MODULE OVERVIEW

This module introduces trainees to the principles, equipment, and methods used to perform the site layout tasks of distance measurement and differential leveling. It also covers the site layout responsibilities of individuals on site, understanding and using site plan drawings, and methods of job site communications.

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; and Carpentry Level Three.

OBJECTIVES

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

1. Describe the major responsibilities of the carpenter relative to site layout.
2. Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa.
3. Use and properly maintain tools and equipment associated with taping.
4. Use manual or electronic equipment and procedures to make distant measurements and perform site layout tasks.
5. Determine approximate distances by pacing.
6. Recognize, use, and properly care for tools and equipment associated with differential leveling.
7. Use a builder’s level and differential leveling procedures to determine site and building elevations.
8. Record site layout data and information in field notes using accepted practices.
9. Check and/or establish 90-degree angles using the 3-4-5 rule.

PERFORMANCE TASKS

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

1. Interpret a construction site/plot drawing and relate the man-made and topographical features and other project information to the layout and topography on the actual site.
2. Convert measurements given in feet and inches to equivalent decimal measurements stated in feet, tenths, and hundredths, and vice versa.
3. Properly use taping equipment and procedures to make distance and site layout measurements.
4. Determine the approximate distances by pacing.
5. Set up, adjust, and field test leveling instruments.
6. Use a builder’s level, leveling rods, and differential leveling procedures to determine site and building elevations.
7. Record differential leveling data in field notes in accordance with accepted procedures.
8. Use differential leveling and distance measurement procedures to transfer elevations up a structure.
9. Check and/or establish 90-degree angles using the 3-4-5 rule.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Markers/chalk</td>
</tr>
<tr>
<td>Transparencies</td>
<td>Pencils and scratch paper</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Appropriate personal protective equipment</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Site plot plans for selected construction sites</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Assortment of hubs, stakes, and laths</td>
</tr>
</tbody>
</table>

*continued*
Assortment of different colored flagging tape  
Permanent markers for marking stakes  
Field notebooks for recording data  
2" × 4" or 2" × 6" ledger boards  
2" × 4" batter boards  
Nylon string  
Calculator  
100 foot steel tape  
Range poles  
Plumb bobs/gammon reels  
Hand sight levels

* 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. This module requires trainees to use differential leveling equipment. Ensure that all trainees are briefed on field safety procedures. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits. This module may require trainees use laser equipment. Ensure all trainees are briefed on laser safety before using laser 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.


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 *Site Layout I: Distance Measurement and Leveling.* 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction to Site Layout</strong></td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Building Plan Drawings</td>
<td></td>
</tr>
<tr>
<td>C. Characteristics of Contour Lines</td>
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<tr>
<td>D. Laboratory</td>
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</tr>
<tr>
<td>Trainees practice interpreting a site/plot drawing. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
<tr>
<td><strong>Session II. Site Control Points and Hand Signals</strong></td>
<td></td>
</tr>
<tr>
<td>A. Site Control Points</td>
<td></td>
</tr>
<tr>
<td>B. Communicating with Hand Signals</td>
<td></td>
</tr>
</tbody>
</table>
Sessions III and IV. Distance Measurements
A. Distance Measurement Tools and Equipment
B. Measuring Distance by Taping
C. Laboratory
Trainees practice making measurements by taping. This laboratory corresponds to Performance Task 3.
D. Converting Distances
E. Laboratory
Trainees practice converting measurements. This laboratory corresponds to Performance Task 2.
F. Estimating Distances by Pacing
G. Laboratory
Trainees practice estimating distances by pacing. This laboratory corresponds to Performance Task 4.

Session V. Differential Leveling Equipment
A. Differential Leveling Tools and Equipment
B. Laboratory
Trainees practice setting up, adjusting, and field testing a leveling instrument. This laboratory corresponds to Performance Task 5.

Sessions VI and VII. Basics of Differential Leveling
A. Basics of Differential Leveling
B. Laboratory
Trainees practice using leveling equipment to determine site elevations. This laboratory corresponds to Performance Task 6.
C. Field Notes
D. Laboratory
Trainees practice recording differential leveling data in field notes. This laboratory corresponds to Performance Task 7.

Session VIII. Leveling Applications
A. Leveling Applications
B. Laboratory
Trainees practice using leveling procedures to transfer elevations. This laboratory corresponds to Performance Task 8.
C. Batter Boards
D. 3-4-5 Rule
E. Laboratory
Trainees practice checking or establishing 90-degree angles using the 3-4-5 rule. This laboratory corresponds to Performance Task 9.

Session IX. 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 introduces trainees to the principles, equipment, and methods used to perform the site layout task of angular measurement. It also covers the site layout responsibilities of individuals on site, understanding and using site plan drawings, and methods of job site communications.

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, Module 27401-08.

