standard.

**Objective(s):**

1. A. List and define the terms used in the lifting and rigging industry.
2. B. Discuss the family of ASME B-30 standards and explain the B-30.9 regulation as it regulates directly to slings.
3. C. List the different types of slings used for lifting.
4. D. Differentiate between the different sling types with respect to use.
5. E. Describe the maintenance procedures as prescribed by the sling standard.

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**Course Outcome(s):**

B. Discuss the relationship of the rated load, including design factors and efficiency and explain the effects of sling to load factors using sling charts and applied math concepts, for sling selection and proper lifting procedures.

**Objective(s):**

1. E. Compute rated working loads using applied math concepts.
  2. A. Identify the different sling capacity charts and explain respective uses for rated loads.
  3. B. Explain the effects of different sling angles with respect to working loads.
  4. C. Compute the sling D/d Ratio where D= the diameter of the bend (load) and d = the diameter of the wire rope for correct working load adjustments per configuration.
  5. D. Describe the importance using applied math concepts to compute rated working loads.
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**Methods of Evaluation:**

1. Quizzes & Exams
2. Participation
3. Assignments
4. Practical application projects

**Course Content Outline:**

1. Lifting stand slings
  - a. Terminology
    - i. Sling
    - ii. Alloy
    - iii. Wire rope
    - iv. Synthetic web
    - v. Synthetic round web
    - vi. Proof tests
    - vii. Qualified person
    - viii. Rated loads
    - ix. Design factor
    - x. Breaking strength
  - b. Family of ASME B-30 standards
    - i. B-30.2 Overhead and Gantry Cranes
    - ii. B-30.3 Tower Cranes
    - iii. B-30.4 Portal and Pedestal Cranes
    - iv. B-30.5 Mobile and Locomotive Cranes
    - v. B-30.7 Winches
    - vi. B-30.9 Slings
    - vii. B-30.10 Hooks
    - viii. B-30.11 Monorails and Underhung Cranes
    - ix. B-30.16 Overhead Hoists
    - x. B-30.20 Below the Hook Lifting Devices
    - xi. B-30.21 Lever Hoists
    - xii. B-30.23 Personnel Lifting Systems
    - xiii. B-30.26 Rigging Hardware
  - c. Sling types
    - i. Alloy chain
    - ii. Wire rope
    - iii. Synthetic web
    - iv. Synthetic round
  - d. Uses
    - i. Environmental
      1. Temperature
      2. Ultraviolet rays
      3. Working conditions
      4. Lifting material
    - ii. Construction
    - iii. Design
      1. Rated loads
      2. Proof loads
    - iv. Maintenance
      1. Tagging
        - a. Manufacturers trademark
        - b. Grade
        - c. Size
        - d. Rated load
      2. Inspection
        - a. Frequency
        - b. Periodic
        - c. Wear

- d. Stretch
- e. Heat damage
- f. Chemical damage
- 3. Repair
  - a. Authorized personnel
  - b. Identification markings
  - c. Compliance
- 4. Removal
  - a. Damage
  - b. Safety
  - c. Fit for use
- 2. Rated loads and efficiency
  - a. Capacity charts
    - i. Vertical
    - ii. Choker
    - iii. Basket
  - b. Uses
    - i. Configuration
    - ii. Load limits
    - iii. Sling selection
  - c. Load limits and angles
    - i. Working load reduction
    - ii. Headroom allowance
    - iii. Sling length
- 3. D/d Ratio
  - a. Computation
    - i. Sling DiameterLoad diameter
    - ii. Minimum ratio allowance
    - iii. Decimal conversion
    - iv. Working load capacity
    - v. Chart reference
  - b. Working load factors
    - i. Breaking strength
    - ii. Design factor
    - iii. Efficiency

## Resources

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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Wire Rope Technical Board. *Wire Rope Sling User's Manual*. 3rd ed. Alexandria: Wire Rope Technical Publishing, 2007.

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## Resources Other

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

Top of page

Key: 464