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
Transparencies
Blank acetate sheets
Transparency pens
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Sheets of plywood
Components used to construct wall forms, including assembly hardware, walers, strongbacks, braces, and stakes
Manufacturers' literature on different types of gang forms
Manufacturers' literature on different types of flexible wall forms
Tools and materials to construct a wall form
Materials to construct blockouts and embedments
Materials inventory
Tools and materials to construct column forms
Circular saw
Form assembly hardware
OSHA Standard 1926:700-701
Walers
Strongbacks
Manufacturers' literature on different types of wall-forming systems
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
Transparencies
Blank acetate sheets
Transparency pens
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Walers
Strongbacks
Manufacturers' literature on deck framing systems
Manufacturers' literature on flying decks
Manufacturers' literature on column-mounted tables
Hand tools
Levels
Bracing materials
Shoring deck systems
Edge forms
Manufacturers' literature on different types of pan forms
Manufacturers' literature on shoring
Wood shores
Metal post shores
Manufacturers' literature on aluminum shoring
Samples of exterior grade plywood
Plyform®
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 course introduces the masonry trainee to the methods and procedures used in setting up and maintaining elevated 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; Masonry Level One;* and *Masonry Level Two,* Modules 28201 through 28206.

OBJECTIVES

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

1. Describe the appropriate steps necessary for setting up and maintaining elevated workstations.
2. Properly operate material handling and hoisting equipment
3. Describe the safety requirements and guidelines employed in elevated and high-rise construction.
4. Describe basic activities that can be used on the job to prevent elevated workstation accidents.
5. Understand scaffolding positioning and how it affected laying techniques.

PERFORMANCE TASKS

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

1. Properly set up a section of tubular steel scaffolding.
2. Properly put on a safety harness and attach it to the building.
3. Demonstrate safe elevated working procedures for stacking materials.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen
Whiteboard/chalkboard
Safety harness(es)
Tubular steel scaffolding components
Appropriate Personal Protective Equipment
Hand tools
Trainee Task Module
Transparencies
Markers/chalk
Paper and pencils
Brick
Planks
Dimensional lumber
Module Examinations
Performance Profile Sheets

SAFETY CONSIDERATIONS

Ensure that trainees are equipped with appropriate personal protective equipment.

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 *Elevated Work.* 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-Special Problems: Sections 1.0.0–2.4.3

Session II. Tubular Steel Sectional Scaffolding-Tear Down; Demonstration: Sections 3.0.0-3.4.0

Session III. Tubular Steel Sectional Scaffolding-Laboratory: Sections 3.0.0-3.4.0

Session IV. Adjustable Tower Scaffolding-The Elevated Workstation: Sections 4.0.0-7.1.0

Session V. Demonstration (Field Trip): Sections 1.0.0-7.1.0

Session VI. Module Examination and Performance Profile Examination

MODULE OVERVIEW

This module introduces the Mobile Crane Operations trainee to the types of cranes and their varied uses, as well as career opportunities and personal requirements for mobile crane operators.

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

OBJECTIVES

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

1. Identify career opportunities in the mobile crane industry.
2. Describe the duties and responsibilities of mobile crane operators.
3. Describe the physical requirements for mobile crane operators.
4. Name the different categories of mobile cranes and describe how each is used.
5. Identify common mobile crane attachments and explain how each is used.

PERFORMANCE TASKS

There are no performance tasks for this module.

MATERIALS AND EQUIPMENT LIST

- Overhead projector and screen
- Transparencies
- Whiteboard/chalkboard
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Appropriate personal protective equipment:
  - Hard hats
  - Work gloves
  - Safety harnesses
  - Safety shoes
  - Ear protection
- Model crane (hydraulic boom)
- Model crane (lattice boom)
- Copies of company policies and procedures
- Copies of site evacuation plans
- Copies of ANSI and OSHA standards
- TV and VCR
- Videotape: *Construction Safety: Choice or Chance,* by the Occupational Safety and Health Administration
- Module Examinations*

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize heavy equipment and work site safety. The topics in this module require the trainee to observe cranes in different configurations. This may require that the trainees visit job sites or crane yards. 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.

