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

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

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

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

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

1. Lay out and tie rebar at every point in the perimeter of a mat (area to be decided individually).
2. Interpret tags.
3. Cut rebar.
4. Demonstrate and perform commonly used ties (wrap and snap, snap, figure 8, and saddle).

MATERIALS AND EQUIPMENT LIST

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

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

ADDITIONAL RESOURCES

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

Planning Reinfocing Bars, 2005. Concrete Reinforcing Steel Institute (CRI).

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 40 hours are suggested to cover Concrete Reinforcement. 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, Overview, and Identification of Reinforcing Bars</td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Overview of Reinforced Concrete</td>
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<tr>
<td>C. Identification of Reinforcing Bars</td>
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<tr>
<td>Sessions II and III. General Requirements</td>
<td></td>
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<tr>
<td>A. Fabrication</td>
<td></td>
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<tr>
<td>B. Laboratory – Trainees practice interpreting reinforcing bar tags. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td>C. Bar Supports</td>
<td></td>
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<tr>
<td>D. Welded-Wire Fabric</td>
<td></td>
</tr>
<tr>
<td>Sessions IV through VI. Safety, Cutting and Bending Reinforcing Bar</td>
<td></td>
</tr>
<tr>
<td>A. General Safety Precautions</td>
<td></td>
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<tr>
<td>B. Cutting</td>
<td></td>
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<tr>
<td>C. Laboratory – Trainees practice cutting reinforcing bar. This laboratory corresponds to Performance Task 3.</td>
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<tr>
<td>D. Bending</td>
<td></td>
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</tbody>
</table>
Sessions VII through X. Tying and Splicing Reinforcing Bar
   A. Tying and Splicing Reinforcing Bar
   B. Tying Tips
   C. Laboratory – Trainees practice various types of ties. This laboratory corresponds to Performance Task 4.

Sessions XI through XV. Placing Reinforcing Steel
   A. Placing Bars in Footings
   B. Column Dowels
   C. Placing Bars in Walls
   D. Wall Mat Supports
   E. Placing Bars in Columns
   F. Placing Bars in Beams and Girders
   G. Laboratory – Trainees practice laying and tying reinforcing bar. This laboratory corresponds to Performance Task 1.

Session XVI. 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 safety requirements for concrete reinforcement. It provides information on work-zone safety, fall protection, and use of personal protective equipment. It also covers topics such as general work-site safety, how to safely use hand and power tools, trenching safety, and confined spaces.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Reinforcing Ironwork Level One, Module 39101-05.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify hazards associated with working with concrete reinforcing bar.
2. Identify signs and barricades that will help you perform your job safely.
3. Identify safety hazards associated with concrete construction work.
4. Demonstrate and explain proper on-site safety, including the use of appropriate personal protective equipment (PPE).
5. Describe how to safely use ladders and scaffolding.
6. Explain and identify safety hazards associated with excavations.
7. Demonstrate proper lifting and carrying techniques for reinforcing bar.
8. Demonstrate the proper technique for using a positioning device.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Demonstrate proper lifting techniques (and setting down) after stretching.
2. Put on fall protection.
3. Wear proper appropriate personal protective equipment (PPE).
4. In real or simulated climbing, demonstrate proper tie-off, body positioning, and three-point contact.

MATERIALS AND EQUIPMENT LIST
- Overhead projector and screen
- Transparencies
- Blank acetate sheets
- Transparency pens
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and scratch paper
- Samples of common safety signs
- Safety tags
- Safety vest
- Rebar safety caps
- Personal protective equipment, including:
  - Hard hats
  - Safety glasses
  - Gloves
  - Safety shoes
  - Hearing protection
  - Personal fall arrest system, including:
    - Safety harness
    - Lanyards
    - Positioning devices
    - Deceleration devices
    - Lifelines
    - Anchoring devices
    - Equipment connectors
    - Atmospheric hazard detection meter
- Copies of Quick Quiz*
- Module Examinations**
- 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.

Construction Back Safety. Videocassette. 10 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.

Construction Confined Space Entry. Videocassette. 10 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.

