MODULE OVERVIEW

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

PREREQUISITES

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

OBJECTIVES

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

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

PERFORMANCE TASKS

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

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

MATERIALS AND EQUIPMENT LIST

- Overhead projector and screen
- Transparencies
- Blank acetate sheets
- Transparency pens
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and scratch paper
- Appropriate personal protective equipment
- Walkie-talkies
- Throat microphone
- ASME B30.5 Consensus Standard
- Ground fault circuit interrupter
- Safety harness
- Lanyard
- Lifeline
- Television
- VCR/DVD player
- Module Examinations*
- Performance Profile Sheets*

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

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

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


TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 17½ hours are suggested to cover *Masonry in High-Rise Construction*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Introduction and High-Rise Construction</strong></td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Construction Sequences</td>
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<tr>
<td>C. Building Design</td>
<td></td>
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<tr>
<td>D. Exterior Walls</td>
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<tr>
<td>E. Interior Walls</td>
<td></td>
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<tr>
<td><strong>Sessions II and III. Materials Handling</strong></td>
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<tr>
<td>A. Working around Cranes</td>
<td></td>
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<tr>
<td>B. Working around Material Hoists</td>
<td></td>
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<tr>
<td>C. Moving and Stocking Materials</td>
<td></td>
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<tr>
<td>D. Elevated Workstations and Disposal Chutes</td>
<td></td>
</tr>
<tr>
<td>E. Laboratory – Trainees practice using hand signals used for lifting materials.</td>
<td></td>
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<tr>
<td><strong>Sessions IV through VI. Personal Protection</strong></td>
<td></td>
</tr>
<tr>
<td>A. Work Area Safety</td>
<td></td>
</tr>
<tr>
<td>B. Fall Protection and Falling Objects</td>
<td></td>
</tr>
<tr>
<td>C. Laboratory – Trainees practice donning a safety harness, lanyard, and lifeline.</td>
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<tr>
<td>D. Personnel Lifts</td>
<td></td>
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<tr>
<td>E. Controlled Access Zones</td>
<td></td>
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<tr>
<td><strong>Session VII. Review, Module Examination, and Performance Testing</strong></td>
<td></td>
</tr>
<tr>
<td>A. Review</td>
<td></td>
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<tr>
<td>B. Module Examination</td>
<td></td>
</tr>
<tr>
<td>1. Trainees must score 70 percent 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>
<td></td>
</tr>
</tbody>
</table>
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 many specialized materials and techniques used in the masonry trade. It covers properties and work requirements for such materials as natural and cultured stone, acid brick, refractory brick, structural tile, and glass block. It presents techniques for working under cold- and hot-weather conditions and explains construction of various types of masonry sound barriers.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Masonry Level One; Masonry Level Two; and Masonry Level Three, Module 28301-05.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Explain the various techniques used to provide adequate protection during hot- and cold-weather masonry construction.
2. Describe all-weather construction techniques.
3. Describe techniques for surface-bonding mortar.
4. Demonstrate techniques for construction of stone walls and other stone building surfaces.
5. Demonstrate basic knowledge of various building materials such as glass block and refractory brick.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Complete two of the following tasks selected by the instructor:
   • Construct a 4’ × 4’ rubble stone wall dry-stacked.
   • Construct a 4’ × 4’ wall of glazed masonry units.
   • Construct a 4’ × 4’ wall of glass blocks.
   • Construct a 4’ × 4’ wall or floor of refractory brick.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Materials and Equipment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Sledgehammer</td>
</tr>
<tr>
<td>Transparencies</td>
<td>Face hammer</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Mash hammer</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Bush hammer</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Pitching chisel</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Toothed chisel</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>Regular chisel</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>Wooden cutting bench</td>
</tr>
<tr>
<td>Admixtures, including:</td>
<td>Masonry tools</td>
</tr>
<tr>
<td>Set accelerator</td>
<td>Slickers</td>
</tr>
<tr>
<td>Air-entraining admixture</td>
<td>Various types of acid brick</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>Various types of refractory brick</td>
</tr>
<tr>
<td>Masonry units</td>
<td>Manufacturer’s literature on refractory bricks</td>
</tr>
<tr>
<td>Samples of natural stone</td>
<td>Refractory mortar</td>
</tr>
<tr>
<td>Samples of manufactured stone</td>
<td></td>
</tr>
</tbody>
</table>
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. This module requires that trainees work with different types of masonry units, mortars, and adhesives. Ensure that all trainees are briefed on shop safety procedures and first aid.

