

MODULE OVERVIEW

This module describes the use and inspection of the basic equipment and hardware used in rigging, including slings, wire ropes, chains, and attaching hardware. It also explains sling angles and describes the use of tuggers, jacks, hoists, and come-alongs.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; and Carpentry Level Two.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Perform a safety inspection on hooks, slings, and other rigging equipment.
2. Select, inspect, use, and maintain special rigging equipment, including:
 - Block and tackle
 - Chain hoists
 - Come-alongs
 - Jacks
 - Tuggers
3. Tie knots used in rigging.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Perform a safety inspection on hooks, slings, and other rigging equipment.
2. Select, inspect, use, and maintain special rigging equipment, including:
 - Block and tackle
 - Chain hoists
 - Come-alongs
 - Jacks
 - Tuggers
3. Tie knots used in rigging.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Various lifting lugs
Transparencies	Turnbuckles
Blank acetate sheets	Manufacturer's literature on plate clamps
Transparency pens	Various rigging plates and links
Whiteboard/chalkboard	Various types of slings
Markers/chalk	Rigging pocket guide
Pencils and scratch paper	<i>29 CFR Section 1926.251, Rigging Equipment for Material Handling</i>
Appropriate personal protective equipment	Samples of wire rope that have failed inspection
Manufacturer's literature on different rigging hooks	Rope for tying knots
Various rigging hooks with wear, cracks, and corrosion	Block and tackle lifting system
Manufacturer's literature on shackles	Sample loads for lifting
Various types of shackles	Spur-gear chain hoist
Various eyebolts	Electric chain hoist
	Ratchet-lever hoist or come-along

Ratchet jack
Screw jack
Hydraulic jack
Tugger

Quick Quiz*
Module Examinations**
Performance Profile Sheets**

*Located in the back of this module

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module requires trainees to use various types of hoists, jacks, and tuggers. Ensure that all trainees are briefed on lifting safely and any other shop safety procedures. This module may require that trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. This is optional material for continued education rather than for task training.

Machinery's Handbook, Latest Edition. Erik Oberg, Franklin D. Jones, Holbrook L. Horton, and Henry H. Ryffel. New York, NY: Industrial Press.

Occupational Safety and Health Standards for the Construction Industry, 29 CFR Part 1926. Washington, DC: OSHA Department of Labor, U.S. Government Printing Office.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Rigging Equipment*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction and Rigging Hardware	
A. Introduction	_____
B. Rigging Hardware	_____
Session II. Slings and Tag Lines	
A. Slings	_____
B. Laboratory Trainees practice performing a safety inspection on hooks, slings, and other rigging equipment. This laboratory corresponds to Performance Task 1.	_____
C. Tag Lines	_____
D. Laboratory Trainees practice tying knots used in rigging. This laboratory corresponds to Performance Task 3.	_____

Session III. Block and Tackle and Hoists

- A. Block and Tackle
- B. Chain Hoists
- C. Ratchet-Lever Hoists and Come-Alongs
- D. Jacks
- E. Tuggers
- F. Laboratory

Trainees practice selecting, inspecting, and using special rigging equipment. This laboratory corresponds to Performance Task 2.

Session IV. Review and Testing

- A. Module Review
- B. Module Examination
 1. Trainees must score 70% or higher to receive recognition from NCCER.
 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.
- C. Performance Testing
 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module describes basic rigging and crane hazards and related safety procedures, provides an overview of personnel lift lifting and lift planning, and introduces load charts and load balancing. It includes instructions for rigging and lifting pipe.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; Carpentry Level Two; and Carpentry Level Three, Module 27301-07.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Determine the weight of the load.
2. Interpret a load chart.
3. Determine the center of gravity of a load.
4. Properly attach rigging hardware for routine lifts.
5. Use and interpret hand signals.
6. Perform sling tension calculations.
7. Identify requirements for an engineered lift.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Determine the center of gravity of a load.
2. Properly attach rigging hardware for routine lifts.
3. Use and interpret hand signals.
4. Perform sling tension calculations.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	<i>ASME B30.5 Consensus Standard</i>
Transparencies	<i>29 CFR 1926.550</i>
Blank acetate sheets	Completed lift plan
Transparency pens	Crane manufacturer's literature
Whiteboard/chalkboard	Typical teeter-totter and weights
Markers/chalk	Various lifting eyebolts
Pencils and scratch paper	Rigging hardware
Appropriate personal protective equipment	Quick Quiz*
Walkie-talkies	Module Examinations**
Throat microphone	Performance Profile Sheets**
Hardwired communication system	

*Located in the back of this module

*Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require that trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Crane Safety on Construction Sites, 1998. Task Committee on Crane Safety on Construction Sites. Reston, VA: ASCE.

