

## **MODULE OVERVIEW**

This module provides the trainee with an overview of pipefitting, pipefitter responsibilities, and career opportunities. The module also covers basic principles of safety.

## **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. Describe the types of work performed by pipefitters.
2. Identify career opportunities available to pipefitters.
3. Explain the purpose and objectives of an apprentice training program.
4. Explain the responsibilities and characteristics of a good pipefitter.
5. Explain the importance of safety in relation to pipefitting.

## **PERFORMANCE TASKS**

There are no performance tasks for this module.

## **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

Sample pipe

Common pipe wrenches

Copy of an employee manual

Job announcements for pipefitting from local newspapers (want ads)

NCCER Apprentice Training Recognition Forms

*OSHA Safety and Health Standards for the Construction Industry*

Module Examinations\*

\* 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.

## 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 Pipefitters Blue Book*, Latest Edition. W.V. Graves. Webster, TX: Graves Publishing Company.

*The Pipefitters Handbook*, 3<sup>rd</sup> Edition. Forrest R. Lindsey. New York, NY: Industrial Press.

## 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
<b>Session I. Orientation to the Trade</b>	
A. Introduction	_____
B. Pipefitting Work	_____
C. Opportunities in the Trade	_____
D. Your Training Program	_____
E. Responsibilities of the Employee	_____
<b>Session II. Human Relations, Safety Roles, Review, and Module Examination</b>	
A. Human Relations	_____
B. Employer and Employee Safety Obligations	_____
C. Review	_____
D. 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.	

## **MODULE OVERVIEW**

This module covers general hand tool safety and procedures for identifying, selecting, inspecting, using, and caring for pipe vises and stands, pipe wrenches, levels, pipe fabrication tools, and pipe bending tools.

## **PREREQUISITES**

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; and *Pipefitting Level One*, Module 08101-06.

## **OBJECTIVES**

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

1. Describe the safety requirements that apply to the use of pipefitter hand tools.
2. Explain how to properly care for selected pipefitter hand tools.
3. Demonstrate how to safely and properly use selected pipefitter hand tools.
4. Identify tools and state their uses.
5. Use selected hand tools.

## **PERFORMANCE TASKS**

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

1. Identify various pipefitting hand tools.
2. Secure a section of pipe in a vise and pipe stand.
3. Properly use:
  - Straight pipe wrenches
  - Offset pipe wrenches
  - Chain wrenches
  - Strap wrenches
4. Properly use:
  - Laser level
  - Torpedo and larger levels
  - Tubing water level
  - Center finder
5. Check square and level:
  - Turn tongue 180 degrees from where it was
  - Flip level to ensure it is level

## **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

Assorted diameters of pipe

Assorted diameters of tubing at various lengths

Conduit

Chain vises

Yoke vises

Strap vises

Various jacks, stands, rollers, and supports	Hi-Lo gauges
Straight pipe wrenches	Wraparounds
Offset pipe wrenches	Drift pins
Compound leverage wrenches	Two-hole pins
Chain wrenches	Flange spreaders
Pipe tongs	Hacksaws
Strap wrenches	Hacksaw blades
Open-end wrenches	Soil pipe cutters
Adjustable wrenches	Tube and pipe cutters
Framing levels	Manual pipe reamers
Torpedo levels	Hand pipe and bolt threaders
Laser levels	Die heads
Tubing water levels	Thread gauges
Framing squares	Pipe extractors
Pipefitter's squares	Pipe taps
Combination tri squares	Spring tube benders
Center finders	Lever compression tube benders
Straight butt welding clamps	Manual benders
Flange welding clamps	Hammer type flaring tools
T-joint welding clamps	Screw-in type flaring tools
Elbow welding clamps	Module Examinations*
Shop-made aligning dogs	Performance Profile Sheets*

\* 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 hand tools. Emphasize basic hand tool safety.