Objectives

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

1. Perform calculations pertaining to angular measurements:
   - Use the Pythagorean theorem to determine unknown values.
   - Use right triangle trigonometry to determine unknown values.
   - Convert feet and inches to decimal feet, and vice versa.
   - Convert angular measurements stated in decimal degrees to degrees, minutes, seconds, and vice versa.
   - Convert azimuth to bearing, and vice versa.
   - Convert polar coordinates to rectangular coordinates, and vice versa.
   - Convert distance and direction into latitudes and departures.

2. Recognize, safely use, and properly care for site layout tools and instruments.

3. Describe the use of GPS devices for construction projects.

4. Lay out building lines using traditional and radial layout techniques.

5. Use trigonometric leveling techniques to determine unknown elevations.

Performance Tasks

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

1. Perform calculations pertaining to angular measurements.

2. Recognize, safely use, and properly care for site layout tools and instruments.

3. Read transit/theodolite scales and verniers.

4. Use a transit to lay out building lines using traditional and radial layout techniques.

5. Use trigonometric leveling techniques to determine unknown elevations.

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
Site plot plans
Rotating beam laser instrument
Electronic laser beam detector
Transits
Optical theodolite
Electronic transit and theodolite
Electronic distance measurement instruments (EDMIs)
Prisms
Total station

continued
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 leveling equipment. Ensure that all trainees are briefed on field safety procedures. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits. This module may require trainees use laser equipment. Ensure all trainees are briefed on laser safety before using laser 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.


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 30 hours are suggested to cover Site Layout II: Angular Measurement. 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions I and II. Introduction and the Mathematics of Angular Measurements</td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. The Elements of Plane Geometry</td>
<td></td>
</tr>
<tr>
<td>C. Working with Right Triangles</td>
<td></td>
</tr>
<tr>
<td>D. Converting Between Measurement Systems</td>
<td></td>
</tr>
<tr>
<td>E. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice performing calculations pertaining to angular measurements. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
</tbody>
</table>
Sessions III and IV. Laser Instruments
A. Laser Instruments
B. Use and Selection of Laser Instruments
C. Safety
D. Calibration
E. Laboratory

Trainees practice setting up and operating laser instruments. This laboratory corresponds to Performance Task 2.

Sessions V through VI. Site Layout Instruments
A. Site Layout Instruments and Equipment
B. Reading Transit/Theodolite Scales
C. Laboratory

Trainees practice reading transit/theodolite scales and verniers. This laboratory corresponds to Performance Task 3.
D. Initial Setup, Adjustment, and Checkout of a Transit/Theodolite
E. Surveying and Site Layout Instrument Field Checks
F. Laboratory

Trainees practice setting up and operating site layout instruments. This laboratory corresponds to Performance Task 2.

Session VII. Measuring Angles
A. Measuring Horizontal and Vertical Angles
B. Measuring Traverse Angles

Sessions VIII and IX. Laying Out Building Foundation Lines
A. Laying Out Building Foundation Lines
B. Laboratory

Trainees practice using a transit to lay out building lines using traditional and radial layout techniques. This laboratory corresponds to Performance Task 4.

Sessions X and XI. Leveling Applications
A. Trigonometric Leveling
B. Line Distance and Direction Systems
C. Laboratory

Trainees practice using trigonometric leveling techniques to determine unknown elevations. This laboratory corresponds to Performance Task 5.

Session XII. 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 covers commercial roofing materials and structures. It also describes the procedures for installing commercial roofing such as lap seam, standing seam, and built-up roofs.

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 and 27402-08.

OBJECTIVES

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

1. Describe the characteristics and properties of metals as they relate to roofing applications.
2. Identify the types of trusses and joists used in commercial roofing.
3. Demonstrate the installation of panels for a lap seam metal roof, including the preparation of eaves.
4. Demonstrate the installation of panels for a standing seam metal roof.
5. Describe the proper installation procedures for a built-up roof.
6. Demonstrate the installation of endlapped panels for a standing seam metal roof.
7. Demonstrate the sealing of a sidelap standing seam metal roof.

PERFORMANCE TASKS

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

1. Prepare an eave installation.
2. Install panels for a lap seam roof.
3. Install endlapped standing seam metal roof panels.
4. Seal sidelap seams for a standing seam metal roof.

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen          | Open-web steel joists          |
| Transparencies                        | Angle iron bridging            |
| Blank acetate sheets                  | Smooth rod bridging            |
| Transparency pens                     | Galvanized steel roof panels   |
| Whiteboard/chalkboard                 | Aluminized steel roof panels   |
| Markers/chalk                         | Corrugated lap seam roof metal panel |
| Pencils and scratch paper             | Fasteners for a lap seam metal roof |
| Appropriate personal protective equipment | Tape sealant                   |
| Metal bars                            | Standing-seam metal roof panel |
| Angle iron samples                    | Standing-seam metal roof clips and fasteners |
| Metal channel samples                 | Reinforcing plates             |
| Metal beam samples                    | Cinch straps                   |
| Glulam samples                        | Batten strips                  |
| LVL samples                           | Ridge covers                   |

continued
Insulation boards  Seaming tools
Rolled roofing felt  Quick Quiz*
Stone aggregate  Module Examinations**
Bitumen  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 the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module requires trainees to install roofing panels. Ensure that all trainees are briefed on field safety procedures. 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.