Rigging Handbook, 2003. Jerry A. Klinke. Stevensville, MI: ACRA Enterprises, Inc.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Rigging Practices*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction, Communication, and Safety	
A. Introduction	_____
B. Methods of Communication	_____
C. Laboratory Trainees practice using and interpreting hand signals. This laboratory corresponds to Performance Task 3.	_____
D. General Rigging Safety	_____
E. Working Around Power Lines	_____
F. Site Safety	_____
G. Emergency Response	_____
Sessions II and III. Lifting Loads	
A. Using Cranes to Lift Personnel	_____
B. Lift Planning	_____
C. Crane Load Charts	_____
D. Center of Gravity	_____
E. Laboratory Trainees practice determining the center of gravity of a load. This laboratory corresponds to Performance Task 1.	_____
F. Sling Tension	_____
G. Laboratory Trainees practice performing sling tension calculations. This laboratory corresponds to Performance Task 4.	_____
Sessions IV and V. Rigging and Unloading	
A. Rigging Pipe	_____
B. Rigging Valves	_____
C. Guidelines for Unloading and Yarding Materials	_____
D. Laboratory Trainees practice properly attaching rigging hardware for routine lifts. This laboratory corresponds to Performance Task 2.	_____

Session VI. Review and Testing

A. Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module describes the properties, characteristics, and uses of cement, aggregates, and other materials that, when mixed together, form different types of concrete. It covers procedures for estimating concrete volume and testing freshly mixed concrete, as well as methods and materials for curing concrete.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; Carpentry Level Two; and Carpentry Level Three, Modules 27301-07 and 27302-07.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify various types of cement and describe their uses.
2. Identify types and sizes of concrete aggregates.
3. Identify types of concrete admixtures and describe their uses.
4. Identify special types of concrete and describe their uses.
5. Calculate concrete volume requirements for rectangular, cylindrical, or other geometric structures using formulas, concrete tables, and/or concrete calculators, as applicable.
6. Identify concrete curing methods and materials.
7. Identify concrete testing methods.
8. Mix concrete using different aggregates and admixtures.
9. Sample concrete using a test cylinder.
10. Perform slump testing of concrete.
11. Demonstrate how to properly set up a curing box.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Calculate concrete volume requirements for rectangular, cylindrical, or other geometric structures using formulas, concrete tables, and/or concrete calculators, as applicable.
2. Perform a specimen casting for concrete strength testing using proper procedures.
3. Extract concrete samples using approved sampling method(s).
4. Perform a concrete slump test using proper procedures.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Water
Transparencies	Containers for mixing concrete
Blank acetate sheets	Samples of different types of concrete
Transparency pens	ASTM C173
Whiteboard/chalkboard	Hoe or other tools to mix concrete
Markers/chalk	Various containers for collecting concrete samples
Pencils and scratch paper	Source of freshly mixed concrete
Appropriate personal protective equipment	Shovels
Copies of a concrete table	Hand scoops
Concrete calculator	ASTM standardized cone mold and steel tamping rod
Samples of various aggregates	ASTM standardized cylindrical mold and steel tamping rod
Concrete admixtures	
Portland cement	

Steel tape or rules
Wood for building a curing box
Basic carpenter's tools

Quick Quiz*
Module Examinations**
Performance Profile Sheets**

*Located in the back of this module

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. Concrete dust and its components are caustic; brief trainees on the hazards posed by dry and wet concrete and respiratory and skin protection needed. This module may require that trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

American Concrete Institute, www.concrete.org

Cement Association of Canada, www.cement.ca

Effect of Cement Characteristics on Concrete Properties, 2005. Johansen, Taylor, and Tennis. Skokie, IL: Portland Cement Association.