## 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.

*Tools and Their Uses*, Latest Edition. Naval Education and Training Program Development Center. Washington, DC: 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 20 hours are suggested to cover *Pipefitting Hand Tools*. 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
<b>Session I. Introduction, Safety, Vises, and Stands</b>	
A. Introduction	_____
B. Hand Tool Safety	_____
C. Vises and Stands	_____
D. Laboratory – Trainees practice securing a section of pipe in a stand. This laboratory corresponds to Performance Task 2.	_____
<b>Sessions II and III. Pipe Wrenches and Levels</b>	
A. Wrenches	_____
B. Laboratory – Trainees practice using various types of wrenches. This laboratory corresponds to Performance Task 3.	_____
C. Levels	_____
D. Laboratory – Trainees practice using various types of levels. This laboratory corresponds to Performance Task 4.	_____
<b>Session IV. Pipe Fabrication Tools</b>	
A. Squares and Center Finders	_____
B. Clamps	_____
C. Gauges and Wraparounds	_____
D. Pins	_____
E. Flange Spreaders	_____
<b>Sessions V and VI. Pipe Cutting Tools</b>	
A. Saws, Tube Cutters, and Pipe Cutters	_____
B. Reamers and Threaders	_____
C. Extractors and Taps	_____
<b>Session VII. Benders and Flaring Tools</b>	
A. Benders	_____
B. Flaring Tools	_____
C. Laboratory – Trainees practice fabricating pipe and checking square and level. This laboratory corresponds to Performance Task 5.	_____
<b>Session VIII. Laboratory, Review, Module Examination, and Performance Testing</b>	
A. Laboratory – Trainees identifying various pipefitting hand tools. This laboratory corresponds to Performance Task 1.	_____
B. Review	_____
C. 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.	
D. 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 identifies the hazards and explains general safety procedures that must be followed when using power tools, and explains specific guidelines for using electric and pneumatic power tools.

## **PREREQUISITES**

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; and *Pipefitting Level One*, Modules 08101-06 and 08102-06.

## **OBJECTIVES**

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

1. State the safety procedures that must be followed when working with power tools.
2. Cut pipe using a portable band saw.
3. Identify and explain the uses of portable grinders.
4. Explain the proper and safe operation of machines used in pipe joint preparation:
  - Pipe threaders
  - Portable power drives
  - Pipe bevelers
5. Perform selected pipe joint preparation operations using power tools.

## **PERFORMANCE TASKS**

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

1. Cut pipe using a portable band saw (do not use threading machine).
2. Operate a portable grinder.
3. Replace dies in a threading machine.
4. Cut, ream, and thread pipe using a threading machine.
5. Cut and thread nipples using a nipple chuck.
6. Thread pipe using a portable power drive.
7. Identify several types of pipe bevelers.

## **MATERIALS AND EQUIPMENT LIST**

Overhead projector and screen	Portable band saws and accessories
Transparencies	Portable grinders and accessories
Blank acetate sheets	Assorted lengths of 1-, 1½-, and 2-inch pipe
Transparency pens	Assorted lengths of 3-, 4-, and 6-inch pipe
Whiteboard/chalkboard	Cut and beveled pipe
Markers/chalk	Soapstone
Pencils and scratch paper	Band saw blades
Appropriate personal protective equipment	Tripod chain vise
Face shields	Wraparounds
Gloves	Grinding wheels
Ground fault circuit interrupter	Measuring tapes
Abrasive saws	Spanner wrenches

Geared threaders and accessories  
Thread cutting oil  
Nipple chucks  
Ridgid 300 power drive

Ridgid 535 power drive  
Pipe bevelers  
Module Examinations\*  
Performance Profile Sheets\*

\* 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 power tools. Review basic power tool safety, electrical safety, and eye and hand protection.

## 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.

*Tools and Their Uses*, Latest Edition. Naval Education and Training Program Development Center. Washington, DC: 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 15 hours are suggested to cover *Pipefitting Power Tools*. 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
<b>Session I. Introduction, Safety, and Cutting</b>	
A. Introduction	_____
B. Power Tool Safety	_____
C. Cutting Pipe Using Saws	_____
D. Laboratory – Trainees practice cutting pipe using a portable band saw. This laboratory corresponds to Performance Task 1.	_____
<b>Session II. Portable Grinders</b>	
A. Types of Portable Grinders	_____
B. Inspecting Grinders	_____
C. Operating Grinders	_____
D. Laboratory – Trainees practice operating a portable grinder. This laboratory corresponds to Performance Task 2.	_____



### **Session III. Threading Machines**

- A. Loading Pipe into a Threading Machine \_\_\_\_\_
- B. Cutting and Reaming Pipe \_\_\_\_\_
- C. Replacing Dies \_\_\_\_\_
- D. Laboratory – Trainees practice replacing dies in a threading machine.  
This laboratory corresponds to Performance Task 3. \_\_\_\_\_
- E. Threading Operations \_\_\_\_\_
- F. Machine Maintenance \_\_\_\_\_
- G. Laboratory – Trainees practice cutting, reaming, and threading pipe  
using a threading machine. This laboratory corresponds to Performance Task 4. \_\_\_\_\_

