

ATLT-2170: OVERHEAD CRANE INSPECTOR

Cuyahoga Community College

Viewing: ATLT-2170 : Overhead Crane Inspector

Board of Trustees:

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Academic Term:

Spring 2019

Subject Code

ATLT - AIT-Lifting Technologies

Course Number:

2170

Title:

Overhead Crane Inspector

Catalog Description:

Advanced course covering crane safety standards, as prescribed by the Occupational Health and Safety Administration, different crane types, and crane components. Included are procedures for crane inspections, configurations and reporting, and report delivery to the end user with critical findings.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: Admission to Lifting Technologies apprenticeship programs.

Outcomes

Course Outcome(s):

A. Discuss the safety standards as prescribed by the Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) that pertain to overhead cranes and hoists, work hazards and recordkeeping and required preventative maintenance.

Objective(s):

1. A. Identify the safety standards relative to overhead cranes and hoists.
2. B. Differentiate between OSHA and ANSI safety regulations.
3. C. List specific safety standards and instructions relative to site access to inspect and maintain of cranes and hoists.
4. D. List the general safety aspects required for crane inspections and maintenance including lock out/tag out, and fall protection.
5. E. List the different types of personal protective equipment PPE that is mandated for work on cranes and hoists.

Course Outcome(s):

B. Describe the different types of industrial cranes, pertinent components and applications of each.

Objective(s):

1. E. Identify the different types of festoon systems including cross conduction, track assembly and pendant station.
2. F. Describe the control system of overhead cranes and explain the different functions within the pendant station including various speed units with respect to direction and operation.
3. A. List and explain the different terms related to lifting technology.
4. B. List the different types of cranes and hoists.
5. C. Identify the different types of overhead crane structures and explain crane fabrication methods and components including beam type and connections.
6. D. Describe the hoist and trolley units of overhead cranes including respective functions, brake mechanisms, trolley structure and hoisting unit.

Course Outcome(s):

C. Demonstrate the ability to properly perform an overhead crane inspection including inspection configuration, recordkeeping and reporting and post inspection communication of critical findings.

Objective(s):

1. A. Select and don the proper safety personal protective equipment PPE and equipment for overhead crane inspections with respect to workplace environment.
 2. B. Conduct a pre-inspection conference to define the work scope, including equipment, job site safety analysis and communication procedure.
 3. C. Configure the inspection report to include structural, mechanical, electrical and safety aspects.
 4. E. Compile findings report from field and computer generated inspection.
 5. F. Discuss inspection findings with designated owner representatives.
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Methods of Evaluation:

1. Quizzes
2. Homework
3. Participation
4. Skills tests

Course Content Outline:

1. Crane and hoist standards
 - a. OSHA 1910.179
 - i. Definition
 - ii. General regulations
 - iii. Inspection classification
 - iv. Testing
 - v. Preventative maintenance
 - b. American National Standards Institute (ANSI)
 - i. Enclosed track
 1. Ceiling
 2. Free standing
 3. Wall mounted jib
 - ii. Underhung crane
 1. Single girder
 2. Double girder
 - iii. Monorail
 1. I-Beam
 2. Enclosed track
 - c. Owner specifications
 - i. Worker safety
 - ii. Site safety analysis
 - iii. Communication
 - iv. Product production
 - v. Special conditions
 1. Chemical
 2. Explosive
 3. Industry applications
 - d. General safety
 - i. Inspection and maintenance
 1. Lock out/tag out
 2. PPE
 3. Fall protection
 4. Aerial lift
 - ii. Work area evaluation
 1. Workplace entry
 2. Area isolation

3. Personnel duties
 4. Environmental
 - iii. PPE
 1. Respirator
 2. Footwear
 3. Fall protection
 4. Identification
 5. Inflammable clothing
 6. Hearing protection
 7. Extremities protection
 8. Hard hat
2. Cranes: components and applications
- a. Terminology
 - i. Festoon system
 - ii. Jib
 - iii. Hooks and blocks
 - iv. Trolley
 - v. Lever hoist
 - vi. Brakes
 - vii. Enclosed track
 - viii. Articulation jib
 - ix. Box girder crane
 - b. Crane types
 - i. Single girder top runner
 - ii. Double girder top runner
 - iii. Single girder under runner
 - iv. Dual girder under runner
 - v. Gantry
 - vi. Monorail and jib
 - c. Crane structure
 - i. Profile
 1. Standard
 2. Wide flange
 3. Patented track
 - ii. Box girder
 - iii. Standard
 1. American
 2. European
 - iv. Connections
 1. Welded
 2. Bolted
 3. Riveted
 - d. Hoist units
 - i. Function
 1. Lifting
 2. Lowering
 - ii. Brake mechanism
 1. Shoe
 2. Disc
 3. Mechanical
 4. Electronic
 - iii. Trolley structure
 1. Dual girder top runner
 2. Single girder under runner
 3. Dual girder under runner
 - iv. Hoisting unit
 1. Structure
 2. Drive train
 3. Braking system

- 4. Controls
- 5. Safety
- e. Festoon system
 - i. Structure
 - 1. Track assembly
 - 2. Trolley
 - ii. Cabling
 - 1. Wire sizing
 - 2. Ambient temperature
 - 3. Cross conductor
 - iii. Pendant control station
 - 1. Radio controlled
 - 2. Manual
 - 3. Operation
 - 4. Speed units
 - iv. Single
 - v. multiple
 - vi. variable
- f. Control types
 - i. Single speed
 - ii. Multiple speed
 - iii. Variable speed
- 3. Inspection
 - a. Safety
 - i. PPE
 - ii. Equipment
 - iii. Workplace environment
 - b. Pre-inspection conference
 - i. Work scope
 - 1. Equipment
 - 2. Environment
 - ii. Safety analysis
 - 1. Working environment
 - 2. High work
 - 3. Temperature
 - 4. Air quality
 - iii. Communication
 - 1. Evacuation procedure
 - 2. Emergency/medical
 - 3. Contact person
 - iv. Inspection configuration
 - 1. Software
 - 2. Crane profile
 - v. Inspection
 - 1. Structure
 - 2. Hoist trolley
 - 3. Festoon system
 - 4. Control
 - 5. Mechanical
 - a. Bridge drive system
 - b. Trolley drive system
 - c. Hoist drive system
 - vi. Post inspection conference
 - 1. Report
 - 2. Condition rating
 - 3. Critical findings
 - 4. Safety
 - 5. Production
 - 6. Maintenance

- a. Rust
 - b. Component wear
 - c. Lubrication
 - d. Bearings
7. Recordkeeping
- a. Hard copy
 - b. accessible

Resources

Morgan, Carl. *Crane Safety*. Lanham, MD: Government Institutes, 1999.

Crane Manufacturers Association of American, Inc. *Specifications for Top Running Bridge Gantry Type Multiple Girder Electric Overhead Traveling Cranes*. CMMA publishers, 2004.

Crain Training USA. *Technicians and Maintenance Inspection Personnel Training Manual*. Westchester, OH: Crane Training, 2013.

Resources Other

1. www.mhi.org/cmaa
2. <https://www.osha.com> (<https://www.mazzellacompanies.com>)
3. <https://www.mazzellacompanies.com>

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