

# ATLT-2020: PROOF TEST OPERATIONS

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## Cuyahoga Community College

### Viewing: ATLT-2020 : Proof Test Operations

**Board of Trustees:**

2015-12-03

**Academic Term:**

Spring 2019

**Subject Code**

ATLT - AIT-Lifting Technologies

**Course Number:**

2020

**Title:**

Proof Test Operations

**Catalog Description:**

An introductory course into the safe testing processes and requirements for operating test equipment for non-destructive testing of slings, rigging gear and special lifting assemblies and hardware.

**Credit Hour(s):**

1

**Lecture Hour(s):**

1

## Requisites

**Prerequisite and Corequisite**

Departmental approval: admission to Lifting Technologies apprenticeship program.

## Outcomes

**Course Outcome(s):**

Discuss the purpose and principles of non-destructive proof testing for rigging gear including standards, best practices and safety precautions.

**Objective(s):**

1. List and identify the terms used in non-destructive proof load testing off rigging gear.
2. Identify types of testing commonly conducted in the rigging industry.
3. Identify the industry standards and best practices of non-destructive proof load testing slings and hardware.
4. Identify and discuss the safety precautions related to proof load testing.

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**Course Outcome(s):**

Discuss the procedures followed in proof load testing including testing equipment, certifications and safety practices.

**Objective(s):**

1. Recognize proper use of safety guards and PPE for proof load testing rigging gear.
2. Explain basic preventative maintenance of proof load test equipment.
3. Evaluate the test Bed work zone.
4. Discuss the basics of hydraulic tension testing equipment.
5. Interpret work instructions, operate computer controls and enter test setup data.
6. Collect proof load test certificates for customer distribution.
7. Identify load pins, carriages and rollers and safety guards.

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**Course Outcome(s):**

Explain the proof load testing requirements for various types of rigging gear, hardware and sling types.

**Objective(s):**

1. Calculate proper proof test loads.
2. Determine grades and construction of components.
3. Establish the proper test configuration for the selected rigging gear.
4. Assess the requirements of the lifting device to determine application of a special test.

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**Course Outcome(s):**

Compare the different types of test fixtures including grips and attachment points used in proof load testing

**Objective(s):**

1. List the various types of chain sling test fixtures.
2. Describe wire rope grips.
3. Identify proper attachment points.
4. Identify critical check points of conducting a proof load test.
5. Reference the materials and documentation required for proof load testing.
6. Operate the test equipment and computer controls properly.
7. Identify the key points of conducting a posttest visual inspection.

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**Course Outcome(s):**

Safely setup and conduct a proof load test of rigging gear components.

**Objective(s):**

1. Identify critical check points of conducting a proof load test.
2. Reference the materials and documentation required for proof load testing.
3. Operate the test equipment and computer controls properly.
4. Identify the key points of conducting a posttest visual inspection.

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**Methods of Evaluation:**

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

**Course Content Outline:**

1. Proof Load Testing
  - a. Terminology
    - i. Non-destructive testing
    - ii. Proof test
    - iii. Minimum breaking strength
    - iv. Design factor
    - v. Safe working load
    - vi. Elongation
    - vii. Slings
    - viii. Bridles
      - ix. High Performance slings
      - x. Pins
      - xi. Hydraulic tension test beds
      - xii. Power units
      - xiii. Cylinders
      - xiv. Controls
        - xv. bed/frame
        - xvi. Guards
      - xvii. Proof test certificates
      - xviii. Work orders
        - xix. Test certs
          - xx. Accept/reject criteria
    - b. Types

- i. Proof load test
    - ii. Ultimate load test
    - iii. Pre stretching
    - iv. Cycle
  - c. Standards
    - i. ASME B30.9
    - ii. ISO-3108
    - iii. EN12385-1
    - iv. Wire Rope Sling User"s Manual
    - v. ASTM E4
    - vi. NACM
2. Proof load test
- a. Test bed work zone
    - i. Clearances
    - ii. Guards
    - iii. Sirens
    - iv. Warning indicator lights
  - b. Hydraulic test equipment
    - i. Cylinders
    - ii. Seals
    - iii. Power units
    - iv. Carriage
    - v. Load cells
    - vi. Controls
  - c. Work Instructions
    - i. Work orders
    - ii. Load test certificates
    - iii. Calibrations
  - d. Certificates
    - i. Procedures
    - ii. Time/load graphs
    - iii. Serial numbers
  - e. Pins, Carriages & Guards
    - i. Proper pin sizing
      - 1. Connections
      - 2. Bunching
    - ii. Safety guards
      - 1. Proper use
      - 2. Operations
  - f. PPE
    - i. Hand protection
    - ii. Eye protection
  - g. Preventative maintenance
    - i. Hydraulic fluid
    - ii. Greasing rollers and hinges
    - iii. Electrical connections
    - iv. Wear, cracks and fatigue
3. Test Requirements
- a. Proof test loads
    - i. 200% safe working load
    - ii. Connection point strength
    - iii. Test speed
    - iv. Duration
  - b. Grade & construction
    - i. Class, grade and construction of wire rope
      - 1. 6X19 class
      - 2. 6X37 class
      - 3. Grade 1960
      - 4. Grade 2160

- 5. High performance wire
- 6. Specials
- ii. Grade of chain
  - 1. G43
  - 2. G70
  - 3. G80
  - 4. G100
  - 5. G120
- c. Configurations
  - i. Bridle slings
  - ii. Straight line pull
  - iii. Basket
  - iv. Endless
- d. Special test
  - i. Cycle
  - ii. Destructive
  - iii. Pre stretching
  - iv. Repairs
- 4. Test fixtures
  - a. Chain sling test fixtures
    - i. Mechanical
    - ii. Hydraulic
    - iii. fixed
  - b. Wire Rope Grips
    - i. 1. Frame
    - ii. 2. Inserts
    - iii. 3. locking
  - c. Attachment points
    - i. 1. Pins
    - ii. 2. Rings
    - iii. 3. Shackles
    - iv. 4. Links
- 5. Test of rigging gear components
  - a. Critical check points
    - i. Guards
    - ii. Connections
    - iii. Pins
  - b. Documentation
    - i. Test Certs
    - ii. Work orders
    - iii. Purchase orders
  - c. Operation
    - i. Setup
    - ii. Speed
    - iii. Duration
    - iv. Max Peak load

## Resources

Associated Wire Rope Fabricators. *Recommended Guidelines for Proof Test Procedures for Slings*. AWRF Publications, 2012.

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Klinke, Jerry. *Rigging Handbook*. 4th Ed. Paperback. 2012.

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## Resources Other

1. <https://www.mazzellacompanies.com>

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