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 Advanced Roof 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction to Advanced Roofing Systems</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Characteristics and Properties of Metal for Roofing</td>
<td></td>
</tr>
<tr>
<td>C. Mechanical Properties of Metal</td>
<td></td>
</tr>
<tr>
<td><strong>Session II. Roof Structures</strong></td>
<td></td>
</tr>
<tr>
<td>A. Open-Web Steel Joists</td>
<td></td>
</tr>
<tr>
<td>B. Stack Trusses</td>
<td></td>
</tr>
<tr>
<td>C. Engineered Truss Systems</td>
<td></td>
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<tr>
<td>D. Laminated Truss Systems</td>
<td></td>
</tr>
<tr>
<td><strong>Sessions III and IV. Metal Roofing Systems: Lap Seam Roofs</strong></td>
<td></td>
</tr>
<tr>
<td>A. Design Considerations</td>
<td></td>
</tr>
<tr>
<td>B. Panel Coatings</td>
<td></td>
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<tr>
<td>C. Lap Seam Metal Roof</td>
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</tr>
<tr>
<td>D. Laboratory</td>
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</tr>
</tbody>
</table>

Trainees practice preparing an eave installation and installing panels for a lap seam roof. This laboratory corresponds to Performance Tasks 1 and 2.
Sessions V and VI. Metal Roofing Systems: Standing Seam Roofs
A. Standing Seam Metal Roofs
B. Laboratory
Trainees practice installing endlapped standing seam metal roof panels and sealing the sidelap seams. This laboratory corresponds to Performance Tasks 3 and 4.

Sessions VII. Built-Up Roofing and Drainage
A. Built-Up Roofing
B. Drainage Considerations

Session VIII. 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 introduces the materials and installation techniques for paneling and wainscoting. It also covers various wall construction systems, including curtain walls and fire-rated walls.

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 27403-08.

OBJECTIVES

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

1. Explain the different types of wall systems.
2. Explain the different types of wall finishes.
3. Explain the various methods of fireproofing a wall system.
4. Demonstrate the ability to install paneling with wainscoting.
5. Describe the process used in forming and installing tilt-up wall panels.
6. Identify various advanced wall systems and explain the techniques used in their construction.
7. Demonstrate the ability to build penetration firewalls and sound control walls per specifications.

PERFORMANCE TASKS

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

1. Apply paneling with wainscoting.
2. Identify various advanced wall systems.
3. Construct firewalls in accordance with specifications.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Drywall compound</td>
</tr>
<tr>
<td>Transparencies</td>
<td>8d nails</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Paneling nails</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Flat black paint</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>General-purpose adhesive</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Vapor barrier materials</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>Tape measure</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>Knife</td>
</tr>
<tr>
<td>Various types of board and sheet paneling</td>
<td>Straightedge</td>
</tr>
<tr>
<td>Wainscoting</td>
<td>Power saw</td>
</tr>
<tr>
<td>Drywall backer board</td>
<td>Hollow-ground blade</td>
</tr>
<tr>
<td>Partial wall for example installation</td>
<td>Cordless drill</td>
</tr>
<tr>
<td>Outlet box</td>
<td>Chalk</td>
</tr>
<tr>
<td>Chalk</td>
<td>Steel square</td>
</tr>
<tr>
<td>Various firestopping materials</td>
<td>Power sander</td>
</tr>
<tr>
<td>Furring strips</td>
<td>Hammer</td>
</tr>
</tbody>
</table>

continued
**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 construct walls. Ensure that all trainees are briefed on shop safety procedures. 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.


**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 25 hours are suggested to cover *Advanced 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Introduction, Safety, and Interior Paneling</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Safety</td>
<td></td>
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<tr>
<td>C. Interior Paneling</td>
<td></td>
</tr>
<tr>
<td><strong>Sessions II through IV. Wainscot Paneling</strong></td>
<td></td>
</tr>
<tr>
<td>A. Wainscot Paneling</td>
<td></td>
</tr>
<tr>
<td>B. Laboratory</td>
<td></td>
</tr>
</tbody>
</table>
|     Trainees practice installing wainscoting, This laboratory corresponds to Performance Task 1.
Sessions V and VI. Curtain Walls
   A. Curtain Walls
   B. Laboratory
      Trainees practice identifying advanced wall systems. This laboratory corresponds to Performance Task 2.

Sessions VII through IX. Fire-Rated Construction
   A. Fire-Rated Construction
   B. Fireproofing and Protection
   C. Laboratory
      Trainees practice constructing firewalls. This laboratory corresponds to Performance Task 3.

Session X. 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 provides extensive coverage of the materials and techniques used in finishing wooden staircases. It also covers stair systems used in commercial construction.

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 27404-08.

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

1. Identify the various stair parts.
2. Explain and demonstrate the procedure for cutting and installing various stair parts, including:
   - Mitered finish stringers
   - Mitered risers
   - Treads
   - Newel posts
   - Handrails
   - Balusters
3. Describe the method for finishing service stairs and main stairs, and demonstrate instructor-selected finishing for one or more of the following:
   - Open
   - Closed
   - Combination open/closed
   - L-shaped
   - U-shaped
4. Identify what materials can be used to build stairs for commercial construction.

