

ATLT-1801: SPECIAL TOPICS: CRANE OPERATOR TRAINING

Cuyahoga Community College

Viewing: ATLT-1801 : Special Topics: Crane Operator Training

Academic Term:

Spring 2019

Subject Code

ATLT - AIT-Lifting Technologies

Course Number:

1801

Title:

Special Topics: Crane Operator Training

Catalog Description:

Operator training course for overhead cranes and hoists. Course identifies the different crane types, operation techniques and hoisting motions. Included are the applicable safety agencies and their respective standard with respect to safe crane and hoisting operations. In addition, practical application of crane maneuvering and hoisting is covered.

Credit Hour(s):

1

Lecture Hour(s):

1

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Lifting Technologies apprenticeship program.

Outcomes

Course Outcome(s):

I Recognize the purpose of safe operation of industrial cranes including governing standards, crane types, and operator awareness covering hoist motion and worker responsibilities.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. List and define the terms related to industrial crane operation.
2. Explain the importance of safe operating techniques for overhead crane operations including load and load weights, rigging practices, and pre-inspection procedures.
3. Identify the different types of overhead cranes and describe the relative application of each.
4. State safety standards related to safe crane operation and list the governing agencies responsible for proper implementation.
5. Identify the responsibilities of the crane operator with respect to lifting procedures in various environments and discuss the importance of timely inspections.
6. Compare the respective crane/hoist motions and explain the different brake types and controls.
7. Differentiate between single, multiple, and variable speed controls.
8. Explain the pendulum effect with respect to trolley and bridge motion, state the respective dangers and describe applicable resolutions.

Methods of Evaluation:

Evaluation of Student Achievement or Proficiency:

Participation and contribution to discussions (Individual)		20%
Assignments	20%	
Quizzes & Exams		30%
Practical Application Projects	<u>30%</u>	
	100%	

Participation & Contribution to discussions (Individual) 20%

Your own contribution to the discussion based on your unique experience and knowledge is a critical part of the success of the course for everyone. Note 20% depends on your performance in this facet of the course. This is often enough to make a difference in final grades. The instructor will expect informed insightful, comments from individuals both in the classroom as well as the practical lab (shop) activities. The grade for participation is not based on quantity but instead on the quality of the contributions.

Assignments 20%

Assignments may be individual or done in teams and provides the opportunity for you to inject some of your own learning and experience more directly into the mix.

Quizzes and Exams 30%

These are individual assignments may be a combination of written, oral or practical in nature.

Practical Application Projects 30%

This portion of the course will help you develop a comprehensive understanding of the materials and periodically throughout the course you may be required to perform and display your understanding of the materials in a practical shop setting.

Note:

Class assignments, quizzes, exams and projects dates may be altered, rescheduled, changes, deleted or added by the instructor.

Grade Computation:

Your grade in this course is based on a combination of individual and group related classroom and lab work.

Grades are reported as follows:

- A:** Indicates consistently excellent work
- B:** Indicates work of the quality normally expected from Lifting Technologies Apprentice student
- C:** Indicates the minimum acceptable level of work from a Lifting Technologies Apprentice student
- D:** Indicates below minimum acceptable level of work (requires review and evaluation with Mazzella Companies)*
- F:** Indicates below minimum acceptable level of work (requires review and evaluation with Mazzella Companies)*
- I:** Indicates incomplete (either due to attendance (withdrawal) or lack of work being submitted)

Grades A, B, and C maybe modified by a plus or minus as appropriate. See below scale.

A+:	99-100%	C+:	78-79%
A:	93-98%	C:	73-77%
A-:	90-92%	C-:	70-72%
B+:	88-89%		69% and below*
B:	83-87%		
B-:	80-82%		

*Any grade achieved below a 70% or "C-" is unacceptable and requires that the Lifting Technologies Apprentice student to re-register and re-take the course. Any apprentice not achieving a grade of 70% or "C-" will be required to meet with Mazzella Companies to review and evaluate continuation in the Lifting Technologies Apprenticeship Program prior to re-registering and retaking.

TO RECEIVE COLLEGE CREDIT THE STUDENT MUST ATTAIN A GRADE OF "C" (2.0) OR BETTER

Course Content Outline:

Course Outline

1. **Industrial overhead cranes**
 - a. **Terminology**
 - i. **Industrial crane**
 - ii. **Hoist**
 - iii. **Bridge**
 - iv. **Hoisting motion**
 - v. **Trolley**
 - vi. **Trolley motion**
 - vii. **Bottom block**
 - viii. **Control**
 - ix. **Brake**
 - x. **Limit switch**
 - xi. **Pendulum**

