# ATIW-1330: ERECTION CONCEPTS & PRACTICES

## Cuyahoga Community College

### Viewing: ATIW-1330 : Erection Concepts & Practices

**Board of Trustees:**
June 2020

**Academic Term:**
Fall 2020

**Subject Code**
ATIW - Appld Indus Tech - Ironworking

**Course Number:**
1330

**Title:**
Erection Concepts & Practices

**Catalog Description:**
Principles and techniques of structural steel erection, including detailing procedures. Covers installation of temporary flooring, accurate alignment of steel assembly, safety nets and railings, and various types of connections: bolts, rivets and pins, layout and erection of bar joists, bridging, scaffolds and ladders, according to OSHA regulations. Includes blueprint reading.

**Credit Hour(s):**
3

**Lecture Hour(s):**
3

### Requisites

**Prerequisite and Corequisite**
ATIW-1300 Structural Steel Concepts or concurrent enrollment, and ATIW-1310 Safety for Ironworkers or concurrent enrollment, or departmental approval.

### Outcomes

**Course Outcome(s):**
A. Discuss the principles and techniques of structural steel erection.

**Objective(s):**
1. Analyze proper methods of unloading, sorting, dressing out, and storing structural steel.
2. Evaluate methods of safely setting up and utilizing craned for erecting structural steel.
3. Select proper rigging to use for different erection tasks.
4. Identify structural connection types and fastening methods used when erecting structural steel.

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**Course Outcome(s):**
B. Describe the installation of temporary flooring, safety nets, and railings.

**Objective(s):**
1. Apply use of temporary flooring systems.
2. Utilize safety nets properly.
3. Ensure all railings are properly installed and maintained.

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**Course Outcome(s):**
C. Accurately plumb, align and bolt-up structural steel.

**Objective(s):**

1. Analyze plumbing and aligning of structural steel.
2. Apply plumbing and aligning procedures on welded structures.
3. Utilize proper detailing procedures for structural steel.

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**Course Outcome(s):**

D. Bolt-up, rivet and pin connections.

**Objective(s):**

1. Identify bolts and accessories.
2. Accurately measure bolt lengths.
3. Analyze tension and torque.
4. Apply proper bolt installation.
5. Analyze methods used to tension bolts.
6. Evaluate pre-installation verification testing of bolts.
7. Ensure proper inspection of bolts.

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**Course Outcome(s):**

E. Erect bar joists, bridging, scaffolds and ladders, according to OSHA regulations.

**Objective(s):**

1. Identify bar joist, joist girders, and trusses.
2. Apply proper methods of connecting bar joist.
3. Utilize proper procedures for erecting, dismantling, and using scaffolds at a construction site.
4. Ensure safe ladder practices when working on a construction site.

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**Course Outcome(s):**

F. Identify detailing procedures.

**Objective(s):**

1. Apply proper installation of metal deck.
2. Apply proper installation of sheeting.
3. Ensure proper use of safety cables.

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**Course Outcome(s):**

G. Interpret blueprints necessary for structural steel erection.

**Objective(s):**

1. Analyze structural steel erection and detail drawings.
2. Identify common views used in structural steel drawings.
3. Apply common symbols and abbreviations used in structural steel drawings.
4. Utilize piece marks to identify structural steel shapes.

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**Methods of Evaluation:**

1. Quizzes
2. Exams
3. Classroom participation
4. Demonstration of project assignments

**Course Content Outline:**

1. Principles of structural steel erection
2. Blueprints
   a. Layout
   b. Erection

3. Skeleton steel construction
    a. Temporary floors
    b. Permanent floors
    c. Safety nets
    d. Over or near water work
    e. Floor periphery safety railing
4. Alignment of structural steel
    a. Methods
    b. Tools and equipment
    c. Bolting-up
    d. Plumb lines
    e. Welded structures
    f. Braced towers
    g. Bridges
5. Connections
    a. Bolts
        i. Erection
        ii. High-strength
            1. History
            2. Theory
            3. Practice
            4. Types
                a. Machine
                b. Turned
                c. Structural ribbed
                d. Weathering
                e. Galvanized
                f. LeJeune
            5. Behavior
    b. Bolting-up tools
        i. Hand
        ii. Power
    c. Drawings
    d. Turn of nut tightening
        i. Calibration for installation
        ii. Inspection
    e. Behavior of connections
    f. Inspection procedures
    g. Washers
    h. Lengths
    i. Self-locking nuts
6. Rivets
7. Pins
    a. Types
    b. Accessories
    c. Pin holes
    d. Pin insertion
    e. Pin connected members
8. Bar joists and bridging
    a. History
    b. Types of bridging
        i. Angle iron
        ii. Smooth rods
        iii. X bridging
    c. Erection procedures
        i. Pre-erection planning
        ii. Hoisting equipment
        iii. Unloading
        iv. Welding electrodes

v. Accessories
vi. Details

9. Detailing procedures
   a. Miscellaneous iron
   b. Tools and equipment
   c. Stairway safety
   d. Erection of ladders
   e. Channel bucks
   f. Metal bar grating
10. Scaffolds and ladders
   a. Types of scaffolds
      i. Float
      ii. Needle beam
      iii. Swinging
      iv. Boatswain chair
      v. Welded frame
         1. Stationary
         2. Rolling
         3. Accessories
      vi. Tubelox
   b. Material hoist towers
   c. Personnel hoists
   d. Types of ladders
      i. Step
      ii. Extension

## Resources

Ambrose, James and Patrick Tripeny. *Simplified Design of Steel Structures*. 8th ed. New York: J. Wiley & Sons, 2007.

International Association of Bridge, Structural and Ornamental Iron Workers. *Structural Manual for Ironworker, Journeymen and Apprentices*. Volumes 1, 2, 3. Washington, D.C.: AFL-CIO, 2018.

American Institute of Steel Construction. "Steel Construction Manual" 15th ed. 2017.

Aghayere, Abi O. and Jason Vigil. *Structural Steel Design*. 3rd ed. Dulles, VA: Mercury Learning and Information, 2020.

National Center for Construction Education and Research. *Ironworking Training Guide*. National Center for Construction Education and Research , 2017. 2nd edition.

**Resources Other**

American Institute of Steel Construction. https://www.aisc.org/technical-resources/ . 2020.

International Association of Bridge, Structural and Ornamental Iron Workers. http://www.ironworkers.org/. 2011.

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