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

1. Install open and closed service stair treads and risers.
2. Install treads and risers on open, closed, and/or combination open/closed main stairs.
3. Miter a finished stringer and risers.
4. Install a return nosing.
5. Install an over-the-post balustrade system.
6. Install a post-to-post balustrade system.
7. Lay out an elliptical stairway.
8. Install a preassembled stair rail system.
9. Install a false tread kit.
MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Landing (balcony) newel</td>
</tr>
<tr>
<td>Transparencies</td>
<td>Gooseneck fitting</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Balusters</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Baluster mounting screws or pins</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Quarterturn</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Wood plugs</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>Opening cap</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>Rosette or half-newel</td>
</tr>
<tr>
<td>Samples of various styles of stair finish and balustrade components</td>
<td>Preassembled stair rail system</td>
</tr>
<tr>
<td>Typical stair and balustrade component installation kits</td>
<td>False tread kit</td>
</tr>
<tr>
<td>Photographs or drawings from architectural firms or building materials manufacturers that show specific types of stairways (both finished and under construction)</td>
<td>Hammer</td>
</tr>
<tr>
<td>Manufacturers’ literature for various styles of rails, newel posts, landing newels, fittings, and blusters</td>
<td>Power compound miter saw</td>
</tr>
<tr>
<td>Stair installation kits, hardware, and tools commonly used for stair component installation</td>
<td>Nail set</td>
</tr>
<tr>
<td>Materials used to construct service stairs</td>
<td>Knife</td>
</tr>
<tr>
<td>Manufactured riser and tread templates</td>
<td>Framing square</td>
</tr>
<tr>
<td>Pre-drilled balustrade components</td>
<td>Power drill with bits</td>
</tr>
<tr>
<td>Finish nails</td>
<td>Screwdriver set</td>
</tr>
<tr>
<td>Handrail stock</td>
<td>Tape measure</td>
</tr>
<tr>
<td>Wood screws</td>
<td>Fabricated tread and rise templates</td>
</tr>
<tr>
<td>Handrail posts</td>
<td>Wrench set</td>
</tr>
<tr>
<td>Tread and riser stock</td>
<td>Wood file</td>
</tr>
<tr>
<td>Handrail brackets</td>
<td>Combination square</td>
</tr>
<tr>
<td>Cove molding</td>
<td>Torpedo level</td>
</tr>
<tr>
<td>Glue or construction adhesive</td>
<td>4&quot; level</td>
</tr>
<tr>
<td>Paraffin wax</td>
<td>Wood chisel</td>
</tr>
<tr>
<td>Starting step</td>
<td>Reciprocating saw</td>
</tr>
<tr>
<td>Starting newel posts and mounting systems</td>
<td>Vise grip pliers</td>
</tr>
<tr>
<td>Tread nosing</td>
<td>Bar clamps</td>
</tr>
<tr>
<td>Lag bolts</td>
<td>Plumb bob</td>
</tr>
<tr>
<td>Rail bolts</td>
<td>Baluster spacing sphere</td>
</tr>
<tr>
<td>Volute</td>
<td>Baluster drilling guides</td>
</tr>
<tr>
<td></td>
<td>Trammed bar and points</td>
</tr>
<tr>
<td></td>
<td>Straightedge</td>
</tr>
<tr>
<td></td>
<td>Tempered hardboard or plywood</td>
</tr>
<tr>
<td></td>
<td>Quick Quizzes*</td>
</tr>
<tr>
<td></td>
<td>Module Examinations**</td>
</tr>
<tr>
<td></td>
<td>Performance Profile Sheets**</td>
</tr>
</tbody>
</table>

* 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. This module requires trainees to construct stairs. Ensure that all trainees are briefed on shop safety procedures. 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 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.


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 25 hours are suggested to cover *Advanced Stair 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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</thead>
<tbody>
<tr>
<td>Session I. Introduction</td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Stair and Balustrade System Components</td>
<td></td>
</tr>
<tr>
<td>Sessions II through IV. Service Stairs</td>
<td></td>
</tr>
<tr>
<td>A. Open Service Stairs</td>
<td></td>
</tr>
<tr>
<td>B. Closed Service Stairs</td>
<td></td>
</tr>
<tr>
<td>C. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice installing open and closed service stair risers. This laboratory corresponds to Performance Task 1.</td>
<td></td>
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<tr>
<td>D. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice installing open and closed service stair treads. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
<tr>
<td>Sessions V through VII. Main Stairs</td>
<td></td>
</tr>
<tr>
<td>A. Main Stairs</td>
<td></td>
</tr>
<tr>
<td>B. Laboratory</td>
<td></td>
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<tr>
<td>Trainees practice installing return nosing. This laboratory corresponds to Performance Task 4.</td>
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<tr>
<td>B. Laboratory</td>
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<tr>
<td>Trainees practice mitering a finished stringer. This laboratory corresponds to Performance Task 3.</td>
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<tr>
<td>C. Laboratory</td>
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<tr>
<td>Trainees practice installing treads and risers on open, closed, and/or combination open/closed stairs. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td>E. Laboratory</td>
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</tr>
<tr>
<td>Trainees practice installing a post-to-post balustrade system. This laboratory corresponds to Performance Task 6.</td>
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<tr>
<td>F. Laboratory</td>
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</tr>
<tr>
<td>Trainees practice installing an over-the-post balustrade system. This laboratory corresponds to Performance Task 5.</td>
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</tr>
</tbody>
</table>
Sessions VIII and IX. Other Types of Stairways