Portland Cement Association, www.cement.org

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Properties of Concrete*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Concrete Materials and Mixing	
A. Introduction	_____
B. Concrete and Concrete Materials	_____
C. Normal Concrete Mix Proportions and Measurements	_____
D. Special Types of Concrete	_____
Session II. Curing and Testing Concrete	
A. Curing Concrete	_____
B. Sampling Concrete	_____
C. Laboratory Trainees practice taking a concrete sample. This laboratory corresponds to Performance Task 3.	_____
D. Slump Testing	_____
E. Laboratory Trainees practice performing a slump test. This laboratory corresponds to Performance Task 4.	_____
F. Strength Testing	_____
G. Laboratory Trainees practice performing a specimen casting for concrete strength testing using proper procedures. This laboratory corresponds to Performance Task 2.	_____

Session III. Estimating Concrete

A. Rectangular Volume Calculations

B. Circular Volume Calculations

C. Laboratory

Trainees practice calculating concrete volume requirements. This laboratory corresponds to Performance Task 1.

Session IV. Review and Testing

A. Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module describes and defines reinforcement materials used in concrete, such as reinforcement bars, bar supports, and welded-wire fabric. It explains the selection and uses of different types of reinforcing materials. It also describes general requirements for cutting, bending, splicing, and tying reinforcing steel, as well as placement of the steel in various types of footings, columns, walls, and slabs.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum*; *Carpentry Level One*; *Carpentry Level Two*; and *Carpentry Level Three*, Modules 27301-07 through 27303-07.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the applications of reinforcing bars, the uses of reinforced structural concrete, and the basic processes involved in placing reinforcing bars.
2. Recognize and identify the bar bends standardized by the American Concrete Institute (ACI).
3. Read and interpret bar lists and describe the information found on a bar list.
4. List the types of ties used in securing reinforcing bars.
5. State the tolerances allowed in the fabrication of reinforcing bars.
6. Demonstrate the proper use of common ties for reinforcing bars.
7. Describe methods by which reinforcing bars may be cut and bent in the field.
8. Use the tools and equipment needed for installing reinforcing bars.
9. Safely use selected tools and equipment to cut, bend, and install reinforcing materials.
10. Explain the necessity of concrete cover in placing reinforcing bars.
11. Explain and demonstrate how to place bars in walls, columns, beams, girders, joists, and slabs.
12. Identify lapped splices.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Use appropriate tools to cut and bend reinforcing bars.
2. Demonstrate five types of ties for reinforcing bars.
3. Demonstrate proper lap splicing of reinforcing bars using wire ties.
4. Demonstrate the proper placement, spacing, tying, and support for reinforcing bars.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Bar lists
Transparencies	Hooks and spirals
Blank acetate sheets	Steel wire bar supports
Transparency pens	Precast concrete bar supports
Whiteboard/chalkboard	Plastic bar supports
Markers/chalk	Standees
Pencils and scratch paper	Welded-wire fabric
Appropriate personal protective equipment	Deformed welded-wire fabric
Pieces of marked rebar	ACI standards for concrete coverage
Copies of ASTM standards	Bolt cutters
Bent bars	Electric shears

Hickey bar and jigs
Tie wire
Pliers
Spliced rebar

Mechanically spliced rebar
Copies of Quick Quiz*
Module Examinations**
Performance Profile Sheet**

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code..

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees cut and work with rebar. Ensure that all trainees are properly briefed before working with rebar.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Placing Reinforcing Bars, 2005. Concrete Reinforcing Steel Institute (CRI).

Manual of Standard Practice, Latest Edition. Concrete Reinforcing Steel Institute (CRI).

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Reinforcing Concrete*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Overview and Identification of Reinforcing Bars	
A. Introduction	_____
B. Overview of Reinforced Concrete	_____
C. Identification of Reinforcing Bars	_____
D. Fabrication	_____
E. Bar Supports	_____
F. Welded-Wire Fabric	_____
Session II. Safety and Cutting and Bending Reinforcing Bar	
A. General Safety Precautions	_____
B. Cutting	_____
C. Bending	_____
D. Laboratory	_____
Trainees practice cutting and bending reinforcing bar. This laboratory corresponds to Performance Task 1.	

Sessions III and IV. Tying and Splicing Reinforcing Bar

A. Tying and Splicing Reinforcing Bar

B. Tying Tips

C. Laboratory

Trainees practice various types of ties. This laboratory corresponds to Performance Task 2.