### **Session IV. Special Threading Applications**

- A. Cutting and Threading Nipples \_\_\_\_\_
- B. Threading Pipe Using a Geared Threader \_\_\_\_\_
- C. Laboratory – Trainees practice cutting and threading nipples using a  
nipple chuck. This laboratory corresponds to Performance Task 5. \_\_\_\_\_

### **Session V. Portable Power Drives and Power Bevelers**

- A. Portable Power Drives \_\_\_\_\_
- B. Laboratory – Trainees practice threading pipe using a portable power drive.  
This laboratory corresponds to Performance Task 6. \_\_\_\_\_
- C. Power Bevelers \_\_\_\_\_
- D. Laboratory – Trainees practice identifying several pipe bevelers.  
This laboratory corresponds to Performance Task 7. \_\_\_\_\_

### **Session VI. Review, Module Examination, and Performance Testing**

- A. Review \_\_\_\_\_
- B. 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.
- 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 explains the safety requirements for oxyfuel cutting. It identifies oxyfuel cutting equipment and setup requirements. It explains how to light, adjust, and shut down oxyfuel equipment. Trainees will perform cutting techniques that include straight line, piercing, bevels, and washing.

## **PREREQUISITES**

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; and *Pipefitting Level One*, Modules 08101-06 through 08103-06.

## **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 empty cylinders.
7. Perform oxyfuel cutting:
  - Straight line and square shapes
  - Piercing and slot cutting
  - Bevels
  - Washing
8. Operate a motorized, portable oxyfuel gas cutting machine.

## **PERFORMANCE TASKS**

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

1. Set up oxyfuel equipment.
2. Light and adjust an oxyfuel cutting torch.
3. Shut down oxyfuel cutting equipment.
4. Disassemble oxyfuel equipment.
5. Change empty cylinders.
6. Perform straight line and square shape cutting.
7. Perform piercing and slot cutting.
8. Perform bevel cutting.
9. Perform washing.

## MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Assorted acetylene, liquefied fuel gas, and special-purpose cutting torch tips
Transparencies	Tip cleaners
Blank acetate sheets	Tip drills
Transparency pens	Mechanical guide
Whiteboard/chalkboard	Cylinder cart
Markers/chalk	Motorized oxyfuel track cutter
Pencils and scratch paper	Framing squares
Appropriate personal protective equipment:	Combination squares with protractor head
Safety goggles	Tape measure
Face shields	Soapstone
Welding helmets	Penknife
Ear protection	Pliers
Welding cap	Chipping hammer
Leather jacket	Friction lighter
Leather pants or chaps	Vendor cutting tip chart
Gauntlet-type welding gloves	Wrenches (torch, hose, and regulator)
Respirators	Steel plate
ANSI Z49.1-1999	Thin (16 to 10 gauge)
OSHA 29 CFR 1910.146	Thick (¼ inch to 1 inch)
MSDS for cutting products	Television with VCR or DVD (optional)
Oxygen cylinder with cap	Welding safety video (optional)
Fuel gas cylinder with cap	Module Examinations*
Regulators (oxygen and fuel gas)	Performance Profile Sheets*
Hose set	
One-piece cutting torch	
Combination cutting torch and torch tips	

\* 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 that the trainees operate oxyfuel cutting equipment. Ensure that trainees are briefed on fire and shop safety policies prior to performing any work. Emphasize the special safety precautions associated with the use of cylinders and oxyfuel cutting equipment.

## 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.

*Safety in Welding, Cutting, and Allied Processes, ANSI Z49.1-99, 1999.* Miami, FL: American Welding Society.