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 60 hours are suggested to cover Specialized Materials and Techniques. 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 and Weather Considerations</strong></td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Weather Considerations</td>
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<tr>
<td><strong>Session II. Surface Bonding and Surface Coatings</strong></td>
<td></td>
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<tr>
<td>A. Surface Bonding</td>
<td></td>
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<tr>
<td>B. Surface Coatings</td>
<td></td>
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<tr>
<td><strong>Sessions III through VI. Stone</strong></td>
<td></td>
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<tr>
<td>A. Materials and Preparation</td>
<td></td>
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<tr>
<td>B. Coursing and Laying</td>
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<tr>
<td>C. Form-Based Stonemasonry</td>
<td></td>
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<tr>
<td>D. Cultured Stone Installation</td>
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<tr>
<td>E. Laboratory – Trainees practice constructing a dry-stacked rubble stone wall.</td>
<td>This laboratory corresponds to Performance Task 1.</td>
</tr>
</tbody>
</table>
Sessions VII through IX. Acid Brick
   A. Uses of Acid Brick
   B. Acid Brick Materials
   C. Laying an Acid Brick Floor

Sessions X through XIII. Refractory Brick
   A. Refractory Brick
   B. Laying Refractory Brick
   C. Curing and Heat-Up
   D. Laboratory – Trainees practice constructing a wall or floor of refractory brick.
      This laboratory corresponds to Performance Task 1.

Sessions XIV through XVIII. Glazed Masonry Units
   A. Properties
   B. Bonding and Coursing
   C. Laying Structural Glazed Tile
   D. Laboratory – Trainees practice constructing a wall of glazed masonry units.
      This laboratory corresponds to Performance Task 1.

Sessions XIX through XXII. Glass Block
   A. Applications and Uses
   B. Variations
   C. Detail Procedures
   D. Laboratory – Trainees practice constructing a wall of glass blocks. This
      laboratory corresponds to Performance Task 1.

Session XXIII. Sound Barrier Walls
   A. Pier and Panel Barrier Walls
   B. Pilaster and Panel Barrier Walls
   C. Cantilever Walls

Session XXIV. 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 most common problems that appear in masonry structures and describes various techniques that can be used to repair them. Repair activities include tuckpointing, brick replacement, crack sealing, waterproofing, and stain removal.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Masonry Level One; Masonry Level Two; and Masonry Level Three, Modules 28301-05 and 28302-05.

OBJECTIVES

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

1. Recognize signs of deterioration in masonry structures.
2. Describe the causes of efflorescence, cracking, and faulty mortar joints.
3. Describe the procedures for preventing and correcting efflorescence, cracking, and faulty mortar joints.
4. Describe the procedures for preventing and correcting water damage in basements.
5. Describe the procedures for rebuilding fireplaces.
6. Replace a damaged brick in a wall.
7. Repair mortar joints.

PERFORMANCE TASKS

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

1. Replace a damaged brick in a wall.
2. Repair mortar joints in a brick wall by tuckpointing.

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
- Fiber-optic boroscope
- Plugging chisel
- Tuckpoint grinder
- Mortar
- Bricks
- Basic masonry tools
- Cleaning solution
- MSDSs for cleaning compounds
- Acid brushes
- Portable pressure washer or manufacturer’s literature
- Portable sand blaster or manufacturer’s literature
- Various types of gloves
- Wire brush
- Tooothing chisel
- Drill
- Stiff brush
- Television
- VCR/DVD player
- 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 trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require trainees to visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits. This module requires that trainees work with chisels, tuckpoint grinders, bricks, and mortar. Ensure that all trainees are briefed on shop safety procedures, eye protection, and first aid.