Bob's Rigging and Crane Handbook, Latest Edition. Bob DeBenedictis. Leawood, KS: Pellow Engineering Services, Inc.

Crane Safety: A Guide to OSHA Compliance and Injury Prevention, 1999. Carl O. Morgan. Rockville, MD: ABS Group, Inc.

Mobile Crane Manual, 1999. Donald E. Dickie, D.H. Campbell. Toronto, Ontario: Construction Safety Association of Ontario.

Occupational Safety and Health Standards for the Construction Industry, 29 CFR Part 1926, Latest Edition. 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 5 hours are suggested to cover *Orientation to the Trade*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	**Planned Time**
Session I. Introduction to the Mobile Crane Industry	
A. Introduction	_____
B. The Mobile Crane Industry	_____
C. General Standards	_____
1. *ANSI Standard B30.5*	_____
2. Crane Operator's Typical Responsibilities	_____
D. Crane Types and Uses	_____
E. Attachments	_____
Session II. Training Program and Operator Responsibilities	
A. Your Training Program	_____
B. Your Responsibilities	_____
C. Human Relations	_____
D. Employer and Employee Safety Obligations	_____
E. Review	_____
F. 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.	

Introduction to the Trade
Annotated Instructor's Guide

Module Overview

This module presents the historical development of the ironworking trade. It explains personal qualities that contribute to successful employment. It also describes the organization and purpose of apprenticeship training, and the safety obligations of the employer and employee.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*.

Objectives

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

1. Identify the personal qualities that contribute to successful employment.
2. Describe the historical development of the trade.
3. Identify the organization and purpose of apprenticeship training.
4. Identify employer and employee safety obligations.

Performance Tasks

This is a knowledge-based module; there are no performance tasks.

Materials and Equipment

Multimedia projector and screen
Ironworking Level One
PowerPoint® Presentation Slides
(ISBN 978-0-13-213795-9)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Copies of the Quick Quiz*
Module Examinations**

* 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.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

Occupational Safety and Health Standards for the Construction Industry, 29 CFR, Part 1926, Latest Edition. 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 5 hours are suggested to cover *Introduction to the Trade*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	**Planned Time**
Session I. Introduction; Opportunities; Your Training Program; Responsibilities	
A. Introduction	_____
B. Ironworking Trade	_____
1. History of Structural Steel Building Materials	_____
2. Ironworking	_____
C. Opportunities in the Construction Industry	_____
D. Your Training Program	_____
1. Standardized Training by NCCER	_____
2. Apprenticeship Program	_____
E. Responsibilities of the Employee	_____
1. Professionalism	_____
2. Honesty	_____
3. Loyalty	_____
4. Willingness to Learn	_____
5. Willingness to Take Responsibility	_____
6. Willingness to Cooperate	_____
7. Rules and Regulations	_____
8. Tardiness and Absenteeism	_____
Session II. Human Relations; Safety Obligations; Review; Module Exam	
A. Human Relations	_____
1. Making Human Relations Work	_____
2. Human Relations and Productivity	_____
3. Attitude	_____
4. Maintaining a Positive Attitude	_____
B. Employer and Employee Safety Obligations	_____
C. Module Review	_____
D. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.	

Electrical Safety
Annotated Instructor's Guide

Module 26102-11

Module Overview

This module introduces the trainees to the safety rules and regulations for electricians, including the necessary precautions for avoiding various job site hazards.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Electrical Level One,* Module 26101-11.

Objectives

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

1. Recognize safe working practices in the construction environment.
2. Explain the purpose of OSHA and how it promotes safety on the job.
3. Identify electrical hazards and how to avoid or minimize them in the workplace.
4. Explain electrical safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.
5. Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.