A. Rough-Sawn Stairs

B. Elliptical Stairs

C. Laboratory
   Trainees practice laying out an elliptical stairway. This laboratory corresponds to Performance Task 7.

D. Shop-Built Stairs

E. Precut Stair Parts

F. Laboratory
   Trainees practice installing a preassembled stair rail system. This laboratory corresponds to Performance Task 8.

G. Laboratory
   Trainees practice installing a false tread kit. This laboratory corresponds to Performance Task 9.

H. Stairs for Commercial Construction

I. Winder Treads

J. Exterior Wood Stairs

Session X. 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 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

* 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.


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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Introduction, Safety, Aerial Lifts, and Skid Steer Loaders</strong></td>
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</tr>
<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Safety Precautions</td>
<td></td>
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<tr>
<td>C. Aerial Lifts</td>
<td></td>
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<tr>
<td>D. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice the safe operation of aerial lifts. This laboratory corresponds to Performance Task 1.</td>
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</tr>
<tr>
<td>E. Skid Steer Loaders</td>
<td></td>
</tr>
<tr>
<td>F. Laboratory</td>
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</tr>
<tr>
<td>Trainees practice the safe operation of skid steer loaders. This laboratory corresponds to Performance Task 1.</td>
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</tr>
</tbody>
</table>
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 to 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.
MODULE OVERVIEW
This module explains the safety requirements for welding and oxyfuel cutting. It identifies equipment and provides instruction for setting up, lighting, and using the equipment.

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 27406-08.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify and explain the parts of an oxyfuel cutting outfit.
2. State the safety rules for working with oxyfuel and welding equipment.
3. Identify the proper protective clothing and eye protection to be used in oxyfuel cutting and welding.
4. Explain the meaning of the terms backfire and flashback, describe how to avoid them, and what to do if they occur.
5. Match cutting torch tips to their applications.
6. Under the supervision of the instructor, demonstrate the ability to:
   • Set up equipment for oxyfuel cutting.
   • Turn on, light, and adjust the equipment to obtain a neutral flame.
   • Cut mild steel, stop, and restart the cut.
7. Identify the types of arc welding machines.
8. Identify the types of arc welding electrodes.
9. Interpret the meanings of the electrode classification codes.
10. Identify the factors to consider when selecting electrodes.
11. State the characteristics of a good weld.
12. Under the supervision of the instructor, demonstrate the ability to perform a basic welding procedure.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Match cutting torch tips to their applications.
2. Set up equipment for oxyfuel cutting.
3. Turn on, light, and adjust the equipment to obtain a neutral flame.
4. Cut mild steel, stop, and restart the cut.
MATERIALS AND EQUIPMENT LIST

Overhead projector and screen
Transparencies
Blank acetate sheets
Transparency pens
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Tape measure
Soapstone
Penknife
Chipping hammer
Friction lighter
Tip manuals and tip manufacturer’s charts
Vendor cutting tip chart
Appropriate personal protective equipment, to include:
  Safety goggles
  Face shields
  Welding helmets or shields
  Ear protection
  Welding cap
  Leather jacket
  Leather pants or chaps
  Gauntlet-type welding gloves
  Respirators
Brass valves
MSDS for cutting products
Oxygen cylinder with cap
Fuel gas cylinder with cap
Regulators (oxygen and fuel gas)
Hose set
SMAW setup
Workpiece clamps
Wire brush
Pliers
Pneumatic slag chipper
Scaler
Flash arrestor
Reverse flow check valve
Grinding equipment
One-piece cutting torch
Combination cutting torch and torch tips
Assorted acetylene, liquefied fuel gas, and special-purpose cutting torch tips
Welding electrodes
MSDS for electrodes
Welding coupons
Samples of welded metal
Cutting tips
Tip cleaners
Tip drills
Mechanical guide
Cylinder cart
Motorized oxyfuel track cutter
Framing squares
Combination squares with protractor head
Wrenches (torch, hose, and regulator)
Examples of good and bad cuts
Steel plate
  Thin (16 to 10 gauge)
  Thick (¼ inch to 1 inch)
Steel pipe
Vises and pipe jacks to hold steel for cutting
Safety video/DVD (optional)
TV/VCR/DVD player (optional)
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 that the trainees operate oxyfuel cutting and welding 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 and welding 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.

