

# ATGL-1340: RIGGING FOR GLAZIERS

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## Cuyahoga Community College

**Viewing: ATGL-1340 : Rigging for Glaziers**

**Board of Trustees:**

March 2020

**Academic Term:**

Fall 2020

**Subject Code**

ATGL - Appld Indus Tech - Glazing

**Course Number:**

1340

**Title:**

Rigging for Glaziers

**Catalog Description:**

Basic course covering proper crane set-up including safety concerns, below the hook devices and signaling procedures. In addition, field lifting techniques will be applied.

**Credit Hour(s):**

1

**Lecture Hour(s):**

1

## Requisites

**Prerequisite and Corequisite**

Departmental approval: admission to apprenticeship program.

## Outcomes

**Course Outcome(s):**

Discuss the risks related to rigging for glaziers, describe proper crane set-up and safety and list and explain the use of rigging hardware and slings.

**Objective(s):**

1. List and define the terms related to crane rigging.
2. Identify and explain the safety standards for proper risk management in rigging as prescribed by governing agencies.
3. List the various crane hazards related to rigging operations.
4. Develop rigging plans and strategies for basic, approved written and engineering lifts.
5. Assess environmental conditions including ground stability and weather related effects to safely position cranes for critical lifts.
6. Identify the different hardware used for rigging including connectors, attachment points, and collectors.
7. Discuss the types, application, and selection of overhead hoisting slings.
8. Compute sling angle stress with respect to sling angle and applied capacities.

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**Course Outcome(s):**

Discuss the function and design use and selection of below the hook devices, including signaling training and qualifications commonly used in crane rigging.

**Objective(s):**

1. Identify the various below the hook devices used in crane rigging.
2. Select the correct sling used for load control with respect to safety practices estimate.
3. Estimate load weight to determine the center of gravity using basic math computation.

4. Identify the different training and qualifications required for proper crane signaling as prescribed in industry safety standards.
5. Evaluate various lifting scenarios using cranes and employ proper signaling methods, modes, and types.

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**Course Outcome(s):**

Demonstrate the ability to properly select Below the Hook devices and safely perform lifting techniques in accordance with industry safety standards.

**Objective(s):**

1. **Assess lifting requirements and select correct Below the Hook devices.**
2. **Assemble various hardware including shackles, eye bolts, and turnbuckles needed for safe lifts.**
3. **Determine and apply the correct hitch required for given loads.**
4. **Attach selected devices to crane hook.**
5. **Employ proper signaling modes, methods, and types in working conjunction with crane operators.**

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**Methods of Evaluation:**

1. Group Exercises
2. Quizzes
3. Tests
4. Participation

**Course Content Outline:**

1. Glazier rigging
  - a. Terminology
    - i. Shackle
    - ii. Safe working load
    - iii. Sheave
    - iv. Reaving
    - v. Capacity
    - vi. Sling angle
    - vii. Dynamic force
    - viii. Hoist
    - ix. Tag line
    - x. Choker
    - xi. Hitch
    - xii. Rigging
    - xiii. Hazards
    - xiv. Safety
    - xv. Rigging plan
    - xvi. Critical lift
    - xvii. Sling
    - xviii. Sling angle stress
  - b. Safety agencies
    - i. Occupational Safety and Health Administration (OSHA)
    - ii. American National Standard Institute
    - iii. American Society of Mechanical Engineers
    - iv. Standards
      1. Federal standards for workers
      2. Industry standards
      3. Crane
      4. Rigging
      5. Signaling
      6. Rules and codes
  - c. Crane hazards
    - i. Overhead
      1. Electrical
      2. Obstructions