Performance Tasks

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

1. Perform a visual inspection on various types of ladders.
2. Set up a ladder properly to perform a task.
3. Properly don a harness.
4. Perform a hazard assessment of a job such as replacing the lights in your classroom.
   - Discuss the work to be performed and the hazards involved.
   - Locate the phone closest to the work site and ensure that the local emergency telephone numbers are either posted at the phone or known by you and your partner(s).
   - Plan an escape route from the location in the event of an accident.

Materials and Equipment

Multimedia projector and screen
Electrical Level One
PowerPoint® Presentation Slides
(ISBN 978-0-13-257126-5)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Copy of the latest edition of the *National Electrical Code®*
OSHA Electrical Safety Guidelines (pocket guide)
NFPA 70E®
Company safety manual
Solvent MSDS
Access to eye wash station
Various types of personal protective and safety equipment, including:
Rubber gloves
Insulating blankets
Hot sticks
Fuse pullers
Shorting probes
Safety glasses
Face shields
Hard hats
GFCI device
Company lockout/tagout procedures
Lockout/tagout devices and labels
Stepladders
Straight ladders

(*continued*)

Fall arrest system
Safety harnesses
TV/DVD/VCR player (*optional*)
Safety videos (*optional*)
Module Examination*
Performance Profile Sheet*

* 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. This module requires trainees to work with ladders. Make sure that all trainees are briefed on appropriate safety procedures. Emphasize electrical safety.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

29 CFR Parts 1900–1910, Standards for General Industry. Occupational Safety and Health Administration, U.S. Department of Labor.
29 CFR Part 1926, Standards for the Construction Industry. Occupational Safety and Health Administration, U.S. Department of Labor.
National Electrical Code® Handbook, Latest Edition. Quincy, MA: National Fire Protection Association.
Standards for Electrical Safety in the Workplace, Latest Edition. Quincy, MA: National Fire Protection Association.
Managing Electrical Hazards, © 2009, NCCER/Pearson Education.

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 *Electrical Safety.* 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. Introduction; Electrical Hazards	
A. Introduction	_____
B. Electrical Shock	_____
C. Protective Equipment	_____
D. OSHA	_____
E. *NFPA 70E®*	_____
Session II. Ladders, Lifts, and Lifting	
A. Ladders and Scaffolds	_____
B. Laboratory Have trainees practice visually inspecting ladders. This laboratory corresponds to Performance Task 1.	_____
C. Laboratory Have trainees practice setting up a ladder. This laboratory corresponds to Performance Task 2.	_____
D. Lifts, Hoists, and Cranes	_____
E. Lifting	_____
F. Basic Tool Safety	_____

Session III. General Construction Safety Topics

A. Confined Space Entry Procedures _____
B. First Aid _____
C. Solvents and Toxic Vapors _____
D. Asbestos, Batteries, PCBs, and Vapor Lamps _____

Session IV. Lead Safety; Fall Protection; Hazard Assessment; Review and Testing

A. Lead Safety _____
B. Fall Protection _____
C. Laboratory _____

Have trainees practice donning a safety harness. This laboratory corresponds to Performance Task 3.

D. Hazard Assessment _____
E. Laboratory _____

Have trainees practice performing a hazard assessment. This laboratory corresponds to Performance Task 4.

F. Review _____
G. Module Examination _____

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

H. 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 Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module explains the applications, proper use, and safety considerations for using light equipment, including aerial lifts, skid steer loaders, trenchers, generators, compressors, forklifts, and backhoe/loaders.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; *Carpentry Level One*; *Carpentry Level Two*; *Carpentry Level Three*; and *Carpentry Level Four*, Modules 27401-08 through 27405-08.

OBJECTIVES

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

1. Identify and explain the operation and use of various pieces of light equipment, including:
   - Aerial lifts
   - Skid steer loaders
   - Trenchers
   - Generators
   - Compressors
   - Compactors
   - Forklifts
   - Backhoe
2. State the safety precautions associated with light equipment.
3. Operate selected items of light equipment.