- American Welding Society: http://www.aws.org
- Lincoln Electric Company: http://www.lincolnelectric.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 25 hours are suggested to cover Welding. 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction, Safety, and Oxyfuel Cutting Equipment</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Safety</td>
<td></td>
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<tr>
<td>C. Oxyfuel Cutting Equipment</td>
<td></td>
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<tr>
<td>D. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice matching torch tips to their applications. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td><strong>Session II. Setting Up Oxyfuel Equipment</strong></td>
<td></td>
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<tr>
<td>A. Setting Up Oxyfuel Equipment</td>
<td></td>
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<tr>
<td>B. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice setting up oxyfuel equipment. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td><strong>Sessions III and IV. Oxyfuel Cutting</strong></td>
<td></td>
</tr>
<tr>
<td>A. Oxyfuel Flames</td>
<td></td>
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<tr>
<td>B. Shutting Off the Torch</td>
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<tr>
<td>C. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice lighting and adjusting the equipment to obtain a neutral flame. This laboratory corresponds to Performance Task 3.</td>
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<tr>
<td><strong>Sessions V and VI. Performing Cutting Procedures</strong></td>
<td></td>
</tr>
<tr>
<td>A. Performing Cutting Procedures</td>
<td></td>
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<tr>
<td>B. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice cutting mild steel. This laboratory corresponds to Performance Task 4.</td>
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<tr>
<td><strong>Session VII. Welding Equipment</strong></td>
<td></td>
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<tr>
<td>A. Shielded Metal Arc Welding</td>
<td></td>
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<tr>
<td>B. Shielded Metal Arc Welding Electrodes</td>
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<tr>
<td><strong>Sessions VIII and IX. Welding</strong></td>
<td></td>
</tr>
<tr>
<td>A. The Welding Process</td>
<td></td>
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<tr>
<td>B. Fillet Welds</td>
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<tr>
<td>C. Additional Cutting and Welding Processes</td>
<td></td>
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<tr>
<td>D. Welding Symbols</td>
<td></td>
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</tbody>
</table>
Session X. 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 materials and methods used to finish the interior and exterior of commercial buildings.

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 27407-08.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify materials and methods used to finish the interior of commercial buildings.
2. Identify materials and methods used to finish the exterior of commercial buildings.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. From a set of drawings, identify the finishes required for different surfaces.

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen | Manufacturer’s literature on drywall grid system ceilings |
| Transparencies | Manufacturer’s literature on wood, cork, and bamboo flooring |
| Blank acetate sheets | Manufacturer’s literature on wood, cork, and bamboo flooring |
| Transparency pens | Manufacturer’s literature on exterior insulation and finish systems and direct-applied exterior finish systems |
| Whiteboard/chalkboard | Manufacturer’s literature on concrete masonry units |
| Markers/chalk | Manufacturer’s literature on stucco |
| Pencils and scratch paper | Quick Quiz* |
| Appropriate personal protective equipment | Module Examinations** |
| Project drawings which include a finish schedule | Performance Profile Sheets** |
| Manufacturers’ literature on epoxy paints, fiberglass reinforced panels, and stone veneers | |
| Manufacturers’ literature on paint additives | |
| Manufacturer’s literature on Compasso™ trim | |

* 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. 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.

EIFS in Fairfax County, http://www.fairfaxcounty.gov/dpwes/construction/eifs.htm

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 Commercial Finish 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 the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Interior Finishing</strong></td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Interior Walls</td>
<td></td>
</tr>
<tr>
<td>C. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Trainees practice identifying the finishes required for different surfaces. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>D. Interior Ceilings</td>
<td></td>
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<tr>
<td>E. Interior Floors</td>
<td></td>
</tr>
<tr>
<td><strong>Session II. Exterior Finishing, Review, and Testing</strong></td>
<td></td>
</tr>
<tr>
<td>A. Exterior Walls</td>
<td></td>
</tr>
<tr>
<td>B. Awnings, Canopies, and Porticos</td>
<td></td>
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<tr>
<td>C. Review</td>
<td></td>
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<tr>
<td>D. Module Examination</td>
<td></td>
</tr>
<tr>
<td>1. Trainees must score 70% or higher to receive recognition from NCCER.</td>
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</tr>
<tr>
<td>2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.</td>
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<tr>
<td>E. Performance Testing</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.</td>
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</tbody>
</table>
MODULE OVERVIEW
This module explains the necessary considerations and procedures to prepare a site for commercial construction.

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 27408-08.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Discuss reasons for stormwater protection and erosion and sedimentation control.
2. Name ways to prevent erosion and sedimentation.
3. List items that need to be addressed in the site utilization plan.
4. State methods for ensuring that crane work is performed safely.
5. Identify methods used to mitigate water problems at a work site.

