

ATIW-1300: STRUCTURAL STEEL CONCEPTS

Cuyahoga Community College

Viewing: ATIW-1300 : Structural Steel Concepts

Board of Trustees:

June 2020

Academic Term:

Fall 2020

Subject Code

ATIW - Appld Indus Tech - Ironworking

Course Number:

1300

Title:

Structural Steel Concepts

Catalog Description:

Introduction to structural steel concepts, including an overview of historical use of iron and steel in construction. Fundamental principles of and preparation for erection of structural steel; blueprint reading; and proper use of tools, according to OSHA regulations.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Admission to Ironworking apprenticeship program, or departmental approval.

Outcomes

Course Outcome(s):

A. Describe the historical use of iron and steel in construction.

Objective(s):

1. Evaluate the transition from iron to steel.
2. Analyze the evolution of structural steel for use in building.
3. Discuss the history and process of riveting.
4. Evaluate the early processes for making the different types of steel and iron.

Course Outcome(s):

B. Explain the key factors in preparing for steel erection.

Objective(s):

1. Discuss the importance of planning a construction site when using structural steel.
2. Research the different components involved with scheduling on a construction site with structural steel.
3. Write a critical lift plan.

Course Outcome(s):

C. Describe the fundamentals of structural steel erection.

Objective(s):

1. Interpret blueprints related to layout and erection of structural steel.
 2. Evaluate the different components that make up the foundations for a steel framed structure.
 3. Identify the four most common structural members.
 4. Evaluate the general erection process for structural steel.
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Course Outcome(s):

- D. Demonstrate the proper use of tools.

Objective(s):

1. Research common hand and power tools used on a construction site that uses structural steel.
 2. Apply a working knowledge of layout instruments.
 3. Adapt safety procedures to be used when working around welding machines.
 4. Identify and utilize the proper rigging equipment on a construction site.
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Methods of Evaluation:

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

Course Content Outline:

1. History of construction
 - a. Iron construction
 - i. Bridges
 - ii. Buildings
 - b. Steel construction
 - i. Brooklyn Bridge
 - ii. Skyscrapers
2. Preparation for steel erection
 - a. Interpretation of structural steel drawings
 - i. Steel shapes
 - ii. Alphabet of lines
 - iii. Basic projections
 - iv. Orthographic drawings
 - v. Erection drawings
 - vi. Detail drawings
 - vii. Welding and other symbols
 - viii. Steel construction abbreviations
 - b. Material list and notes
3. Structural steel erection fundamentals
 - a. Steel erection safety
 - b. Steel erection equipment
 - c. Welding and burning equipment
 - d. Riveting equipment
4. Tools
 - a. Types and uses
 - b. OSHA regulations

Resources

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

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

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

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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