PERFORMANCE TASKS

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

1. Demonstrate or simulate the procedures for the safe and proper operation of one or more types of selected light equipment, including:
   - Aerial lift
   - Skid steer loader
   - Trencher
   - Generator
   - Air compressor
   - Compactor
   - Fork lift
   - Backhoe/loader

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
Aerial lift and operator's manual
Skid steer loader and operator's manual

continued

Trencher and operator's manual
Portable generators and accessories
Portable generator operator's manual
Portable air compressor and accessories
Portable air compressor operator's manual
29 CFR 1926.453
Compaction equipment
Compactor operator's manual
Forklift and operator's manual
Backhoe and operator's manual
Quick Quiz*
Module Examinations**
Performance Profile Sheets**

* Located in the Trainee Guide.

**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. This module requires trainees to use various types of light equipment. Review hazards associated with each type of equipment and general precautions needed when operating light equipment.

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.

Construction Equipment Guide. Latest Edition. New York, NY: John Wiley & Sons.

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 *Introduction to Light Equipment*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	**Planned Time**
Session I. Introduction, Safety, Aerial Lifts, and Skid Steer Loaders	
A. Introduction	_____
B. Safety Precautions	_____
C. Aerial Lifts	_____
D. Laboratory Trainees practice the safe operation of aerial lifts. This laboratory corresponds to Performance Task 1.	_____
E. Skid Steer Loaders	_____
F. Laboratory Trainees practice the safe operation of skid steer loaders. This laboratory corresponds to Performance Task 1.	_____

Session II. Trenchers, Generators, and Air Compressors

A. Trenchers _____

B. Laboratory _____

Trainees practice the safe operation of trenchers. This laboratory corresponds to Performance Task 1.

C. Generators _____

D. Laboratory

Trainees practice the safe operation of generators. This laboratory _____ corresponds to Performance Task 1.

E. Air Compressors _____

F. Laboratory _____

Trainees practice the safe operation of air compressors. This laboratory corresponds to Performance Task 1.

Session III. Compaction Equipment, Forklifts, and Backhoes

A. Compaction Equipment _____

B. Laboratory _____

Trainees practice the safe operation of compaction equipment. This laboratory corresponds to Performance Task 1.

C. Forklifts _____

D. Laboratory _____

Trainees practice the safe operation of forklifts. This laboratory corresponds Performance Task 1.

E. Backhoes _____

F. Laboratory _____

Trainees practice the safe operation of backhoes. 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.

Forklifts

Annotated Instructor's Guide

Module 22206-06

MODULE OVERVIEW

This module covers the different types of forklifts and their applications on construction sites. It includes instructions for lifting, transporting, and placing various types of loads. It also describes the duties and responsibilities of operators, as well as safety rules, and operator preventive maintenance duties.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Heavy Equipment Operations Level One;* and *Heavy Equipment Operations Level Two,* Modules 22201-06 through 22205-06.

OBJECTIVES

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

1. Describe the uses of a forklift.
2. Identify the components and controls on a typical forklift.
3. Explain safety rules for operating a forklift.
4. Perform prestart inspection and maintenance procedures.
5. Start, warm up, and shut down a forklift.
6. Perform basic maneuvers with a forklift.
7. Perform basic lifting operations with a forklift.
8. Describe the accessories used on forklifts.

PERFORMANCE TASKS

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

1. Complete proper prestart inspection and maintenance for a forklift.
2. Perform proper startup, warmup, and shutdown procedures.
3. Execute basic maneuvers with a forklift.
4. Perform basic lifting operations with a forklift.
5. Demonstrate proper parking of a forklift (with forks down).

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
Forklift
Hand tools
Grease gun
Air gauge
Hydrometer
Rags
Fluids for equipment servicing
Company safety manual
Daily inspection checklist
Forklift operator's manual
Forklift maintenance manual
Machine maintenance records
Chocks and tie-down equipment
OSHA PowerPoint® presentation on forklift safety or video on forklift safety (optional)
TV/VCR/DVD player (optional)

Multimedia projector for PowerPoint® presentation (optional)

Computer with internet access (optional)

Base with upright and extension to hang a load (optional)

Wooden blocks or sample loads for tipping demonstration (optional)

Traffic cones or devices

Samples loads, including:

Pallet of empty barrels
Long pipe

Blocking

Module Examinations*

Performance Profile Sheet*

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module requires trainees to operate heavy equipment. Ensure that all trainees are briefed on machine safety rules and review the operator's manual before operating equipment. This module may require trainees to visit construction sites. Ensure that all trainees are briefed on site safety policy and have appropriate personal protection equipment.