PERFORMANCE TASKS
This is a knowledge-based module. There are no performance tasks.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Army Corps of Engineers literature on disposal of demolition debris</td>
</tr>
<tr>
<td>Transparencies</td>
<td>Sample Stormwater Pollution Prevention Plan</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Concrete calculator</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>One-Call cards</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Soil samples</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Typical construction site signs</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>Quick Quiz*</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>Module Examinations**</td>
</tr>
<tr>
<td>Sample site/plot drawings</td>
<td>Performance Profile Sheets**</td>
</tr>
<tr>
<td>EPA Guide to Developing a Stormwater Pollution Prevention Plan</td>
<td></td>
</tr>
</tbody>
</table>

* 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. 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.


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 7½ hours are suggested to cover Site Preparation. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction and Environmental Concerns</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Environmental Concerns</td>
<td></td>
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<tr>
<td>C. Characteristics of Contour Lines</td>
<td></td>
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<tr>
<td>D. Laboratory</td>
<td></td>
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<tr>
<td>Trainees practice interpreting a site/plot drawing.</td>
<td></td>
</tr>
<tr>
<td><strong>Session II. Site Control</strong></td>
<td></td>
</tr>
<tr>
<td>A. Setting Up the Site</td>
<td></td>
</tr>
<tr>
<td>B. Site Safety and Security</td>
<td></td>
</tr>
<tr>
<td><strong>Session III. Utilities; Review and Testing</strong></td>
<td></td>
</tr>
<tr>
<td>A. Utilities</td>
<td></td>
</tr>
<tr>
<td>B. Review</td>
<td></td>
</tr>
<tr>
<td>C. Module Examination</td>
<td></td>
</tr>
<tr>
<td>1. Trainees must score 70% or higher to receive recognition from NCCER.</td>
<td></td>
</tr>
<tr>
<td>2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.</td>
<td></td>
</tr>
</tbody>
</table>
COURSE OVERVIEW
This course introduces the basic leadership skills a crew leader needs in order to supervise a crew. Trainees will learn about:

- The construction industry today
- Construction organization
- Team building
- Gender and minority issues
- Communication
- Motivation
- Problem solving
- Decision making
- Safety
- Project control

PREREQUISITES
There are no prerequisites for this course.

LEARNING OBJECTIVES
Upon completion of this course, the trainee will be able to:

1. Discuss current issues and organizational structure in the construction industry today.
2. Understand and incorporate leadership skills into work habits, including communication, motivation, team building, problem solving, and decision-making skills.
3. Demonstrate an awareness of safety issues, including the cost of accidents and safety regulations.
4. Identify a supervisor’s typical safety responsibilities.
5. Show a basic understanding of the planning process, scheduling, and cost and resource control.

PERFORMANCE OBJECTIVES
This is a knowledge-based module—there is no performance profile examination.

NCCER STANDARIZED CRAFT TRAINING PROGRAM
The National Center for Construction Education and Research (NCCER) provides a standardized national program of accredited craft training. Key features of the program include instructor certification, competency-based training, and performance testing. The program provides trainees, instructors, and companies with a standard form of recognition through a National Craft Training Registry. The program is described in full in the Guidelines for Accreditation, published by the NCCER. For more information on standardized craft training, contact the NCCER by writing us at 13614 Progress Boulevard, Alachua, FL 32615, calling 1-800-NCCER20, or e-mailing info@NCCER.org. More information may be found at our website at www.nccer.org.

NOTE TO INSTRUCTORS
If you are training under an Accredited NCCER Sponsor, note that you may be eligible for dual credentials for successful completion of Introductory Skills for the Crew Leader. When submitting the Form 200, indicate completion of the two module numbers that apply to Introductory Skills for the Crew Leader – MT101 (from NCCER’s Contren® Management Series) and 04406-09 (from NCCER’s Sheet Metal Level Four) and transcripts will be issued to you accordingly.
HOW TO USE THIS ANNOTATED INSTRUCTOR’S GUIDE

Each page presents two sections of information. The larger section displays each page exactly as it appears in the Trainee Guide. The narrow column ties suggested trainee and instructor actions to each page and provides icons to call your attention to material, safety, audiovisual, or testing requirements. The bottom of each page includes space for your notes.

Review questions and participant exercises are found periodically throughout the Trainee Guide in order for the trainees to test their knowledge. An answer key to these review questions and suggested answers for the participant exercises are located at the back of this Annotated Instructor’s Guide. After trainees complete thereview questions, go over the correct answers with them to be sure they understand all concepts.

PREPARATION

Before teaching this course, you should review the Course Outline, Learning Objectives, and the Materials and Equipment List. Be sure to allow ample time to prepare your own training or lesson plan and gather all required equipment and materials.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Materials</th>
<th>Equipment</th>
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<tbody>
<tr>
<td>Transparencies</td>
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<td>Screen (or large blank wall)</td>
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<td>Calculator</td>
<td>Whiteboard/chalkboard</td>
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<td>Pencils/scratch paper</td>
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<td>Example of OSHA Log Books</td>
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<td>Examples of MSDS Sheets</td>
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<tr>
<td>Copies of Module Examinations*</td>
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</tbody>
</table>

* 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 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.