D. Splicing Reinforcing Bar

E. Laboratory

Trainees practice proper lap splicing of reinforcing bars. This laboratory corresponds to Performance Task 3.

Session V. Placing Reinforcing Steel and Post-Tensioned Concrete

A. Placing Bars in Footings

B. Column Dowels

C. Placing Bars in Walls

D. Wall Mat Supports

E. Placing Bars in Columns

F. Placing Bars in Beams and Girders

G. Laboratory

Trainees practice placing, spacing, tying, and supporting reinforcing bar. This laboratory corresponds to Performance Task 4.

H. Post-Tensioned Concrete

Session VI. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module covers the tools, equipment, and procedures for handling, placing, and finishing concrete. It also covers the joints made in concrete structures, the use of joint sealants, and form removal procedures. It emphasizes safety procedures for handling, placing, and finishing concrete.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum*; *Carpentry Level One*; *Carpentry Level Two*; and *Carpentry Level Three*, Modules 27301-07 through 27304-07.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Recognize the various equipment used to transport and place concrete.
2. Describe the factors that contribute to the quality of concrete placement.
3. Demonstrate the correct methods for placing and consolidating concrete into forms.
4. Demonstrate how to use a screed to strike off and level concrete to the proper grade in a form.
5. Demonstrate how to use tools for placing, floating, and finishing concrete.
6. Determine when conditions permit the concrete finishing operation to start.
7. Name the factors that affect the curing of concrete and describe the methods used to achieve proper curing.
8. Properly care for and safely use hand and power tools used when working with concrete.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Properly handle, place, and consolidate concrete in selected concrete forms.
2. Use a screed to strike off and level a concrete surface.
3. Use a bullfloat and/or darby to level and smooth a concrete surface.
4. Use an edger to form a radius at the edges of a concrete pad, slab, etc.
5. Use a jointer to make control joints in a concrete surface.
6. Use a hand float and finishing trowel to level high spots, remove imperfections, and smooth a concrete surface.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen
Transparencies
Blank acetate sheets
Transparency pens
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Equipment for moving, placing, and consolidating concrete, including:
Moveable chutes (such as used with mixer trucks)
Drop chutes
Elephant trunk
Wheelbarrow
Power buggy and/or carts
Crane and bucket

Belt conveyor
Concrete pump
Pneumatic gun
Internal vibrator
Rollerbug tamper
Equipment for screeding, leveling, and finishing concrete, including:
Manual/power screeds
Knee boards
Darby floats/bullfloats
Pointed trowels
Edgers
Jointers (groovers)
Power saws
Hand floats
Hand trowels
Finishing machines

Brooms
 Assortment of combination tools
 Pointing and margin trowels
 Cement hammers
 Carborundum rubbing stones
 Sprayers
 Power grinders
 Properly-constructed concrete formworks

Sand
 Boxes to contain wet sand
 Copies of Quick Quiz*
 Module Examinations**
 Performance Profile Sheet**

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Concrete dust and its components are caustic; brief trainees on the hazards posed by dry and wet concrete and respiratory and skin protection needed. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

American Concrete Institute. www.concrete.org
Cement Association of Canada. www.cement.ca
Portland Cement Association. www.cement.org

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 22½ hours are suggested to cover *Handling and Placing Concrete*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Overview and Joints in Concrete Structures	
A. Introduction	_____
B. Joints in Concrete Structures	_____
Session II. Moving and Handling Concrete	
A. Off-Site Equipment for Mixing and Conveying Concrete	_____
B. On-Site Equipment for Mixing and Conveying Concrete	_____
Sessions III and IV. Placing and Consolidating Concrete in Forms	
A. Placing Concrete in Forms	_____
B. Consolidating Concrete	_____
C. Laboratory	_____
Trainees practice placing, handling, and consolidating concrete in selected concrete forms. This laboratory corresponds to Performance Task 1.	

Session V. Finishing I

A. Screeding

B. Laboratory

Trainees practice using a screed to strike off and level a concrete surface. This laboratory corresponds to Performance Task 2.

C. Leveling Concrete

D. Laboratory

Trainees practice using a bullfloat and/or darby to level and smooth a concrete surface. This laboratory corresponds to Performance Task 3.