Construction Fall Protection: Get Arrested! Videocassette. 11 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.


Construction Stairways & Ladders. Videocassette. 10 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.


HazCom for Construction. Videocassette. 11 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.


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 Concrete Reinforcement Safety. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td>Session I. Introduction and Work-Zone Safety</td>
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<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Work-Zone Safety</td>
<td></td>
</tr>
<tr>
<td>1. Signs, Tags, Barricades, and Barriers</td>
<td></td>
</tr>
<tr>
<td>2. Highway Work Zones</td>
<td></td>
</tr>
<tr>
<td>3. Falling Objects and Tool and Equipment Safety</td>
<td></td>
</tr>
<tr>
<td>4. Concrete Construction</td>
<td></td>
</tr>
</tbody>
</table>
5. Personal Protective Equipment

6. Personal Safety

C. Laboratory – Trainees practice proper lifting techniques. This laboratory corresponds to Performance Task 1.

D. Laboratory – Trainees practice putting on personal protective equipment. This laboratory corresponds to Performance Task 3.

Session II. Fall Protection

A. Falling Hazards and Safeguards

B. Guardrails

C. Personal Fall-Arrest Systems

D. Safety Net Systems

E. Rescue After A Fall

F. Laboratory – Trainees practice putting on fall protection. This laboratory corresponds to Performance Task 2.

G. Laboratory – Trainees practice proper climbing techniques. This laboratory corresponds to Performance Task 4.

Session III. Ladders and Scaffolding

A. Ladders

B. Scaffolding

Session IV. Trenching

A. Trenching and Soil Hazards

B. Trench Failure

C. Shoring Systems

D. Sloping Systems

E. Combined Systems

Session V. Confined Spaces

A. Classification and Permits

B. Hazards

C. Responsibilities and Duties

D. Personal Protective Equipment

E. Communication and Training

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 covers how to inspect and use common rigging hardware, slings, and tag lines. It also explains how to select, inspect, use, and maintain special rigging equipment, including block and tackle, chain hoists, come-alongs, jacks, and tuggers.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Reinforcing Ironwork Level One, Modules 39101-05 and 39102-05.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify and describe the uses of common rigging hardware and equipment.
2. Perform a safety inspection on hooks, slings, and other rigging equipment.
3. Describe common slings and determine sling capacities and angles.
4. Select, inspect, use, and maintain special rigging equipment, including:
   • Block and tackle
   • Chain hoists
   • Come-alongs
   • Jacks
   • Tuggers
5. Inspect heavy rigging hardware.
6. Tie knots used in rigging.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Perform a safety inspection on hooks, slings, and other rigging equipment.
2. Select, inspect, and use special rigging equipment, including:
   • Block and tackle
   • Chain hoists
   • Come-alongs
   • Jacks
   • Tuggers
3. Tie knots used in rigging.

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen | Various rigging hooks with wear, cracks, and corrosion |
| Transparencies | Manufacturer’s literature on shackles |
| Blank acetate sheets | Various types of shackles |
| Transparency pens | Various eyebolts |
| Whiteboard/chalkboard | Various lifting lugs |
| Markers/chalk | Turnbuckles |
| Pencils and scratch paper | Manufacturer’s literature on plate clamps |
| Appropriate personal protective equipment | Various rigging plates and links |
| Manufacturer’s literature on different rigging hooks | Various types of slings |
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 hoists, jacks, and tuggers. Ensure that all trainees are briefed on lifting safely and any other 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 10 hours are suggested to cover *Rigging Equipment*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of 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 and Rigging Hardware</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Rigging Hardware</td>
<td></td>
</tr>
<tr>
<td><strong>Session II. Slings and Tag Lines</strong></td>
<td></td>
</tr>
<tr>
<td>A. Slings</td>
<td></td>
</tr>
<tr>
<td>B. Laboratory – Trainees practice performing a safety inspection on hooks, slings, and other rigging equipment. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
<tr>
<td>C. Tag Lines</td>
<td></td>
</tr>
</tbody>
</table>
D. Laboratory – Trainees practice tying knots used in rigging. This laboratory corresponds to Performance Task 3.