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 15 hours are suggested to cover Repair and Restoration. 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>
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<tbody>
<tr>
<td>Session I. Introduction, Inspection, and Problem Solving</td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Inspection and Problem Solving</td>
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<tr>
<td>1. Types of Deterioration and Their Causes</td>
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<tr>
<td>2. Inspection of Existing Masonry Structures</td>
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<tr>
<td>3. Inspection Checklist</td>
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<tr>
<td>Session II. Repair Techniques</td>
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<tr>
<td>A. Tuckpointing</td>
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<tr>
<td>B. Laboratory – Trainees practice repairing mortar joints in a brick wall by tuckpointing. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td>C. Efflorescence Removal</td>
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<td>D. Crack Repair</td>
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<tr>
<td>Session III. Restoration of Brick Walls</td>
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<tr>
<td>A. Cleaning Techniques</td>
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<td>B. Staining Problems</td>
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<td>C. Removing Old Paint</td>
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<tr>
<td>D. Replacing Bricks and Mortar Joints</td>
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<tr>
<td>E. Laboratory – Trainees practice replacing a damaged brick in a wall. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>Session IV. Repair of a Foundation Wall</td>
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<tr>
<td>A. Repairing Water Intrusion</td>
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<tr>
<td>B. Repairing Cracks and Localized Problems</td>
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</tbody>
</table>
Session V. Repairing and Rebuilding Chimneys and Fireplaces

A. Repairing Chimneys
B. Repairing Fireplaces

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 provides information about the format and content of commercial drawings and their use in conveying specific construction requirements. It describes the standard format for specifications.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Masonry Level One; Masonry Level Two; and Masonry Level Three, Modules 28301-05 through 28103-05.

OBJECTIVES

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

1. Recognize the difference between commercial and residential construction drawings.
2. Identify the basic keys, abbreviations, and other references contained in a set of commercial drawings.
3. Accurately read a set of commercial drawings.
4. Explain basic construction details and concepts employed in commercial construction.

PERFORMANCE TASKS

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

1. Identify and document the design and location of ten items contained in a set of commercial drawings (the drawings and items will be chosen by the instructor).
2. Calculate the floor area of each room in a floor plan.

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen | Pencils and scratch paper |
| Transparencies               | Appropriate personal protective equipment |
| Blank acetate sheets         | Set of commercial drawings |
| Transparency pens           | Quick Quiz* |
| Whiteboard/chalkboard       | Module Examinations** |
| Markers/chalk               | Performance Profile Sheets** |

* Located in the back of this module.
**Located in the Test Booklet.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures.
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 $2 \frac{1}{2}$ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately $12 \frac{1}{2}$ hours are suggested to cover Commercial Drawings. 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>Session I. Introduction and Drawing Requirements and Contents</td>
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</tr>
<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Requirements for Commercial Plans</td>
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<tr>
<td>C. Commercial Plan Contents</td>
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</tr>
<tr>
<td>Sessions II and III. Reading and Understanding Drawings I</td>
<td></td>
</tr>
<tr>
<td>A. Architectural Drawings</td>
<td></td>
</tr>
<tr>
<td>B. Laboratory – Trainees practice calculating the area of each room in a floor plan in a set of commercial drawings. This laboratory corresponds to Performance Task 2.</td>
<td></td>
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<tr>
<td>C. Structural Drawings</td>
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<tr>
<td>Session IV. Reading and Understanding Drawings II and Written Specifications</td>
<td></td>
</tr>
<tr>
<td>A. Mechanical Drawings</td>
<td></td>
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<tr>
<td>B. Electrical Drawings</td>
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<tr>
<td>C. Laboratory – Trainees practice identifying and documenting the design and location of ten items contained in a set of commercial drawings. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>D. Written Specifications</td>
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<tr>
<td>Session V. Review, Module Examination, and Performance Testing</td>
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</tr>
<tr>
<td>A. Review</td>
<td></td>
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<tr>
<td>B. Module Examination</td>
<td></td>
</tr>
<tr>
<td>1. Trainees must score 70 percent 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>C. 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>
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<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 covers the basic procedures for doing takeoffs and estimating quantities of masonry material. Several different methods are described.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Masonry Level One; Masonry Level Two; and Masonry Level Three, Modules 28301-05 through 28304-05.

