

ATIW-1320: STEEL CONSTRUCTION PROCEDURES

Cuyahoga Community College

Viewing: ATIW-1320 : Steel Construction Procedures

Board of Trustees:

June 2020

Academic Term:

Fall 2020

Subject Code

ATIW - Appld Indus Tech - Ironworking

Course Number:

1320

Title:

Steel Construction Procedures

Catalog Description:

Occupational safety and health standards for construction industry in general, and ironworking trade specifically. Includes regulations and procedures for fall protection; electrical work; scaffolding; confined spaces; personal protective equipment; materials handling, storage, use and disposal; hand and power tools; steel erection; and cranes, derricks, hoists, elevators, and conveyors.

Credit Hour(s):

1

Lecture Hour(s):

1

Requisites

Prerequisite and Corequisite

Admission to Ironworking apprenticeship program, or departmental approval.

Outcomes

Course Outcome(s):

A. Explain the procedures of steel construction.

Objective(s):

1. Interpret blueprints related to layout and erection of structural steel.
2. Establish an erection plan for a construction site using structural steel.
3. Establish erection duties to be followed on a construction site using structural steel.
4. Establish a lay down area for each sequence of structural steel to be erected.

Course Outcome(s):

B. Demonstrate the methods of unloading and shaking out iron.

Objective(s):

1. Utilize the basic procedures for unloading structural steel.
2. Utilize the basic procedure for sorting out structural steel.
3. Utilize the procedure for storing structural steel.
4. Apply the appropriate method to unload structural steel safely.

Course Outcome(s):

C. Layout and set anchor bolts in accordance with job specifications.

Objective(s):

1. Ensure anchor bolts have the proper orientation and projection.
 2. Ensure layout of the bolts are dimensioned correctly before installation begins.
 3. Inspect all anchor bolts for damage and make necessary repairs.
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Course Outcome(s):

D. Demonstrate the procedure for erecting structural steel columns and beams.

Objective(s):

1. Utilize the three primary means of rigging structural steel columns.
 2. Utilize the proper process for erecting structural steel columns.
 3. Apply the process of erecting structural steel beams, including beam-to-column connections.
 4. Identify structural steel column and beam splices.
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Course Outcome(s):

E. Use tools according to the Occupational Safety and Health Administration's regulations.

Objective(s):

1. Apply safety procedures when handling all power tools.
 2. Inspect all hand tools before use for signs of excessive wear.
 3. Apply safety procedures when working around welding machines.
 4. Apply proper procedures when using electrical chords.
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Course Outcome(s):

F. Discuss bridge types and components.

Objective(s):

1. Adapt the history of bridge construction to current day bridge construction.
 2. Evaluate how bridges function in relation to loads, forces, and spans.
 3. Research six of the most common types of bridges.
 4. Evaluate the major steps in bridge erection.
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Methods of Evaluation:

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

Course Content Outline:

1. Fundamental procedures of steel construction
 - a. Use of blueprints
 - i. layout
 - ii. erection plan
 1. plan problems
 2. site problems
 - b. Equipment and material set-up
 - c. Tools
 - i. proper use
 - ii. OSHA regulations
 - d. Erection duties
 - i. directing
 - ii. hooking on
 - iii. signaling
 - e. Connecting

- i. plumbing
 - ii. guying
 - iii. fastening
- 2. Unloading of iron
 - a. Yard gang
 - b. Multi-story jobs
 - c. Railroad cars
 - i. loading
 - ii. unloading
- 3. Shaking out of iron
 - a. Use of spreaders and hooks
 - b. Tools and equipment
 - c. Buildings
 - i. multi-story
 - ii. one-story
- 4. Anchor bolts
 - a. Preparation
 - i. tools
 - ii. measurements
 - iii. procedures
 - b. Layout
 - c. Chemical adhesive fasteners
 - i. cartridge
 - ii. glass capsule
- 5. Individual ironworking skills
- 6. Raising gang
 - a. Roles and responsibilities
 - b. Work skills
- 7. Erection of columns
 - a. Setting
 - b. Splices
 - c. Connections
 - d. Welding
- 8. Erection of beams
 - a. Setting
 - b. Tandem loads
 - c. Splices
 - d. Connections
 - e. Girders
 - f. Trusses
 - g. Topping out
 - h. Braces
- 9. Bridges
 - a. Types of steel bridges
 - i. simple beam
 - ii. plate-girder
 - iii. orthotopic deck-plate
 - iv. truss
 - v. cantilever
 - vi. arch
 - vii. suspension
 - b. Materials
 - c. Cableways
 - d. Catwalks

Resources

Hopkins, H. J. *A Span of Bridges: An Illustrated History*. New York: Praeger. (Or most recent version), 1970.

Salmon, Charles G. *Steel Structures: Design and Behavior: Emphasizing Load and Resistance Factor Design*. 5th ed. New York, NY: Harper Collins College Publishers, 2008.

American Institute of Steel Construction. *Steel Construction Manual*. 15th ed. Chicago: American Institute of Steel Construction, 2017.

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.

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

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

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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