

ATPD-2020: PILE DRIVING TECHNOLOGIES

Cuyahoga Community College

Viewing: ATPD-2020 : Pile Driving Technologies

Board of Trustees:

September 2025

Academic Term:

Fall 2025

Subject Code

ATPD - Applied Ind Tech-Pile Driving

Course Number:

2020

Title:

Pile Driving Technologies

Catalog Description:

Advanced study of set up and breakdown of various cranes and equipment types. Includes identification of crane types, hardware & hitch usage, signals, and equipment capacities.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

ATCT-1301 Introduction to Carpentry, and departmental approval: admission to Pile Driving Technology apprenticeship program.

Outcomes

Course Outcome(s):

Identify types of cranes, determine crane capacities, and direct movement of crane using proper signals after selecting, assembling, and attaching necessary pieces, and computing necessary mathematical information.

Objective(s):

1. Select slings and rigging hardware.
2. Attach slings and hardware to hoist loads safely.
3. Compute effective loads.
4. Determine center of gravity loads.
5. Assemble wedge sockets and use softeners.
6. Determine friction loss when using sheaves.
7. Spool wire rope on a drum.
8. Identify standard types of cranes and assist in safe set up.
9. Use crane chart to determine lifting capacity of a crane.
10. Direct crane movement of rigging operations with hand and voice signals.

Methods of Evaluation:

1. Quizzes
2. Exams

3. Classroom participation
4. Completion of assigned projects.

Course Content Outline:

1. Concepts
 - a. Types of hardware attachments
 - i. Shackle pin placement
 - ii. Shackle on a hook
 - iii. Eyebolt working load limits (WLL"s)
 - iv. Turnbuckle WLL"s
 - b. Types of sling attachments
 - i. softeners
 - ii. one sling on hook
 - iii. two slings on hook
 - iv. three slings on hook
 - v. four slings on hook
 - vi. lifting beam
 - vii. spreader beam
 - c. Types of cranes
 - i. boom truck
 - ii. mobile hydraulic boom
 - iii. load bearing capacity of soil
 - iv. load bearing capacity of wood
 - v. lattice boom cranes
 - vi. fixed and slewing tower
 - vii. saddle jib
 - viii. front and rear pivot luffing
 - ix. fixed luff
 - d. Load computation.
 - e. Proper hand and voice signals for directing rigging operations.
 - f. Determining center of gravity.
 - g. Determining friction loss.
 - h. Safe crane set up.
 - i. Crane chart usage.
 - j. Geometric configuration calculations.
 - k. Critical lift calculation.
 - l. Sling angle calculations.
 - m. Center of gravity calculations.
 - n. Safety procedures for wiring hardware and sling attachments.
 - o. Hitch configuration.
2. Skills
 - a. Configuring hitches using single vertical, symmetrical and asymmetrical two-leg bridle, three-leg bridle, four-leg bridle, vertical legs and inclined legs single basket, double wrap basket, single choker, double choker, and double wrap choker.
 - b. Calculating sling angle to degrees to horizontal.
 - c. Calculating center of gravity including shape and weight.
 - d. Using safety procedures when wiring hardware and sling attachments.
 - e. Spooling and reeving wire rope on drum, transferring storage reel to drum, and fleet angle.
 - f. Calculating geometric configuration of crane base including quadrant of operation, boom length, boom angle, and load radius.
 - g. Demonstrating critical lift.
 - h. Demonstrating hand signals for raise the load, lower the load, raise the load slowly, lower the load slowly, everything slow, stop, emergency stop, dog everything, use main hook, use auxiliary hook, move trolley, move bridge, raise the boom, lower the boom, raise the boom and hold the load.
 - i. Demonstrating lattice boom signals including travel, turn, move trolley, swing.
 - j. Demonstrating voice signals including general signals, overhead bridge crane, mobile hydraulic telescoping boom crane and lattice crane, and tower crane.
3. Issues
 - a. Safety.
 - b. Maintenance of equipment.

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Resources for the Instructor

United Brotherhood of Carpenters. *Rigging Procedures*. First ed. Northern CA: United Brotherhood of Carpenters, 2000.

Garby, R. *IPT's Crane and Rigging Training Manual*. Alberta, Canada: IPT Publishing and Training LTD, 1999.

Dickie, D. *Mobile Crane Manual*. First ed. Ontario, Canada: Construction Safety Association of Ontario, 1985.

Inc Total Equipment Training. *Mobile Crane Certification Training Manual*. Total Equipment Training, 2023.

Duerr, David. *Mobile Crane Support Handbook*. 2nd ed. LeVare Press, Inc., 2019.

Reynolds, Andrew. *Mobile Crane Certification Training Manual 2024-2025 All-in-One Crane Operator Study Guide*. BookVault Publishing, 2024.

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