*Welder's Handbook, Richard Finch, 1997.* New York, NY: The Berkley Publishing Group, 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 17½ hours are suggested to cover *Oxyfuel Cutting*. 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
<b>Session I. Introduction, Safety, and Oxyfuel Cutting Equipment</b>	
A. Introduction	_____
B. Oxyfuel Cutting Safety	_____
C. Oxyfuel Cutting Equipment	_____
1. Cylinders, Regulators, and Hoses	_____
2. Cutting Torch, Tips, and Tip Equipment	_____
3. Friction Lighters	_____
4. Cylinder Cart	_____
5. Soapstone Markers	_____
6. Specialized Equipment	_____
<b>Session II. Setting Up Oxyfuel Equipment</b>	
A. Setting Up Oxyfuel Equipment	_____
1. Cylinders	_____
2. Hoses and Regulators	_____
3. Torches and Tips	_____
4. Purging and Testing	_____
B. Laboratory – Trainees practice setting up oxyfuel equipment. This laboratory corresponds to Performance Task 1.	_____
<b>Session III. Torch Operations</b>	
A. Controlling the Oxyfuel Torch Flame	_____
B. Laboratory – Trainees practice lighting and adjusting an oxyfuel cutting torch. This laboratory corresponds to Performance Task 2.	_____
C. Shutting Down Oxyfuel Equipment	_____
D. Laboratory – Trainees practice shutting down an oxyfuel cutting outfit. This laboratory corresponds to Performance Task 3.	_____
E. Disassembling Oxyfuel Equipment	_____
F. Laboratory – Trainees practice disassembling an oxyfuel cutting outfit. This laboratory corresponds to Performance Task 4.	_____
G. Changing Empty Cylinders	_____
H. Laboratory – Trainees practice changing empty cylinders on an oxyfuel cutting outfit. This laboratory corresponds to Performance Task 5.	_____

**Sessions IV through VI. Performing Cutting Operations**

- A. Performing Cutting Procedures \_\_\_\_\_
- B. Portable Oxyfuel Cutting Machine Operation \_\_\_\_\_
- C. Laboratory – Trainees practice straight line and square shape cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 6. \_\_\_\_\_
- D. Laboratory – Trainees practice piercing and slot cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 7. \_\_\_\_\_
- E. Laboratory – Trainees practice bevel cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 8. \_\_\_\_\_
- F. Laboratory – Trainees practice washing with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 9. \_\_\_\_\_

**Session VII. Review, Module Examination, and Performance Testing**

- A. Review \_\_\_\_\_
- B. 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.
- 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 hazards and general safety procedures governing the use of stepladders, straight and extension ladders, fixed scaffolds, and rolling scaffolds.

## **PREREQUISITES**

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; and *Pipefitting Level One*, Modules 08101-06 through 08104-06.

## **OBJECTIVES**

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

1. Identify the different types of ladders and scaffolds used on a work site.
2. Describe how to safely use ladders and scaffolding.
3. Properly set up, inspect, and use stepladders, extension ladders, and scaffolding.

## **PERFORMANCE TASKS**

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

1. Select, inspect, and use stepladders.
2. Select, inspect, and use straight and extension ladders.
3. Erect, inspect, and disassemble tubular buck scaffolding.

## **MATERIALS AND EQUIPMENT LIST**

Overhead projector and screen	Transporter
Transparencies	Twelve hinge pins
Blank acetate sheets	Two middle guard rails
Transparency pens	Two scaffold cross braces
Whiteboard/chalkboard	Two scaffold planks with safety
Markers/chalk	Two scaffold upper end frames
Pencils and scratch paper	Two scaffold vertical supports
Appropriate personal protective equipment	Two top guardrails
Stepladder	Company safety manual with procedures for fall protection and rescue after a fall
Platform ladder	Scaffolding tags
Straight ladder	OSHA requirements for scaffolds: 29 CFR 1926.450, Subpart L Scaffolds
Extension ladder	Television with VCR or DVD (optional)
Personal fall arrest system	Safety training video (optional)
Pliers	Module Examinations*
Four base plates	Performance Profile Sheets*
Four caster wheels	
Four leveling jacks	
Four toe boards	

\* 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 ladders and scaffolding. Review fall hazards and personal fall arrest systems.

## 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.

*Occupational Safety and Health Standards for the Construction Industry*, Latest Edition. Occupational Safety and Health Administration. U.S. Department of Labor. Washington, DC: 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 12.5 hours are suggested to cover *Ladders and Scaffolds*. 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
<b>Sessions I and II. Introduction and Ladders</b>	
A. Introduction	_____
B. Stepladders	_____
C. Laboratory – Trainees practice selecting, inspecting, and using a stepladder. This laboratory corresponds to Performance Task 1.	_____
D. Straight and Extension Ladders	_____
E. Laboratory – Trainees practice selecting, inspecting, and using straight and extension ladders. This laboratory corresponds to Performance Task 2.	_____
<b>Sessions III and IV. Scaffolding</b>	
A. Using and Caring for Tubular Buck Scaffolding	_____
B. Using and Caring for Pole Scaffolding	_____
C. Rolling Scaffolding	_____
D. Scaffolding Hazards	_____
E. Scaffolding Safety Guidelines	_____
F. Rescue After a Fall	_____
G. Laboratory – Trainees practice erecting, inspecting, and disassembling scaffolding. This laboratory corresponds to Performance Task 3.	_____
<b>Session V. Review, Module Examination, and Performance Testing</b>	
A. Review	_____
B. 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.	
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 explains the applications, proper use, and safety considerations for using engine-driven generators, welding machines, air compressors, pumps, forklift trucks, and hydraulic cranes.