Session VI. Finishing II

A. Edging

B. Laboratory

Trainees practice using an edger to form a radius at the edges of a concrete pad or slab. This laboratory corresponds to Performance Task 4.

C. Jointing

D. Laboratory

Trainees practice using a jointer to make control joints in a concrete surface. This laboratory corresponds to Performance Task 5.

E. Floating and Troweling

F. Laboratory

Trainees practice using a hand float and finishing trowel to level high spots, remove imperfections, and smooth a concrete surface. This laboratory corresponds to Performance Task 6.

Session VII.

A. Curing Concrete

B. Joint Sealants

C. Removing Forms

Session VIII. Tools and Safety

A. Other Hand and Power Tools Used When Working with Concrete

B. Safety Precautions

Session IX. Module Testing

A. Module Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module prepares the trainee for working in and around excavations, particularly in preparing building foundations. It covers types and bearing capacities of soils; procedures used in shoring, sloping, and shielding trenches and excavations; trenching safety requirements, including recognition of unsafe conditions; and mitigation of groundwater and rock when excavating foundations.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum*; *Carpentry Level One*; *Carpentry Level Two*; and *Carpentry Level Three*, Modules 27301-07 through 27305-07.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify the different types, bearing capacities, and classifications of soils.
2. Identify ways to increase soil density.
3. State the purpose of soil density (compaction) tests.
4. Explain the safety considerations for trenches and deep excavations.
5. Identify and describe groundwater mitigation methods.
6. Identify and describe rock mitigation techniques.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Perform a trench inspection.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Several types of pumps
Transparencies	Safety video or DVD (optional)
Blank acetate sheets	TV with VCR or DVD player (optional)
Transparency pens	Plastic boxes
Whiteboard/chalkboard	Sand
Markers/chalk	Tools for digging
Pencils and scratch paper	Water
Appropriate personal protective equipment	Boxes of sand or dirt
Samples of different types of soils	Module Examinations*
Access to a trench for inspection	Performance Profile Sheet*
Soil density testing equipment	
Sample stormwater permit and pollution prevention plan	

*Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees work near trenches. Ensure that all trainees are properly briefed on trench safety procedures before working near trenches.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference work is suggested for both instructors and motivated trainees interested in further study. This is optional material for continued education rather than for task training.

Boston Groundwater Trust Report. Aldrich & Lambrecht. Civil Engineering Practices Journal of the Boston Society of Civil Engineering Section/ASCE, Fall 1986 Volume 1, Number 2, <http://www.bostongroundwater.org/ceprep.html>

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Trenching and Excavating*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Sitework	
A. Introduction	_____
B. Sitework	_____
C. Compaction	_____
Session II. Safety	
A. Deep Foundation Excavation Safety	_____
B. Trenching Safety	_____
C. Laboratory	_____
Trainees practice inspecting a trench. This laboratory corresponds to Performance Task 1.	
Session III. Mitigation	
A. Surface and Groundwater Mitigation	_____
B. Rock Mitigation	_____
Session IV. Review and Testing	
A. Module Review	_____
B. Module Examination	_____
1. Trainees must score 70% or higher to receive recognition from NCCER.	_____
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	_____
C. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.	_____
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	_____

MODULE OVERVIEW

This module covers basic site layout tools and methods; layout and construction of deep and shallow foundations; layout and forming of slabs-on-grade; and forms used for curbing and paving.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum*; *Carpentry Level One*; *Carpentry Level Two*; and *Carpentry Level Three*, Modules 27301-07 through 27306-07.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Establish elevations.
2. Identify various types of footings and foundations.
3. Select the appropriate footing for a foundation.
4. Lay out and construct a selected footing and foundation using an established gridline.
5. Install templates, keyways, and embedments.
6. Form and strip pier foundation forms and prepare for resetting at another location.
7. Identify the different classes of slabs-on-grade.
8. Identify edge forms and explain their purpose.
9. Construct and disassemble edge forms.
10. Install vapor barrier, reinforcement, and control joints.
11. Establish finish grade and fill requirements.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Establish elevations.
2. Lay out and construct a selected footing and foundation using an established gridline.
3. Install templates, keyways, and embedments.
4. Form and strip pier foundation forms and prepare for resetting at another location.
5. Construct and disassemble edge forms.
6. Install vapor barrier, reinforcement, and control joints.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Batter boards
Transparencies	Hub stakes
Blank acetate sheets	Marker stakes
Transparency pens	Color-coded stakes or markers
Whiteboard/chalkboard	Markers/chalk
Plumb bob and line	Pencils and scratch paper
Leveling rods and accessories	Appropriate personal protective equipment
Direct elevation rod	Steel tape (100')
Project plans	Gammon reel
Automatic leveling instruments	Field notebook
Builder's level	Transit level
Tripod	2' or 4' level
Laser level	String line