**TEACHING TIME FOR THIS COURSE**

An outline for use in developing your lesson plan is presented below. This course is designed to be taught in one of two formats: two 8-hour sessions (such as all-day workshops) or eight 2-hour sessions (such as after-work training seminars). Because of this, each session below has a suggested time period of two hours. If leading 8-hour sessions, simply teach four of these 2-hour sessions both times your class meets. All instructors will need to adjust the time required for participant activities and testing based on class size and resources.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Orientation to the Job</strong></td>
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<tr>
<td>A. Overview of the Construction Industry</td>
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<tr>
<td>1. Historical Importance of the Construction Industry</td>
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<td>2. Growth and Economics of the Construction Industry</td>
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<td>3. Changing Values of Workers</td>
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<tr>
<td>B. The Construction Industry Today</td>
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<tr>
<td>1. Training</td>
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<td>2. New Technology</td>
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<tr>
<td>C. Gender and Minority Issues</td>
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<tr>
<td>1. Communication Styles of Men and Women</td>
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<td>2. Language Barriers</td>
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<td>3. Cultural Differences</td>
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<td>4. Sexual Harassment</td>
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<td>5. Gender and Minority Discrimination</td>
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<tr>
<td>D. Construction Projects</td>
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<tr>
<td>E. The Construction Organization</td>
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<tr>
<td>1. Division of Responsibility</td>
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<td>2. Authority and Responsibility</td>
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<tr>
<td>3. Job Descriptions</td>
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<tr>
<td>4. Policies and Procedures</td>
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<tr>
<td><strong>Session II. Leadership Skills, Part One</strong></td>
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<tr>
<td>A. Introduction to Supervision</td>
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<tr>
<td>B. The Shift in Work Activities</td>
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<tr>
<td>C. Becoming a Leader</td>
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<tr>
<td>1. Characteristics of Leaders</td>
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<tr>
<td>2. Functions of a Leader</td>
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<tr>
<td>3. Leadership Styles</td>
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<tr>
<td>4. Ethics in Leadership</td>
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<td>D. Communication</td>
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<tr>
<td>1. Verbal Communication</td>
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<td>2. Non-Verbal Communication</td>
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<td>3. Written or Visual Communication</td>
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<tr>
<td>4. Communication Issues</td>
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<tr>
<td>E. Motivation</td>
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<tr>
<td>1. Employee Motivators</td>
<td></td>
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<tr>
<td>2. Motivating Employees</td>
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</tbody>
</table>
Session III. Leadership Skills, Part Two
A. Team Building
   1. Successful Teams
   2. Building Successful Teams
B. Getting the Job Done
   1. Delegating Responsibilities
   2. Implementing Policies and Procedures
C. Problem Solving and Decision Making
   1. Problem Solving vs. Decision Making
   2. Types of Decisions
   3. Formal Problem-Solving Techniques
   4. Special Leadership Problems

Session IV. Safety, Part One
A. Safety Overview
B. Costs of Accidents
   1. Insured Costs
   2. Uninsured Costs
C. Safety Regulations
   1. Workplace Inspections
   2. Penalties for Violations

Session V. Safety, Part Two
A. Safety Responsibilities
   1. Safety Program
   2. Safety Policies and Procedures
   3. Hazard Identification and Assessment
   4. Safety Information and Training
   5. Safety Record Systems
   6. Accident Investigation Procedures
B. Supervisor Involvement in Safety
   1. Safety Meetings
   2. Inspections
   3. First Aid
   4. Fire Protection and Prevention
   5. Substance Abuse
   6. Accident Investigations
C. Promoting Safety
   1. Meetings
   2. Contests
   3. Recognition and Awards
   4. Publicity

Session VI. Project Control, Part One
A. Project Control Overview
B. Project Delivery Systems
   1. General Contracting
   2. Design-Build
   3. Construction Management
C. An Overview of Planning
   1. What is Planning?  
   2. Why Plan?
D. Stages of Planning
   1. Pre-Construction Planning  
   2. Construction Planning
E. The Planning Process
   1. Establishing a Goal  
   2. Identifying the Work to be Done  
   3. Determining Tasks  
   4. Communicate Responsibilities  
   5. Follow-Up
F. Planning Resources
   1. Planning Materials  
   2. Planning Equipment  
   3. Planning Tools  
   4. Planning Labor
G. Ways to Plan

Session VII. Project Control, Part Two
A. Estimating
B. Scheduling
   1. The Scheduling Process  
   2. Bar Charts  
   3. Network Schedule  
   4. Short-Interval Production Scheduling  
   5. Updating a Schedule

Session VIII. Project Control, Part Three
A. Cost Awareness And Control
   1. Categories of Costs  
   2. Field Reporting System  
   3. Supervisor’s Role in Cost Control
B. Resource Control
   1. Control  
   2. Materials Control  
   3. Equipment Control  
   4. Tools Control  
   5. Labor Control
C. Production and Productivity
D. Summary
   1. Summarize Course  
   2. Answer Questions
E. Module Examination
   1. Trainee must score 70% or higher to receive recognition from the NCCER.  
   2. Record testing results on Craft Training Report Form 200 and submit the results to the Training Program Sponsor.