- ii. Environmental
  - 1. Weather
  - 2. Site
- iii. Tipping
- iv. Swing radius
- v. Overloading
- vi. Inspection criterion
  - 1. Wire rope
  - 2. Cracks
  - 3. Excessive temperature
  - 4. Weld splatter
  - 5. Load hooks
- d. Rigging: plans and strategies
  - i. Purpose
    - 1. Safety
    - 2. Load transfer
  - ii. Types
    - 1. Basic
    - 2. Written and approved
    - 3. Engineered
  - iii. Basic
    - 1. Repetitive lifts
    - 2. Known load weight
    - 3. Single crane lift
    - 4. Normal rigging application
  - iv. Written/approved
    - 1. Basic lift items
    - 2. Calculated load weight
    - 3. Sling angle stress
  - v. Engineered
    - 1. Basic and written plans
    - 2. Hoisted Personnel
    - 3. High Dollar Lift
    - 4. Multi-Crane Lift
- e. Crane Positioning
  - i. Environmental Factors
    - 1. Rain
    - 2. Wind
    - 3. Ground Conditions
    - 4. Lightening
  - ii. Electrical
  - iii. Site specific
- f. Rigging hardware
  - i. Connectors and attachments
    - 1. Shackles
      - a. Chain
      - b. Wide body
      - c. Screw pin
      - d. Nut pin
    - 2. Eye bolts
      - a. Shouldered
      - b. Machined
      - c. Swivel
    - 3. Turn buckle
      - a. Hook
      - b. Lock nut
  - ii. Collectors
    - 1. Central collection point
    - 2. Types

- a. Master link
    - b. Cold weather
    - c. Pear shape
  - g. Slings
    - i. Types
      - 1. Nylon
      - 2. Wire rope
      - 3. Bridle
      - 4. Synthetic
      - 5. Round
    - ii. Applications
      - 1. Basket hitch
      - 2. Double wrapped hitch
      - 3. Choker hitch
      - 4. Vertical
    - iii. Sling selection
      - 1. Lift description
      - 2. Rigging description
      - 3. Damage control
      - 4. Load size
      - 5. Weight
      - 6. Inspection
  - h. Sling angle stress
    - i. Calculation
      - 1. Basic math
      - 2. Geometry
      - 3. Center of gravity
    - ii. Load charts
      - 1. Horizontal sling angle stress
      - 2. Stress multiplier
      - 3. Total tension applied
- 2. Crane devices and signaling
  - a. Below the hook devices
    - i. Chain fall
    - ii. Spreader bar
    - iii. Equalizer beam
    - iv. Vacuum lifters
  - b. Slings and load control
    - i. Slings
      - 1. Synthetic
        - a. Product quality
        - b. Damage control
      - 2. Wire rope
        - a. Versatile lifts
        - b. Greater load capacity
      - 3. Chain
        - a. Adjustable lengths
        - b. Multiple attachment points
    - ii. Load control
      - 1. Proper sling length
      - 2. Sling positioning
      - 3. Center of gravity
  - c. Load weight
    - i. Weight
      - 1. Listed weight
      - 2. Computed
    - ii. Center of gravity

- 1. Purpose
  - a. Level load
  - b. Hazard prevention
  - c. Lifting control
- 2. Calculation
  - a. Measuring
  - b. Chart interpretation
  - c. Math principles
- d. Signaling
  - i. Training
    - 1. Industry requirement
    - 2. Safety standards
  - ii. Qualifications
    - 1. Signal relations
    - 2. Crane dynamics
    - 3. Competent person
- e. Signaling scenarios
  - i. Hazard recognition
  - ii. Signal selection
  - iii. Environmental conditions
    - 1. Wind
    - 2. Rain
    - 3. Snow
    - 4. Lightening
    - 5. Temperature
  - iv. Methods, modes, and types
- 3. Load lifting
  - a. Lifting assessment
    - i. Load
    - ii. Hardware
    - iii. Path of travel
  - b. Hardware
    - i. Condition
    - ii. Quantity
    - iii. Load weight
  - c. Hitch
    - i. Choke
    - ii. Basket
    - iii. Double wrapped
    - iv. Vertical
  - d. Crane hook attachment
    - i. Hardware compatibility
    - ii. Hook size
    - iii. Locking hook
    - iv. Open throat hook
  - e. Signaling
    - i. Modes
      - 1. Sequence of signals
      - 2. Crane specific
    - ii. Methods
      - 1. Signal delivery
      - 2. Operator distance
    - iii. Types
      - 1. Lifting
      - 2. Extending
      - 3. Load landing

## Resources

Overton. *Signaling for Cranes Safety Training*. Hanover, Maryland: IUPAT, 2010.

**Resources Other**

1. [www.acratech.com](http://www.acratech.com)
2. [www.thecrosbygroup.com](http://www.thecrosbygroup.com) (<http://www.thecrosbygroup.com>)

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