- | | |
|---|-----------------------------|
| Samples of rebar and WWR | Edge forms |
| Pier foundation forms | Copies of Quick Quiz* |
| Manufacturer’s literature on wall forms | Module Examinations** |
| Manufacturer’s literature on leave-in-place forms | Performance Profile Sheet** |

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees work with concrete forms.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

American Concrete Institute, www.aci-int.org

Principles and Practices of Commercial Construction, Prentice Hall, Upper Saddle River, NJ

The Concrete Network, www.concretenetwork.com

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 20 hours are suggested to cover *Foundations and Slab-on-Grade*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Sitework	
A. Introduction	_____
B. Sitework	_____
C. Establishing Formwork Locations and Elevations	_____
D. Laboratory	_____
Trainees practice establishing elevations. This laboratory corresponds to Performance Task 1.	
Sessions II and III. Job Site Layout	
A. Establishing Building Location	_____
B. Batter Boards	_____
C. Excavation and Trenching	_____
D. Laying Out Forms	_____
E. Laboratory	_____
Trainees practice laying out and constructing a selected footing and foundation using an established gridline. This laboratory corresponds to Performance Task 2.	
F. Templates	_____
G. Laboratory	_____
Trainees practice installing templates, keyways, and embedments. This laboratory corresponds to Performance Task 3.	

Session IV. Foundations and Slabs-on-Grade

- A. Deep Foundation Elements _____
- B. Shallow Foundation Elements _____
- C. Construction Considerations for Slab-on-Grade _____
- D. Laboratory _____

Trainees practice installing vapor barrier, reinforcement, and control joints. This laboratory corresponds to Performance Task 6.

- E. Commercial Slab-on-Grade _____

Sessions V and VI. Foundation Forms

- A. Job-Built Forms _____
- B. Pier Forms _____
- C. Laboratory _____

Trainees practice forming and stripping pier foundation forms and preparing for resetting at another location. This laboratory corresponds to Performance Task 4.

- D. Manufactured Forms _____
- E. Edge Forms _____
- F. Laboratory _____

Trainees practice constructing and disassembling edge forms. This laboratory corresponds to Performance Task 5.

Session VII. Screeds and Paving Forms

- A. Screeds _____
- B. Curbing and Paving Forms _____

Session VIII. Review and Testing

- A. Module Review _____
- B. Module Examination _____

1. Trainees must score 70% or higher to receive recognition from NCCER. _____
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor. _____

- C. Performance Testing _____

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements. _____

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor. _____

MODULE OVERVIEW

This module covers the applications and construction methods for various types of forming and form hardware systems for walls, columns, and stairs, as well as slip forms, climbing forms, and shaft forms. This module also provides an overview of the assembly, erection, and stripping of gang forms.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; Carpentry Level Two; and Carpentry Level Three, Modules 27301-07 through 27307-07.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Explain safety procedures associated with using concrete wall forms.
2. Identify the various types of concrete wall forms.
3. Identify the components of each type of vertical forming system.
4. Erect, plumb, and brace a selected wall.
5. Recognize various types of manufactured forms.
6. State the differences in construction and use among different types of forms.
7. Erect, plumb, and brace a column form.
8. Erect, plumb, and brace a stair form.
9. Locate and install bulkheads and embedded forms.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Erect, plumb, and brace a selected wall form.
2. Erect, plumb, and brace a column form.
3. Erect, plumb, and brace a stair form.
4. Install blockouts and embedded items.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	flexible wall forms
Transparencies	Tools and materials to construct a wall form
Blank acetate sheets	Materials to construct blockouts and embedments
Transparency pens	Materials inventory
Whiteboard/chalkboard	Tools and materials to construct column forms
Markers/chalk	Circular saw
Pencils and scratch paper	Form assembly hardware
Appropriate personal protective equipment	<i>OSHA Standard 1926:700-701</i>
Sheets of plywood	Walers
Components used to construct wall forms, including assembly hardware, walers, strongbacks, braces, and stakes	Strongbacks
Manufacturers' literature on different types of gang forms	Manufacturers' literature on different types of wall-forming systems
Manufacturers' literature on different types of	Manufacturers' literature on different types of column forms
	Drawings with design details