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.

Forklift Safety: A Practical Guide to Preventing Powered Industrial Truck Incidents and Injuries, 2nd Edition, 1999. George Swartz. Lanham, MD: Government Institutes.

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 17½ hours are suggested to cover *Forklifts*. 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. Introduction and Identification of Equipment	
A. Introduction	_____
B. Identification of Equipment	_____
C. Attachments	_____
Session II. Safety, Inspection, and Maintenance	
A. Safety	_____
B. Inspection and Maintenance	_____
C. Laboratory – Trainees practice completing proper prestart inspection and maintenance. This laboratory corresponds to Performance Task 1.	_____
Sessions III and IV. Basic Operation	
A. Preparing to Work	_____
B. Laboratory – Trainees practice performing proper startup, warmup, shutdown procedures, and parking. This laboratory corresponds to Performance Tasks 2 and 5.	_____

C. Basic Maneuvering _____

D. Laboratory – Trainees practice executing basic maneuvers with a forklift. This laboratory corresponds to Performance Task 3. _____

Sessions IV through VI. Work Activities and Review

A. Basic Operational Movement _____

B. Laboratory – Trainees practice performing basic lifting operations with a forklift. This laboratory corresponds to Performance Task 4. _____

C. Special Attachments _____

D. Transporting a Forklift _____

E. Review _____

Session VII. Module Examination and Performance Testing

A. Module Examination _____

1. Trainees must score 70 percent 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.

B. 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.

Oxyfuel Cutting
Annotated Instructor's Guide

Module Overview

This module teaches principles of safe oxyfuel cutting. Setup, care, and maintenance are covered, as well as procedures and methods for performing various types of oxyfuel cuts.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: *Core Curriculum* and *Welding Level One*, Module 29101-09.

Objectives

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

1. Identify and explain the use of oxyfuel cutting equipment.
2. Set up oxyfuel equipment.
3. Light and adjust an oxyfuel torch.
4. Shut down oxyfuel cutting equipment.
5. Disassemble oxyfuel equipment.
6. Change cylinders.
7. Perform oxyfuel cutting:
   - Straight line and square shapes
   - Piercing and slot cutting
   - Bevels
   - Washing
   - Gouging
8. Operate a motorized, portable oxyfuel gas cutting machine.

Performance Tasks

1. Set up oxyfuel equipment.
2. Light and adjust an oxyfuel torch.
3. Shut down oxyfuel cutting equipment.
4. Disassemble oxyfuel equipment.
5. Change empty cylinders.
6. Cut shapes from various thicknesses of steel, emphasizing:
   - Straight line
   - Square shape
   - Piercing
   - Bevel
   - Slot
7. Perform washing.
8. Perform gouging.

Materials and Equipment List

Markers/chalk
Pencils and scratch paper
Whiteboard/chalkboard
Welding 1 PowerPoint® Presentation Slides (ISBN 0-13-609092-3)
Multimedia projector and screen
Desktop or laptop computer
Appropriate personal protective equipment
Oxygen cylinder (with cap)
Fuel gas cylinder (with cap)
Extra empty cylinders
Regulators (oxygen and fuel gas)
Extra regulators with check valves and flashback arrestors
Hose set
A selection of usable and non-usable hoses
Combination cutting torch
One-piece cutting torch
Assorted torch nozzles (cutting, washing, gouging)

Cylinder cart
Motorized oxyfuel track cutter
Framing squares
Combination squares with protractor head
Tape measure
Soapstone
Penknife
Pliers
Chipping hammers
Friction lighters
Vendor cutting tip chart
Tip cleaners, drills, and files
Vendor-supplied videos/DVDs showing oxyfuel equipment in operation (optional)
TV/VCR/DVD player (optional)
Approved leak-testing solution
Wrenches (torch, hose, and regulator)
Steel plate
- Thin (16 to 10 gauge)
- Thick (¼-inch thick to 1-inch thick)

Module Examinations*
Performance Profile Sheets*

*Located in the Test Booklet

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize the special safety precautions associated with the handling and use of cylinders and oxyfuel cutting equipment. Ensure that trainees are briefed on shop safety procedures.