## **PREREQUISITES**

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; and *Pipefitting Level One*, Modules 08101-06 through 08105-06.

## **OBJECTIVES**

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

1. State the safety precautions associated with the use of motor-driven equipment on job sites.
2. Identify and explain the operation and use of the following motor-driven equipment.
  - Welding machines
  - Portable generators
  - Air compressors
  - Portable pumps
  - Aerial lifts
  - Forklifts
  - Compaction equipment
  - Trenching equipment
  - Backhoe loaders
  - Mobile cranes
3. Perform prestart checks and operate the following equipment:
  - Portable generators
  - Welding machines
  - Portable pumps
  - Air compressors

## **PERFORMANCE TASKS**

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

1. Perform all prestart checks for engine-driven generators.
2. Set up and operate engine-driven welding machines.
3. Operate engine-driven generators.
4. Perform all prestart checks for portable air compressors.
5. Operate portable air compressors.
6. Identify portable pumps to use for specific applications.
7. Identify forklift trucks and recognize safety hazards involved in working around them.
8. Identify types of hydraulic cranes and recognize safety hazards involved in working around them.

## **MATERIALS AND EQUIPMENT LIST**

Overhead projector and screen	Portable air compressor and accessories
Transparencies	Portable air compressor operator's manual
Blank acetate sheets	Portable pumps and accessories
Transparency pens	Portable pump operator's manual
Whiteboard/chalkboard	29 CFR 1926.453
Markers/chalk	Aerial lift operator's manual
Pencils and scratch paper	Compactor operator's manual
Appropriate personal protective equipment	Forklift operator's manual
Portable generators and accessories	Backhoe operator's manual
Portable generator operator's manual	Trencher operator's manual
Welding machine and accessories	Module Examinations*
Welding machine operator's manual	Performance Profile Sheets*

\* 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 motorized equipment. Review hazards associated with each type of equipment and general precautions needed when operating motorized equipment.

## **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.

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

*Machinery Handbook*, Latest Edition. Erik Oberg, Franklin D. Jones, Holbrook L Horton, and Henry H Ryffel. New York, NY: Industrial Press, 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 10 hours are suggested to cover *Motorized 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 the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
<b>Session I. Introduction, Safety, Generators, and Welding Machines</b>	
A. Introduction	_____
B. Safety Precautions	_____
C. Generators	_____
D. Laboratory – Trainees practice performing prestart checks and operating generators. This laboratory corresponds to Performance Tasks 1 and 3.	_____
E. Welding Machines	_____
F. Laboratory – Trainees practice setting up and operating welding machines. This laboratory corresponds to Performance Task 2.	_____
<b>Session II. Air Compressors, Portable Pumps, Aerial Lifts, and Compaction Equipment</b>	
A. Air Compressors	_____
B. Laboratory – Trainees practice performing prestart checks and operating air compressors. This laboratory corresponds to Performance Tasks 4 and 5.	_____
C. Portable Pumps	_____
D. Laboratory – Trainees identifying portable pumps to use for specific applications. This laboratory corresponds to Performance Task 6.	_____
E. Aerial Lifts	_____
F. Compaction Equipment	_____
<b>Session III. Forklifts, Backhoes, Trenchers, and Cranes</b>	
A. Forklifts	_____
B. Laboratory – Trainees practice identifying forklifts and recognizing hazards associated with them. This laboratory corresponds to Performance Task 7.	_____
C. Backhoes	_____
D. Trenchers	_____
E. Cranes	_____
F. Laboratory – Trainees practice identifying cranes and recognizing hazards associated with them. This laboratory corresponds to Performance Task 8.	_____
<b>Session IV. Review, Module Examination, and Performance Testing</b>	
A. Review	_____
B. 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.	
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.	