Manufacturers' literature on stay-in-place polystyrene forms
 Basic stair form
 Tools and materials to construct a stair form

Copies of Quick Quiz*
 Module Examinations**
 Performance Profile Sheet**

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees work with concrete forms. Ensure that all trainees are properly briefed on lifting and tool safety procedures before working with forms.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

Principles and Practices of Commercial Construction, Prentice Hall, Upper Saddle River, NJ
 Scaffold, Shoring, and Forming Institute. www.ssfi.org

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 27½ hours are suggested to cover *Vertical Formwork*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Sessions I and II. Formwork Planning and Wall Forms	
A. Introduction	_____
B. Formwork Planning	_____
C. Wall Forms	_____
D. Patented Wall-Forming Systems	_____
E. Framing Wall Openings	_____
F. Laboratory	_____
Trainees practice installing blockouts and embedded items. This laboratory corresponds to Performance Task 4.	
Sessions III and IV. Form Construction	
A. Preparation	_____
B. Assembly	_____
C. Setting the Form	_____
D. Laboratory	_____
Trainees practice erecting, plumbing, and bracing a selected wall form. This laboratory corresponds to Performance Task 1.	

Sessions V through VII. Column Forms and Slipforming

- A. Fiber Column Forms
- B. Steel Column Forms
- C. Job-Built Column Forms
- D. Laboratory

Trainees practice erecting, plumbing, and bracing a column form. This laboratory corresponds to Performance Task 2.

- E. Vertical Slipforming

Sessions VIII through X. Stair and Other Forms

- A. Stair Forms
- B. Laboratory

Trainees practice erecting, plumbing, and bracing a stair form. This laboratory corresponds to Performance Task 3.

- C. Vertical Architectural Forms
- D. Polystyrene Forms

Session XI. Review and Testing

- A. Module Review
- B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

- C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module covers the types of elevated decks and the formwork systems and methods used in their construction. It covers joist, pan, metal deck, and flat slab systems and provides instructions for the use of flying forms, as well as shoring and reshoring systems.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; Carpentry Level Two; and Carpentry Level Three, Modules 27301-07 through 27308-07.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify the safety hazards associated with elevated deck formwork and explain how to eliminate them.
2. Identify the different types of elevated decks.
3. Identify the different types of flying form systems.
4. Identify different types of handset form systems.
5. Erect, plumb, brace, and level different types of handset deck form systems.
6. Install edge forms, blockouts, embedments, and construction joints.
7. Identify typical bridge and culvert form systems.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Erect, plumb, brace, and level different types of handset deck form systems.
2. Install edge forms.
3. Install blockouts and embedded items.
4. Locate and install construction joints.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Hand tools
Transparencies	Levels
Blank acetate sheets	Bracing materials
Transparency pens	Shoring deck systems
Whiteboard/chalkboard	Edge forms
Markers/chalk	Manufacturers' literature on different types of pan forms
Pencils and scratch paper	Manufacturers' literature on shoring
Appropriate personal protective equipment	Wood shores
Walers	Metal post shores
Strongbacks	Manufacturers' literature on aluminum shoring
Manufacturers' literature on deck framing systems	Samples of exterior grade plywood
Manufacturers' literature on flying decks	Plyform [®]
Manufacturers' literature on column-mounted tables	Stringers
	Joists

Blockouts
 Embedded items
 Materials for construction joints
 Manufacturers' literature on bridge deck forms
 Manufacturers' literature on culvert forms

OSHA 1926.703
 Copies of Quick Quiz*
 Module Examinations**
 Performance Profile Sheet**

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees work with concrete forms. Ensure that all trainees are properly briefed on lifting and tool safety procedures before working with forms.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

American Concrete Institute (ACI). www.concrete.org
 Cement Association of Canada. www.cement.ca
 Portland Cement Association. www.cement.org

