

ATCT-1360: SCAFFOLDING

Cuyahoga Community College

Viewing: ATCT-1360 : Scaffolding

Board of Trustees:

May 2024

Academic Term:

Fall 2024

Subject Code

ATCT - Appld Indus Tech - Carpentry

Course Number:

1360

Title:

Scaffolding

Catalog Description:

Course covers the various types of scaffolding used in the construction industry including specific applications, assembly and dismantling procedures and identifies and explains the safety rules and regulations for safe assembly and use as prescribed by the Occupational Safety and Health Administration (OSHA).

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: admission to the Carpenter's apprenticeship program.

Outcomes

Course Outcome(s):

Discuss the scaffold regulations as prescribed by OSHA including scaffold types and hazard regulations.

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.

Objective(s):

1. List and define the terms related to scaffolding and scaffold safety.
2. Identify the different types of scaffolds used in the construction industry and explain the respective use for each.
3. Review the OSHA regulations for supported scaffolding.
4. Identify the safe working requirements for supported scaffolding.
5. Differentiate between live load and dead load.
6. Identify the hazards of working on scaffolds and discuss precautions needed.

Course Outcome(s):

Demonstrate the ability to safely erect a welded frame scaffold including fall protection systems with access requirements.

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.

Objective(s):

1. List the procedural steps that are followed for safe welded frame scaffold erection.
2. Conduct site inspection to determine need for screw jacks and/or base plate and mudsill.
3. Layout scaffold components for erection.
4. Maintain plumb level and square with respect to all scaffold components throughout assembly.
5. Ensure proper bracing throughout erection.
6. Provide personal fall arrest protection system or guardrail protection.
7. Describe fall protection systems including type and requirements.
8. Discuss access types required for ascending and use of scaffolds.
9. List the components of a welded frame scaffold and explain the function of each.

Course Outcome(s):

Discuss the function and use of tube and clamp scaffold used in the construction industry including components and assembly procedures and interpret drawings required for safety in the workplace.

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.

Objective(s):

1. Provide personal fall arrest protection system or guardrail protection.
2. Discuss the purpose and function of tube and clamp scaffolds used in difficult workplace settings.
3. List the different components and explain the use of each.
4. Differentiate between compression and tension bracing.
5. Explain the use of putlog and scaffold trusses.
6. Interpret shop drawings to establish a component list, scaffold size and shape with respect to work area, and to provide a visual interpretation of tube and clamp scaffold.
7. Demonstrate the ability to properly build a tube and clamp scaffold.

Course Outcome(s):

Discuss the “systems” scaffold application to the construction industry including specific components and function, explain and calculate loads on all scaffold systems and discuss general procedures for all scaffold disassembly.

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.

Objective(s):

1. Discuss the application and function of systems scaffolding.
2. Identify loads on scaffolding, live and dead, and perform load calculations to establish load limits during design and use phases.
3. Identify various hazards related to scaffolding and describe respective remediation.
4. List the procedures followed for of all scaffolding including general sequence, effective communication and falling object awareness and disassembly.

Methods of Evaluation:

1. Quizzes
2. Test
3. Class participation
4. Hands-on skill-based demonstration projects

Course Content Outline:

- I. Scaffolds: types and regulations
 - A. Terminology
 1. Scaffold
 2. Mudsill
 3. Base plate
 4. Screw jack

5. Fall protection
 6. Falling object
 7. Competent person
 8. Qualified person
 9. Platform
 10. Hand rail
 11. Capacity
 12. Bracing
 13. Guying, tying, and bracing
 14. Load calculations
 15. Outrigger
 16. Cantilever
 17. Cantilever bracket
 18. Personal fall arrest system
 19. Node point
 20. Anchor point
 21. Height to base ratio
 22. Load path
 23. Load amplification
 24. Supported scaffold
 25. Suspended scaffold
- Putlog/scaffold truss
- B. Scaffold types
 1. Supported.
 2. Welded frame
 3. Mobile
 4. Tube and clamp
 5. Systems
 - a. Suspended
 - b. Tube and couple
 - c. Swing stage
 - C. OSHA regulations and Subpart L
 1. Introduction
 - a. Height to bas
 - b. Plumb, level, and square
 2. Personnel
 - a. Competent person
 - i. Scaffold construction: alteration and use
 - ii. General oversight
 - iii. Authority
 - iv. Employer appointed
 - v. Training, experience, and knowledge
 - vi. Hazard recognition
 - b. Qualified person
 - i. Trained workers
 - ii. Works under competent person
 - c. Scaffold user
 3. Supported scaffold capacity
 - a. Working load limit
 - b. Workers
 - c. Live load/dead load
 - d. Load path
 - e. Load amplification
 - D. Safe working requirements