- xii. **Pendant**
 - xiii. **Pulpit crane**
 - xiv. **Hoist limit**
 - xv. **Drifting**
 - xvi. **Qualified operator**
 - xvii. **Pick point**
 - b. **Operating techniques**
 - i. **Load**
 - 1. **Configuration**
 - a. **Balanced**
 - b. **Liquid**
 - c. **Irregular**
 - d. **Regular**
 - 2. **Pick point**
 - ii. **Load weight**
 - 1. **Original equipment manufacturer (OEM)**
 - 2. **Chart**
 - 3. **Capacity listing**
 - 4. **Calculation**
1. **Rigging practices**
 - a. **Sling**
 - i. **Wire rope**
 - ii. **Synthetic**
 - b. **Load/sling compatibility**
 - c. **Pick point**
 - d. **Signaling**
 - i. **Hand**
 - ii. **Radio**
 - e. **Load specific**
 - f. **Application**
 - g. **visibility**
2. **Crane types and application**
 - a. **Overhead/top running crane**
 - i. **Heavy capacity**
 - ii. **High lifts**
 - iii. **Location**
 - 1. **Steel mills**
 - 2. **Die handling**
 - 3. **Pulp and paper**
 - b. **Overhead under running**
 - i. **Low ceiling**
 - ii. **Medium to heavy capacity**
 - iii. **Application**
 - 1. **Steel fabrication**
 - 2. **Machine shop**
 - 3. **General industry**
 - c. **Jib crane**
 - i. **Weld fixture**
 - ii. **Sub assembly**
 - iii. **Light/medium capacity**
 - iv. **Fixed reach**
 - v. **Dedicated work stations**
 - d. **Monorail**
 - i. **Medium to light duty**
 - ii. **Light assembly areas**
 - iii. **Low head room**
 - iv. **Application**
 - 1. **Maintenance**
 - 2. **Production**

1. **Safety standards**
 - a. **OSHA 1910.179**
 - i. **Overhead crane and hoist**
 - ii. **Worker safety**
 - iii. **Operator checklist**
 - b. **CMAA (Crane Manufacturers Association of America)**
 - i. **Crane Operators Manual requirements**
 - ii. **Inspection requirements**
 - iii. **Safe operation of overhead cranes and hoists**
 - c. **ASME (American Society of Mechanical Engineers)**
 - d. **B.30.15 Overhead hoists: under running**
 - e. **B.30.11 Monorails and Under running cranes**
2. **Operator responsibilities**
 - a. **Environments**
 - i. **Indoor**
 - ii. **Outdoor**
 - iii. **Hot**
 - iv. **Cold**
 - v. **Chemical**
 - b. **Responsibilities**
 - i. **Inspections**
 1. **Daily**
 2. **Periodically**
 3. **Shift/first use**
 - ii. **Load application**
 1. **Rigging**
 2. **Center of gravity**
 3. **Parking the load**
3. **Crane/hoist motion: brake types**
 - a. **Brake types**
 - i. **Mechanical holding**
 - ii. **Electro/mechanical**
 - iii. **Electronic**
 - b. **Motions**
 - i. **Raising**
 - ii. **Lowering**
4. **Speed control types**
 - a. **Hoist**
 - b. **Bridge**
 - c. **Trolley**
 - d. **Speed points**
 - e. **Pendant control**
 - f. **Radio**
 - g. **Cab control**
 - h. **Single speed control**
 - i. **One speed point**
 - ii. **Basic**
 - i. **Multiple speed control**
 - i. **Two speed points**
 1. **Slow**
 2. **High**
 - ii. **Repeatability of speed**
 - j. **Variable speed control**
 - i. **Electronically controlled**
 - ii. **From low to high speed and everything in between**
5. **Crane Movement under load**
 - a. **Pendulum effect**
 - i. **Load swing effect**
 - ii. **Delayed movement**
 - iii. **Dangers**

1. **Uncontrolled load**
 2. **Personnel and equipment damage**
- b. **Resolutions**
- i. **Training**
 - ii. **Equipment selection**
 - iii. **Reverse plug/counter movement**

Resources

• CMAA – Crane Manufacturers Association of America. "• Specification #79" • *Overhead Crane Operators* . current. CMAA – Crane Manufacturers Association of America •Charlotte, N.C., • 2012.

• CMAA – Crane Manufacturers Association of America. "• Specification #78" • *Standards and Guidelines for Professional Services on Overhead Cranes and Hoisting Equipment*. current. • CMAA – Crane Manufacturers Association of America•Charlotte, N.C., • 2002.

• OSHA. *OSHA Manual 1910.179*. current. OSHA • Washington, DC, 2000.

Resources Other

- [WWW.MHIA.org/CMAA \(http://WWW.MHIA.org/CMAA/\)](http://WWW.MHIA.org/CMAA/)
- [www.osha.gov/law-regs.html \(http://www.osha.gov/law-regs.html\)](http://www.osha.gov/law-regs.html)

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