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 22½ hours are suggested to cover *Horizontal Formwork*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Concrete Floor and Roof Slabs	
A. Introduction	_____
B. Types of Structural-Concrete Floor and Roof Slabs	_____
C. Types of Form Systems	_____
Session II. Shoring	
A. Types of Shoring	_____
B. Adjustable Wood Shoring	_____
C. Manufactured Shoring	_____
Sessions III and IV. Form Construction	
A. Types of Decks	_____
B. Laboratory	_____
Trainees practice erecting, plumbing, bracing, and leveling selected handset deck form systems. This laboratory corresponds to Performance Task 1.	
C. Grading Elevated Slab Decks	_____

Sessions V through VII. Additional Form Elements

A. Edge Forms

B. Laboratory

Trainees practice installing edge forms. This laboratory corresponds to Performance Task 2.

C. Blockouts and Embedments

D. Laboratory

Trainees practice installing blockouts and embedded items. This laboratory corresponds to Performance Task 3.

E. Jointing

F. Laboratory

Trainees practice installing construction joints. This laboratory corresponds to Performance Task 4.

Session VIII. Bridges, Culverts, and Safety

A. Bridge Deck Forms

B. EFCO Culvert-Forming Systems

C. General Forming and Shoring Safety

Session IX. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module describes how tilt-up concrete construction is used and how tilt-up panels are formed, erected, and braced. It covers the installation of rebar and the types of embedments used to lift and brace panels. Methods used to achieve architectural and decorative finishes are also covered.

PREREQUISITES

Please refer to the Course Map in the Trainee Module. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum; Carpentry Level One; Carpentry Level Two; and Carpentry Level Three, Modules 27301-07 through 27309-07.*

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the different processes used in installing tilt-up wall panels.
2. Explain the importance of the casting bed.
3. Identify and install the various types of lifting eyes used in forming tilt-up panels.
4. Identify the special rigging requirements for tilt-up wall panels.
5. Identify the different methods of forming tilt-up wall panels.
6. Demonstrate the different methods of forming tilt-up wall panels.
7. Prepare for the erection of tilt-up wall panels.
8. Install proper bracing for tilt-up wall panels.
9. Erect and properly align tilt-up wall panels.
10. Install embedments, blockouts, architectural finishes, lifting devices, and reinforcing materials using a set of construction drawings.
11. Describe the final grouting procedure.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Form a tilt-up panel in accordance with a drawing provided by the instructor.
2. Install inserts, reinforcement, and reveals.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Wood for building panel forms
Transparencies	Hand tools
Blank acetate sheets	Fasteners
Transparency pens	Concrete mix
Whiteboard/chalkboard	Water
Markers/chalk	Wheelbarrow or concrete mixer
Pencils and scratch paper	Tools to mix and spread concrete
Appropriate personal protective equipment	Drawing of panel forms
Variety of inserts and embedments	Copies of Quick Quiz*
Reinforcing bar	Module Examinations**
Wood or other materials to form reveals	Performance Profile Sheet**

*Located in the back of this module.

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires that trainees work with concrete forms. Ensure that all trainees are properly briefed on lifting and tool safety procedures before working with forms.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

The Tilt-Up Construction and Engineering Manual, Sixth Edition. Tilt-Up Concrete Association, Mount Vernon, IA.

Tilt-Up Concrete Construction Guide, 2005. American Concrete Institute, Farmington Hills, MI.
Tilt-up Concrete Association, www.tilt-up.org

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 20 hours are suggested to cover *Tilt-Up Wall Systems*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Sessions I through III. Introduction to Tilt-Up Wall Panels	
A. Introduction	_____
B. Forming Tilt-Up Wall Panels	_____
C. Laboratory	_____
Trainees practice forming a tilt-up panel. This laboratory corresponds to Performance Task 1.	
Sessions IV and V. Inserts and Embedments	
A. Placing Inserts and Embedments	_____
B. Laboratory	_____
Trainees practice installing inserts, reinforcement, and reveals. This laboratory corresponds to Performance Task 2.	
Session VI. Finishing	
A. Architectural Treatments	_____
B. Placing and Finishing the Concrete	_____
Session VII. Erecting and Bracing the Panels	
A. Erecting Panels	_____
B. Bracing the Panels	_____
C. Summary	_____

Session VIII. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70% or higher to receive recognition from NCCER.
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.