OBJECTIVES

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

1. Explain and apply basic materials estimating procedures for concrete block and brick construction.
2. Explain and apply basic estimating procedures for reinforcements, ties, and other materials.
3. Explain and apply procedures for estimating quantities of mortar and mortar materials.

PERFORMANCE TASKS

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

1. Estimate masonry quantities and volumes from a set of commercial drawings.
2. Complete a set of estimating worksheets.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead projector and screen</td>
<td>Appropriate personal protective equipment</td>
</tr>
<tr>
<td>Transparencies</td>
<td>Calculator</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Estimating calculator</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Estimating program</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Module Examinations*</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Performance Profile Sheets*</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td></td>
</tr>
</tbody>
</table>

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

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

ADDITIONAL RESOURCES

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

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 $2\frac{1}{2}$ 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 Estimating. 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>Sessions I and II. Introduction and Estimating Brick and Mortar</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Laboratory – Trainees practice completing a set of estimating worksheets. This laboratory corresponds to Performance Task 2.</td>
<td></td>
</tr>
<tr>
<td>C. Estimating Brick and Mortar</td>
<td></td>
</tr>
<tr>
<td>1. Coursing Method for Brick</td>
<td></td>
</tr>
<tr>
<td>2. Square Foot Method for Brick</td>
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<td>3. Openings and Mortar</td>
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<td><strong>Sessions III and IV. Estimating Block and Mortar</strong></td>
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<td>A. Coursing Method for Block</td>
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<td>B. Square Foot Method for Block</td>
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<td>C. Openings</td>
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<td>D. Mortar and Grout</td>
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<td>E. Laboratory – Trainees practice estimating masonry quantities from a set of commercial drawings. This laboratory corresponds to Performance Task 1.</td>
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<td><strong>Sessions V and VI. Estimating Accessory Items</strong></td>
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<td>A. Joint Reinforcement</td>
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<td>B. Structural Reinforcement</td>
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<td>C. Masonry Ties and Additional Items</td>
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<td>D. Laboratory – Trainees practice estimating masonry quantities from a set of commercial drawings. This laboratory corresponds to Performance Task 1.</td>
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<td><strong>Session VII. Estimating Stone</strong></td>
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<td>A. Stone Veneers</td>
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<td>B. Stone Volume Estimates</td>
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<tr>
<td>C. Laboratory – Trainees practice estimating masonry quantities from a set of commercial drawings. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td><strong>Sessions VIII and IX. Estimating Aids and Practice Exercises</strong></td>
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<tr>
<td>A. Estimating Aids</td>
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<tr>
<td>B. Practice Exercises</td>
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<tr>
<td>C. Laboratory – Trainees practice estimating masonry quantities from a set of commercial drawings. This laboratory corresponds to Performance Task 1.</td>
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<td><strong>Session X. Review, Module Examination, and Performance Testing</strong></td>
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<td>A. Review</td>
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<td>B. Module Examination</td>
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<td>1. Trainees must score 70 percent or higher to receive recognition from NCCER.</td>
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<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>
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 masonry trainee to the principles, equipment, and methods used to perform the site layout tasks of distance measurement and differential leveling. Also covered are the site layout responsibilities of individuals on site, understanding and using site plan drawings, and methods of job site communication.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Masonry Level One; Masonry Level Two; and Masonry Level Three, Modules 28301-05 through 28305-05.

