

# ATPD-1370: PILE DRIVING ON LAND AND WATER

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## Cuyahoga Community College

**Viewing: ATPD-1370 : Pile Driving on Land and Water**

**Board of Trustees:**

2006-05-25

**Academic Term:**

Spring 2019

**Subject Code**

ATPD - Applied Ind Tech-Pile Driving

**Course Number:**

1370

**Title:**

Pile Driving on Land and Water

**Catalog Description:**

Introduction to basic pile types and applications. Topics include recognition and use of different types of hammers, pile families designs, structural characteristics, pile driving leads, required equipment and accessories, and pile driving on land and water.

**Credit Hour(s):**

2

**Lecture Hour(s):**

2

## Requisites

**Prerequisite and Corequisite**

ATCT-1301 Introduction to Carpentry, and departmental approval: admission to Carpenter's apprentice program.

## Outcomes

**Course Outcome(s):**

Identify four basic families of pile, pile driving hammers, types of cranes, structural components of cranes and their functions.

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**Course Outcome(s):**

Set up and drive a small rectangle cell, a pile extraction, pick and loft with a water rig, predict reactions, and work safely while performing operations.

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**Methods of Evaluation:**

1. Quizzes
2. Exams
3. Classroom participation
4. Completion of assigned projects.

**Course Content Outline:**

1. Concepts
  - a. Structural components and functions of crane booms
    - i. hydraulic and lattice.
  - b. Types of mutation styles
    - i. truck and crawler.
  - c. Families of pile
    - i. wood
    - ii. concrete

- iii. steel
  - iv. composite
  - d. Structural characteristics of piles
    - i. bearing
    - ii. friction
    - iii. friction/bearing
  - e. History, types and appropriate uses of hammers
    - i. gravity
    - ii. impact
    - iii. low
    - iv. high frequency vibratory/extractors
  - f. Accessories of piledriving leads
    - i. spotters
    - ii. pile gates
    - iii. lofters
    - iv. telescopes
    - v. auger attachment assembly
  - g. Crane equipment and accessories
    - i. headache balls
    - ii. swivels
    - iii. load blocks
    - iv. tagline reels
    - v. timber mats
  - h. Pile equipment and accessories
    - i. cushion blocks
    - ii. splice systems
    - iii. driving points
    - iv. spray paint
    - v. spreader beams
    - vi. driving shoes
    - vii. pile rings
  - i. Hammer accessories
    - i. driving caps/heads
    - ii. exhaust port plugs
    - iii. transport plugs
    - iv. barrel lids
    - v. oil/lubricants
    - vi. starting fluid
  - j. Work roles included in piledriving on land
    - i. foreman
    - ii. operator
    - iii. oiler
    - iv. pilebutts
    - v. front end man
    - vi. back end man
    - vii. rigger
    - viii. loftsmen
    - ix. ropeman
    - x. inspector
    - xi. superintendent
    - xii. apprentice
2. Skills
- a. Crane boom assembly, rigging, handling, hoisting and rope reeving, and use of equalizers and pendants.
  - b. Reading and using capacity charts to determine selection, nomenclature, chart notes, jib capacities, and liftcrane capacities.
  - c. Designing retaining and column or bearing piles using sheets, lagging walls, anchors, wood, pre-cast or prestressed concrete, steel H-piles, steel pipe, and steel caisson.
  - d. Creating miscellaneous pile types using concrete caisson, composite, shell, cast-in-place, or pressure injected footing and franki.

- e. Configurations and characteristics of piledriving leads including swinging, fixed, semi-fixed/sliding extended, cross sectional, box, pipe, truss, H-beam, and triangular.
  - f. Creating piledriving scene including job site description, access, scope of work, foundation design, pile schedule, and equipment schedule.
  - g. Mobilizing job including crane and lead assembly.
  - h. Sequencing piledriving for pile unloading, rigging and lofting, and driving the pile.
  - i. Creating piledriving scene on water with stiffleg and barge mounted water rigs, and cranes, turntable/pedestal mounted, and barge.
3. Issues
- a. Advantages and disadvantages of fixed, extended, semi-fixed/sliding extended, box, pipe, truss, H-beam, and triangular piledriving leads.
  - b. Safety.
  - c. Predit reactions of barges and floating rigs.
  - d. Dealing professionally with people operating barges and floating rigs.

## Resources

United Brotherhood of Carpenters. *Piledriving*. Washington D.C.: United Brotherhood of Carpenters, 2001.

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Northern California Pile Drivers. *Pile Driving Technologies*. 2nd ed. Northern CA: Northern California Pile Drivers, 1990.

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Munoz, Michael. *Pilebutt, Stories and Photographs about Pile Driving*. California: Munoz, Michael, 2000.

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Deep Foundation Institute. *A Pile Inspector's Guide to Hammers*. 2nd ed. Hawthorne, NJ: Deep Foundation Institute, 1995.

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