

ATLT-2050: BLUE PRINT READING FOR RIGGING II

Cuyahoga Community College

Viewing: ATLT-2050 : Blue Print Reading for Rigging II

Board of Trustees:

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Academic Term:

Spring 2019

Subject Code

ATLT - AIT-Lifting Technologies

Course Number:

2050

Title:

Blue Print Reading for Rigging II

Catalog Description:

Advanced reading and interpreting of working drawings for fabrication processes of both weldments and fabricated slings including inspections. The course offers an advanced look into fabrication prints of various types of rigging gear in use. We will delve more deeply into real-world applications and involve more hands on activities. The course will explore the creation of as built noted drawings, inspection drawings, tolerance stacking, surface finishes specialty weld symbols, electrical schematics and material alternatives.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Lifting Technologies apprenticeship program.

Outcomes

Course Outcome(s):

Discuss the purpose of Inspection Drawings used in the fabrication of rigging and lifting components for the manufacturing industry.

Objective(s):

1. List and define the terms used in inspections for the lifting industry.
2. Explain the purpose of inspections for lifting devices and cranes.
3. Identify the various inspection methods used.
4. Reference the applicable standards for the lifting device to be inspected.

Course Outcome(s):

Interpret Tolerance stacking and surface finishes

Objective(s):

1. Recognize non-standard weld symbols.
2. Interpret tolerance stacking to determine final built tolerance.
3. Correlate a surface finish with the proper symbol.
4. Identify different types of surface finishes.
5. Identify and explain the importance of tolerance stacking and its impact on assembly.

Course Outcome(s):

Identify specialty weld symbols and material alternatives.

Objective(s):

1. List and define common material types used in fabrication of lifting devices and cranes.
 2. Interpret drawing to select appropriate material alternative.
 3. Identify different types of material families
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Course Outcome(s):

Demonstrate the ability to read and interpret electrical schematics.

Objective(s):

1. Identify Basic electrical schematic symbols.
 2. Relate electrical symbols to real world components.
 3. Interpret electrical drawings to effectively read electrical circuits.
 4. Reference electrical schematic to troubleshoot basic electrical control pane.
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Methods of Evaluation:

1. Participation
2. Assignments
3. Quizzes & Exams
4. Practical Application Project

Course Content Outline:

1. Inspection drawings
 - a. Terminology
 - i. Bill of Material
 - ii. Dimensions
 - iii. Centerlines
 - iv. Weld Symbol
 - v. Note
 - vi. Critical Measurement
 - vii. Revision
 - viii. Item Number
 - b. Purpose
 - i. Quality Control
 - ii. Dimensional accuracy
 - iii. Conformance
 - iv. Safety
 - c. Methods
 - i. Non-Destructive
 - a. Mag Particle
 - b. X-Ray
 - c. Ultra-Sonic
 - d. Liquid Penetrant
 - vi. Destructive
 - a. Failure Test
 - b. Cross-Section
 - c. Cycle Test
 - d. Standards
 - i. BTH-1-2014
 - ii. CMAA
 - iii. ASME B30.2
2. Tolerance Stacking and Surface Finishes
 - a. Final Built Tolerances
 - i. Definitions
 1. Basic Size
 2. Nominal Size
 3. Deviation
 4. Upper Deviation

- 5. Lower Deviation
- 6. Fundamental Deviation
- ii. Preferred Fit
 - 1. Clearance
 - 2. Transition
 - 3. Interference
- b. Surface Finishes
 - i. Definitions
 - 1. Grit
 - 2. Root Mean Squared (RMS)
 - 3. Ra
 - ii. Types of finishes
 - 1. Vertical
 - 2. Horizontal
 - 3. Radial
 - 4. Cross-Hatched
 - 5. Circular
 - 6. Isotropic
- c. Finishing Processes
 - i. Abrasive Blasting
 - ii. Burnishing
 - iii. Grinding
 - iv. Mass finishing processes
 - v. Polishing
- d. Importance of tolerance stacking
 - i. Definition
 - 1. Free running fit
 - 2. Sliding fit
 - 3. Locational clearance fit
 - 4. Locational transition fit
 - 5. Medium drive fit
 - 6. Force fit
 - ii. Consequences
 - 1. Oversized
 - 2. Loose fit
 - 3. Deviation
- 3. Weld Symbols and Materials
 - a. Material Families
 - i. Alloy Steel
 - ii. Carbon Steel
 - iii. Stainless Steel
 - iv. Aluminum
 - b. Weld symbols
 - i. Types of welds
 - 1. Chain-Intermittent-Fillet
 - 2. Staggered Intermittent-Fillet
 - 3. Combined Welds
 - 4. Single V groove with root Penetration
 - 5. Backing weld symbol
 - ii. Terminology
 - 1. Length of Increment
 - 2. Pitch of Increment
 - 3. Root Opening
 - 4. Groove Angle
 - 5. Depth of Root Penetration
 - c. Common Material Types
 - i. A36
 - ii. A572 GR50
 - iii. A514

- iv. 304
 - v. 6061
 - vi. 306
 - d. Material Alternative
 - i. Material Characteristics
 - 1. Yield Strength
 - 2. Weldability
 - 3. Material Family
 - ii. Material Availability
4. Electrical Schematics
- a. Basic Electrical schematic symbols
 - i. Wire nomenclature
 - ii. Limit Switches
 - iii. Relays and contacts
 - iv. Pushbuttons
 - v. Motors
 - vi. Lights
 - vii. Variable Frequency Drives
 - viii. Programmable Logic Controller
 - ix. Terminal Strip
 - x. 3 Phase power
 - xi. Control power
 - xii. Transformers
 - xiii. Circuit Breakers
 - xiv. Fuses
 - b. Electrical Symbols Components
 - i. Wire Types
 - ii. Mechanical Limit Switch
 - iii. Non-Contact Limit Switches
 - iv. Mechanical relays
 - v. Solid state relays
 - vi. Variable Frequency Drives
 - vii. Braking Resistors
 - viii. Pushbutton Pendants
 - ix. Radio controls
 - x. Motors
 - xi. Transformers
 - xii. Circuit Breakers
 - xiii. Fuses
 - c. Interpret Circuit Layout
 - i. Three phase power
 - ii. Breakers
 - iii. Fuses
 - iv. Motors
 - v. Transformers
 - vi. Single Phase Control Power
 - vii. Relays
 - viii. Contacts
 - ix. Limits
 - x. Pushbuttons
 - xi. Inputs
 - xii. Outputs
 - xiii. Variable Frequency Drives
 - xiv. Braking Resistors
 - xv. Pushbutton Pendants
 - xvi. Radio controls
 - d. Troubleshoot Electrical circuits

- i. Electrical Multi-Meter
- ii. Three phase power
- iii. Breakers
- iv. Fuses
- v. Motors
- vi. Transformers
- vii. Single Phase Control Power
- viii. Relays
- ix. Contacts
- x. Limits
- xi. Pushbuttons
- xii. Inputs
- xiii. Outputs
- xiv. Variable Frequency Drives
- xv. Braking Resistors

Resources

Walker/Polanin. *Welding Print Reading*. 6th ed. G-W Publisher, 2013.

Hobart Institute of Welding Technology. *Symbols For Welding*. 1st ed. Troy, OH: Hobart Institute of Welding Technology, 2008.

Resources Other

1. <http://www.mazzellalifting.com/>

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