Session III. Block and Tackle and Hoists
A. Block and Tackle
B. Chain Hoists
C. Ratchet-Lever Hoists and Come-Alongs
D. Jacks
E. Tuggers
F. Laboratory – Trainees practice selecting, inspecting, and using special rigging equipment. This laboratory corresponds to Performance Task 2.

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

This module covers communications, basic rigging safety precautions, lift planning, and load and sling calculations. It also covers load charts and load balancing.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Reinforcing Ironwork Level One, Modules 39101-05 through 39103-05.

OBJECTIVES

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

1. Identify and use the correct hand signals to guide a crane operator.
2. Identify basic rigging and crane safety procedures and determine the center of gravity of a load.
3. Identify the pinch points of a crane and explain how to avoid them.
4. Identify site and environmental hazards associated with rigging.
5. Properly attach rigging hardware for routine lifts and pipe lifts.
6. Identify the components of a lift plan.
7. Perform sling tension calculations.

PERFORMANCE TASKS

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

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

MATERIALS AND EQUIPMENT LIST

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

* 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. 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 15 hours are suggested to cover *Rigging Practices*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of 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 Communication</strong></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Methods of Communication</td>
<td></td>
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<tr>
<td>C. Laboratory – Trainees practice using and interpreting hand signals. This laboratory corresponds to Performance Task 3.</td>
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<tr>
<td><strong>Session II. Safety</strong></td>
<td></td>
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<tr>
<td>A. General Rigging Safety</td>
<td></td>
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<tr>
<td>B. Working Around Power Lines</td>
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<tr>
<td>C. Site Safety</td>
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<tr>
<td>D. Emergency Response</td>
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<tr>
<td><strong>Session III. Lifting Personnel and Lift Planning</strong></td>
<td></td>
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<tr>
<td>A. Lifting Personnel</td>
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<tr>
<td>B. Lift Planning</td>
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<tr>
<td><strong>Session IV. Load Charts and Load Balancing</strong></td>
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<tr>
<td>A. Load Charts</td>
<td></td>
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<tr>
<td>B. Load Balancing</td>
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<tr>
<td>C. Laboratory – Trainees practice determining the center of gravity of a load. This laboratory corresponds to Performance Task 1.</td>
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</tr>
<tr>
<td>D. Laboratory – Trainees practice performing sling tension calculations. This laboratory corresponds to Performance Task 4.</td>
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<tr>
<td><strong>Session V. Rigging Pipe, Rigging Valves, Unloading, and Yarding</strong></td>
<td></td>
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<tr>
<td>A. Rigging Pipe</td>
<td></td>
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<tr>
<td>B. Rigging Valves</td>
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<tr>
<td>C. Guidelines for Unloading and Yarding Materials</td>
<td></td>
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<tr>
<td>D. Laboratory – Trainees practice properly attaching rigging hardware for routine lifts. This laboratory corresponds to Performance Task 2.</td>
<td></td>
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</tbody>
</table>
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 builds upon the basic information presented in the Introduction to Blueprints module studied in the Core Curriculum. Trainees will learn the techniques for reading and using blueprints and specifications, with an emphasis placed on those drawings and types of information that are relevant to the reinforcing ironworker trade. It introduces the subject of quantity takeoffs.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Reinforcing Ironwork Level One, Modules 39101-05 through 39104-05.

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.
5. Read and interpret the information on a set of commercial drawings.

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. Using structural drawings (either in the Appendix or of the instructor’s choosing), identify the sizes, lengths, configurations, and locations of rebar specified.