OBJECTIVES

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

1. Describe the major responsibilities of the mason 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 taping and/or chaining equipment and procedures to make distance 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 or transit 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 topographic features and other project information to the layout and topography of 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 approximate distances by pacing.
5. Set up, adjust, and field test a leveling instrument.
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 practices.
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

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 for selected construction sites  
Assortment of hubs, stakes, and laths  
Assortment of different colored flagging tape  
Permanent markers for marking stakes  
Field notebook pages for recording leveling data  
2 × 4 or 2 × 6 ledger boards  
2 × 4 batter board support stakes  
Nylon string  
Calculator  
VCR/DVD player (optional)  
Television (optional)  
Videotape (optional), Foundation and Curb Forms: Preparing Site for Form Building  
100-foot steel tape  
Range poles  
Plumb bobs/gammon reels  
Hand sight levels  
Chaining pins  
Tension spring  
Builder’s level  
Transit level  
Laser level  
Tripods  
Assortment of leveling rods and accessories  
Copies of Worksheets 1 through 4*  
Module Examinations*  
Performance Profile Sheets*  

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 22½ hours are suggested to cover Site Layout—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>
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<tbody>
<tr>
<td>Session I. Introduction, Site/Plot Plans and Topographical Maps, and Contour Lines</td>
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</tr>
<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Site/Plot Plans and Topographical Maps</td>
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</tbody>
</table>
C. Characteristics of Contour Lines

D. Laboratory – Trainees practice interpreting a drawing and relating the man-made and topographic features and other project information to the layout and topography of the actual site. This laboratory corresponds to Performance Task 1.

Session II. Site Layout Control Points and Communicating with Hand Signals
A. Site Layout Control Points
B. Communicating with Hand Signals

Sessions III and IV. Measuring Distances by Taping and Pacing
A. Distance Measurement Tools and Equipment
B. Measuring Distances by Taping
C. Laboratory – Trainees practice measuring various distances using taping equipment. This laboratory corresponds to Performance Task 3.
D. Converting Between Distance Measurement Systems
E. Laboratory – Trainees practice converting measurements. This laboratory corresponds to Performance Task 2.
F. Estimating Distances by Pacing
G. Laboratory – Trainees practice pacing distances and determining their individual pace lengths. This laboratory corresponds to Performance Task 4.

Session V. Electronic Distance Measurements and Differential Leveling Tools and Equipment
A. Electronic Distance Measurements
B. Differential Leveling Tools and Equipment
C. Initial Setup and Adjustment of a Leveling Instrument
D. Laboratory – Trainees practice setting up and adjusting a leveling instrument. This laboratory corresponds to Performance Task 5.
E. Testing the Calibration of the Leveling Instrument
F. Laboratory – Trainees practice field testing a leveling instrument. This laboratory corresponds to Performance Task 5.

Sessions VI and VII. Basics of Differential Leveling and Field Notes
A. Basics of Differential Leveling
B. Field Notes
C. Laboratory – Trainees calculate and record differential leveling measurement data. This laboratory corresponds to Performance Task 7.
D. Laboratory – Trainees practice using a builder’s level, leveling rods, and differential leveling procedures to determine site and building elevations. Ensure that all data is properly recorded in field notes. This laboratory corresponds to Performance Task 6.

Session VIII. Leveling Applications, Batter Boards, and the 3–4–5 Rule
A. Leveling Applications
B. Laboratory – Trainees practice using differential leveling to transfer elevations up a structure. This laboratory corresponds to Performance Task 8.
C. Batter Boards
D. 3–4–5 Rule
E. Laboratory – Trainees practice using the 3–4–5 rule to check or establish a 90-degree angle. This laboratory corresponds to Performance Task 9.
Session IX. 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.
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 these review 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>
<td>Overhead projector</td>
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<tr>
<td>Markers/chalk</td>
<td>Screen (or large blank wall)</td>
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<tr>
<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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</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.

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<thead>
<tr>
<th>Topic</th>
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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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<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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<td>D. Construction Projects</td>
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<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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<td>4. Policies and Procedures</td>
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<td><strong>Session II. Leadership Skills, Part One</strong></td>
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<td>A. Introduction to Supervision</td>
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<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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<td>2. Functions of a Leader</td>
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<td>3. Leadership Styles</td>
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<td>4. Ethics in Leadership</td>
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<td>D. Communication</td>
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<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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<td>4. Communication Issues</td>
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<td>E. Motivation</td>
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<tr>
<td>1. Employee Motivators</td>
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<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.