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.

ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, American Welding Society, Miami, FL.

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 17½ hours are suggested to cover *Oxyfuel Cutting*. You will need to adjust the time required for 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. Introduction to Oxyfuel Safety; Oxyfuel Cutting Equipment, Part One	
A. Introduction	_____
B. Oxyfuel Safety Summary	_____
1. Protective Clothing and Equipment	_____
2. Fire/Explosion Prevention	_____
3. Work Area Ventilation	_____
C. Oxyfuel Cutting Equipment	_____
1. Oxygen	_____
2. Acetylene	_____
3. Liquefied Fuel Gases	_____
4. Regulators	_____
a. Laboratory Allow trainees to install and remove regulators from empty oxygen and gas cylinders.	_____
5. Hoses	_____

Session II. Oxyfuel Cutting Equipment, Part Two

A. Cutting Torches _____
B. Cutting Torch Tips _____
C. Tip Cleaners and Tip Drills _____
D. Friction Lighters _____
E. Cylinder Cart _____
F. Soapstone Markers _____
G. Specialized Cutting Equipment _____

Session III. Setting Up Oxyfuel Equipment; Controlling the Oxyfuel Torch Flame

A. Setting Up Oxyfuel Equipment
   1. Transporting and Securing Cylinders _____
   2. Cracking Cylinder Valves _____
   3. Attaching Regulators _____
   4. Installing Flashback Arrestors or Check Valves _____
   5. Connecting Hoses to Regulators _____
   6. Attaching Hoses to the Torch _____
   7. Connecting Cutting Attachments (Combination Torch Only) _____
   8. Installing Cutting Tips _____
   9. Closing Torch Valves and Loosening Regulator Adjusting Screws _____
   10. Opening Cylinder Valves _____
   11. Purging the Torch and Setting the Working Pressures _____
   12. Testing for Leaks _____

B. Controlling the Oxyfuel Torch Flame
   1. Oxyfuel Flames _____
   2. Backfires and Flashbacks _____
   3. Igniting the Torch and Adjusting the Flame _____
   4. Shutting Off the Torch _____

Session IV. Shutting Down Oxyfuel Cutting Equipment; Disassembling Oxyfuel Equipment; Changing Cylinders

A. Shutting Down Oxyfuel Cutting Equipment _____
B. Disassembling Oxyfuel Equipment _____
C. Changing Cylinders _____
D. Laboratory _____

   Have trainees set up, ignite, adjust, shut down, and disassemble oxyfuel equipment, as well as change cylinders. This laboratory corresponds to Performance Tasks 1 through 5.

Session V. Performing Cutting Procedures, Part One

A. Performing Cutting Procedures
   1. Inspecting the Cut _____
   2. Preparing for Oxyfuel Cutting with a Hand Cutting Torch _____
   3. Cutting Thin Steel _____
   4. Cutting Thick Steel _____
   5. Piercing a Plate _____
   6. Cutting Bevels _____
   7. Washing _____
   8. Gouging _____

Session VI. Performing Cutting Procedures, Part Two; Portable Oxyfuel Cutting Machine Operation

A. Laboratory _____

Have trainees perform straight-line cutting, square shape cutting, piercing, slot cutting, bevel cutting, washing, and gouging. This laboratory corresponds to Performance Tasks 6 through 8.

B. Portable Oxyfuel Cutting Machine Operation _____

1. Torch Adjustment _____
2. Straight-Line Cutting _____
   a. Laboratory

      Allow trainees to practice straight-line cutting with an oxyfuel machine.
3. Bevel Cutting _____
   a. Laboratory

      Allow trainees to practice bevel cutting with an oxyfuel machine.