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
A set of commercial drawings
Quick Quiz*
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 20 hours are suggested to cover Commercial Blueprints. 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 Drawing Requirements and Contents</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td>____________</td>
</tr>
<tr>
<td>B. Requirements and Contents</td>
<td>____________</td>
</tr>
<tr>
<td><strong>Sessions II and III. Architectural and Structural Drawings</strong></td>
<td></td>
</tr>
<tr>
<td>A. Architectural Drawings</td>
<td>____________</td>
</tr>
<tr>
<td>B. Structural Drawings</td>
<td>____________</td>
</tr>
<tr>
<td><strong>Sessions IV and V. Mechanical and Electrical Drawings</strong></td>
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<tr>
<td>A. Mechanical Drawings</td>
<td>____________</td>
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<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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<td><strong>Sessions VI and VII. Written Specifications and Rebar Drawings</strong></td>
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<tr>
<td>A. Written Specifications</td>
<td>____________</td>
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<tr>
<td>B. Rebar Drawings</td>
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<tr>
<td>C. Laboratory – Trainees practice identifying the sizes, lengths, configurations, and locations of rebar specified in a set of commercial drawings. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td><strong>Session VIII. Review, Module Examination, and Performance Testing</strong></td>
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<td>A. Review</td>
<td>____________</td>
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<tr>
<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>C. Performance Testing</td>
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MODULE OVERVIEW

This module explains the safety requirements for oxyfuel cutting. It identifies oxyfuel cutting equipment and setup requirements. It explains how to light, adjust, and shut down oxyfuel equipment. Trainees will perform cutting techniques that include straight line, piercing, bevels, washing, and gouging.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Reinforcing Ironwork Level One, Modules 39101-05 through 39105-05.

OBJECTIVES

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

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

PERFORMANCE TASKS

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

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

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen | Appropriate personal protective equipment, including: |
| Transparencies | Safety goggles |
| Blank acetate sheets | Face shields |
| Transparency pens | Welding helmets |
| Whiteboard/chalkboard | Ear protection |
| Markers/chalk | Welding cap |
| Pencils and scratch paper | Leather jacket |
|  | Leather pants or chaps |
SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module requires that the trainees operate oxyfuel cutting equipment. Ensure that trainees are briefed on fire and shop safety policies prior to performing any work. Emphasize the special safety precautions associated with the use of cylinders and oxyfuel cutting equipment.

ADDITIONAL RESOURCES

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


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 17.5 hours are suggested to cover Oxyfuel Cutting. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tr>
<td>Session I. Introduction, Safety, and Oxyfuel Cutting Equipment</td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Oxyfuel Cutting Safety</td>
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</tbody>
</table>
C. Oxyfuel Cutting Equipment
   1. Cutting Torches
   2. Cutting Torch Tip and Tip Equipment
   3. Friction Lighters
   4. Cylinders
   5. Soapstone Markers
   6. Specialized Equipment

Session II. Setting Up Oxyfuel Equipment
A. Setting Up Oxyfuel Equipment
   1. Cylinders
   2. Hoses and Regulators
   3. Torches and Tip
   4. Purging and Testing
B. Laboratory – Trainees practice setting up oxyfuel equipment. This laboratory corresponds to Performance Task 2.

Sessions III. Torch Operations
A. Controlling the Oxyfuel Torch Flame
B. Laboratory – Trainees practice lighting, adjusting, and shutting down an oxyfuel cutting torch. This laboratory corresponds to Performance Tasks 3 and 4.
C. Shutting Down Oxyfuel Equipment
D. Disassembling Oxyfuel Equipment
E. Laboratory – Trainees practice disassembling an oxyfuel cutting torch. This laboratory corresponds to Performance Task 5.
F. Changing Empty Cylinders
G. Laboratory – Trainees practice changing empty cylinders on an oxyfuel cutting torch. This laboratory corresponds to Performance Task 6.

Sessions IV through VI. Performing Cutting Operations
A. Performing Cutting Procedures
B. Portable Oxyfuel Cutting Machine Operation
C. Laboratory – Trainees practice straight line and square shape cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 6.
D. Laboratory – Trainees practice piercing and slot cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 7.
E. Laboratory – Trainees practice bevel cutting with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 7.
F. Laboratory – Trainees practice washing with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 7.
G. Laboratory – Trainees practice gouging with an oxyfuel cutting torch. This laboratory corresponds to Performance Task 7.
H. Laboratory – Trainees practice using a portable oxyfuel cutting machine. This laboratory corresponds to Performance Task 8.

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

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