1. Load capacity
2. Jobsite inspection
3. PPE
4. Competent person

E. Live load versus dead load

1. Live load
 - a. Moving weight
 - i. Workers
 - ii. Tools
 - b. Variable
 2. Dead load
- a. Scaffold components/structure

b. Fixed

F. Scaffold use hazards

1. Surfaces
 - a. Interior
 - b. Exterior
 2. Overhead obstructions
 - a. Structural components
 - b. Pipes, ductwork, electrical
 3. Falling objects

I. Environmental

1. Wind
2. Snow
3. Ice
4. Terrain

a. Frozen

b. Thawed

5. Vehicular

6. Pedestrian

II. Tube and clamp scaffold

A. Terminology

1. Bearer
2. Transform
3. Coupler
4. Plan bracing
5. Ledger bracing
6. Pre-fabricated rack
7. Right angle clamp
9. Runner
10. Tie-in
11. Tube
12. Put-log
13. Scaffold spaces

B. Purpose and function

1. Purpose/use
 - a. Confine spaces
 - b. Limited access
 - c. Industrial
 - i. Coal bins
 - ii. Boilers
 - iii. Power Plants

2. Function

- a. Adaptability
- b. Customized height, width, length
- C. Components
 - 1. Base plate—load distribution
 - 2. Tube—horizontal and vertical frame member
 - 3. Clamp—structure fastener
 - 4. Brace—support
 - 5. Put log—mid span support/connector
 - 6. Guard rail
 - 7. Toe kick
- D. Compression versus tension
 - 1. Compression
 - a. Work surface support
 - b. Cantilever support
 - c. Internal force
 - 2. Tension
 - a. Pulling forces
 - b. Bridging obstacles
 - c. Load reversal
- E. Shop drawing
 - 1. Component list
 - 2. Task assignment
 - 3. Work area
 - a. Size
 - b. Configuration
 - 4. Visual interpretation
 - a. Pre-planning
 - b. Personnel requirements
- F. Put logs and scaffold truss
 - 1. Function
 - a. Bridging obstacles
 - b. Scaffold tower connector
 - c. Stabilization
 - 2. Application
 - a. Bridging
 - i. Pedestrian walkway
 - ii. Vehicular Traffic
 - b. Mid-span access
 - G. Assembly
 - 1. Shop drawings
 - a. Materials, components, and site inspection
 - b. Work force
 - 2. Footprint layout
 - a. On center spacing
 - b. Location
 - c. Accessibility
 - 3. Tools and equipment
 - 4. Erection practices
 - a. Plumb
 - b. Level
 - c. Square
 - 5. Base layer

- 6. Bracing
 - a. Planned
 - b. Horizontal
 - c. Diagonal
 - d. Ledger

III. Systems, scaffolds, loads and disassembly

A. Systems scaffolds

- 1. Function
 - a. Hybrid
 - b. Proprietary connections
 - c. Assembly efficiency
- 2. Application
 - a. Confined space
 - b. Industrial
 - c. Greater load capacity

B. Loads

- 1. Calculations
 - a. Leg load
 - b. Duty rating
 - c. Contributing area
- 2. Computation
 - a. Leg load
 - i. Contributing area
 - ii. Duty rating
 - b. Duty rating
 - i. Industry-standard
 - ii. Universal
 - c. Contributing area
 - i. Length
 - ii. Width

Resources

Carpenters International Training Fund. *Scaffold Erector: Qualification*. Las Vegas, NV: Carpenters International Training Fund, 2023.

Carpenters International Training Fund. *Scaffolding 1, Revision 1*. Las Vegas, NV: Carpenters International Training Fund, 2019.

Carpenters International Training Fund. *Scaffolding 2*. Las Vegas, NV: Carpenters International Training Fund, 2019.

Occupational Safety and Health Administration, United States Department of Labor. "Code of Federal Regulations 1926" National Safety Compliance, 2022.

Resources Other

- 1. www.waco.com
- 2. www.brandsscaffold.com
- 3. www.safway.com
- 4. [Carpenter's International Training Fund. https://www.carpenters.org/citf-training/](https://www.carpenters.org/citf-training/) . 2024.

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