Session VII. 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 complete each task to the satisfaction of the instructor to receive recognition from the 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.

D. Performance Accreditation Tasks – Have trainees complete PATs 1 through 3 according to the acceptance criteria. _____

1. Have trainees perform PAT 1, Setting Up, Igniting, Adjusting, and Shutting Down Oxyfuel Equipment. This task corresponds to *AWS EG2.0,* Module 8 – Thermal Cutting Processes, Unit 1 – Manual OFC Principles, Key Indicators: 3 and 4.
2. Have trainees perform PAT 2, Cutting a Shape from Thin Steel. This task corresponds to *AWS EG2.0,* Module 8 – Thermal Cutting Processes, Unit 1 – Manual OFC Principles, Key Indicators: 5, 6, and 7. _____
3. Have trainees perform PAT 3, Cutting a Shape from Thick Steel. This task corresponds to *AWS EG2.0,* Module 8 – Thermal Cutting Processes, Unit 1 – Manual OFC Principles, Key Indicators: 5, 6, and 7. _____

Masonry in High-Rise Construction
Annotated Instructor's Guide

Module 28301-05

MODULE OVERVIEW

This module describes the activities involved in organizing and implementing the construction of high-rise buildings. It focuses on the masonry construction techniques used in high-rise construction. Safety and logistics are emphasized.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; *Masonry Level One*; and *Masonry Level Two*.

OBJECTIVES

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

1. Recognize and explain the use of high-rise construction equipment.
2. Identify construction sequence in high-rise construction.
3. State the safety procedures in high-rise construction.
4. Safely work with materials handling equipment in high-rise construction.
5. Properly put on a safety harness, lanyard, and lifeline.
6. Demonstrate hand signals used for lifting materials.

PERFORMANCE TASKS

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

1. Properly don a safety harness, lanyard, and lifeline.
2. Demonstrate hand signals used for lifting materials.

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
Walkie-talkies
Throat microphone
ASME B30.5 Consensus Standard
Ground fault circuit interrupter
Safety harness
Lanyard
Lifeline
Television
VCR/DVD player
Module Examinations*
Performance Profile Sheets*

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. 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.

Building Block Walls—A Basic Guide, National Concrete Masonry Association, Herndon, VA, 1988.

Concepts in Building Fire Safety, John Wiley and Sons, New York, NY, 1978.

Masonry Design and Detailing—For Architects, Engineers and Contractors, Fourth Edition, Christine Beall, McGraw-Hill Publishing, New York, NY, 1997.

The ABCs of Concrete Masonry Construction, Videotape 13:34 minutes, Portland Cement Association, Skokie, IL, 1980.

The Application of Reinforced Concrete Masonry Loadbearing Walls in Multistory Structures, National Concrete Masonry Association, Herndon, VA, 1973.

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 17½ hours are suggested to cover *Masonry in High-Rise Construction*. 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. Introduction and High-Rise Construction	
A. Introduction	_____
B. Construction Sequences	_____
C. Building Design	_____
D. Exterior Walls	_____
E. Interior Walls	_____
Sessions II and III. Materials Handling	
A. Working around Cranes	_____
B. Working around Material Hoists	_____
C. Moving and Stocking Materials	_____
D. Elevated Workstations and Disposal Chutes	_____
E. Laboratory – Trainees practice using hand signals used for lifting materials. This laboratory corresponds to Performance Task 2.	_____
Sessions IV through VI. Personal Protection	
A. Work Area Safety	_____
B. Fall Protection and Falling Objects	_____
C. Laboratory – Trainees practice donning a safety harness, lanyard, and lifeline. This laboratory corresponds to Performance Task 1.	_____
D. Personnel Lifts	_____
E. Controlled Access Zones	_____
Session VII. Review, Module Examination, and Performance Testing	
A. Review	_____
B. Module Examination	_____
1. Trainees must score 70 perent 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.