MODULE OVERVIEW
This module explains the role of safety in the construction crafts. Trainees will learn how to identify and follow safe work practices and procedures as well as how to properly inspect and use safety equipment. Trainees will be able to describe safe work procedures for lifting heavy objects, fighting fires, and working around electrical hazards.

PREREQUISITES
There are no prerequisites for this module.

OBJECTIVES
Upon completion of this module, the trainee will be able to:
1. Explain the role that safety plays in the construction crafts.
2. Describe the meaning of job-site safety.
3. Describe the characteristics of a competent person and a qualified person.
4. Explain the appropriate safety precautions to take around common job-site hazards.
5. Demonstrate the use and care of appropriate personal protective equipment (PPE).
6. Properly don and remove personal protective equipment (safety goggles, hard hat, and personal fall protection).
7. Follow the safety procedures required for lifting heavy objects.
8. Describe safe behavior on and around ladders and scaffolds.
9. Explain the importance of Hazard Communications (HazCom) and material safety data sheets (MSDSs).
10. Describe fire prevention and firefighting techniques.
11. Define safe work procedures to use around electrical hazards.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to:
1. Inspect PPE to determine if it is safe to use (PPE should include safety goggles, hard hat, gloves, safety harness, and safety shoes).
2. Properly don and remove PPE (safety goggles, hard hat, and personal fall protection).
3. Demonstrate safe lifting procedures.

MATERIALS AND EQUIPMENT LIST
- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Overhead projector and screen
- Whiteboard/chalkboard
- Copies of your local code
- Variety of communication tags and signs
- Dull and sharp cutting tools
- Code of Federal Regulations Part 1910
- OSHA 29 CFR 1926
- OSHA Form 300
- New and damaged hoses and regulators
- Materials to create hypothetical fire hazards
- Variety of safety tags
- Variety of types of personal protective equipment, including:
  - Hard hats
  - Safety glasses, goggles, and face shields
  - Safety harnesses
  - Gloves
  - Safety shoes
  - Hearing protection
  - Respiratory protection
- Copies of your company’s fall protection plan
Variety of ladders and scaffolds, including:
- Straight ladders
- Extension ladders
- Stepladders
- Manufactured scaffolds
- Rolling scaffolds

Sample material safety data sheet (MSDS)

Variety of fire extinguishers

Module Examinations*

Performance Profile Sheets*

*Located in the Test Booklet.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment. Always work in a clean, well-lit, appropriate work area.

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 Electrical Safety. 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 Lockout/Tagout. Videocassette. 10 minutes. Coastal Training Technologies Corp. Virginia Beach, VA.


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

Construction Welding Safety. 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 Basic 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><strong>Session I. Introduction to Accidents</strong></td>
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<tr>
<td>A. Accident Causes and Results</td>
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<tr>
<td>B. Safety Policies and Regulations</td>
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<tr>
<td>C. Reporting Accidents</td>
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<tr>
<td><strong>Session II. Job-Site Hazards</strong></td>
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<tr>
<td>A. Construction Job-Site Hazards</td>
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<tr>
<td>B. Working Safely with Job Hazards</td>
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<tr>
<td><strong>Session III. Personal Protective Equipment and Lifting</strong></td>
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<tr>
<td>A. Personal Protective Equipment</td>
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<tr>
<td>B. Lifting</td>
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<tr>
<td>C. Performance Testing</td>
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<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>
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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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<tr>
<td><strong>Session IV. Aerial Work</strong></td>
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<tr>
<td>A. Ladders and Scaffolds</td>
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<td>B. Scaffolds</td>
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<tr>
<td><strong>Session V. Hazard Communication and Fire Safety</strong></td>
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<tr>
<td>A. Hazard Communication Standard</td>
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<tr>
<td>B. Fire Safety</td>
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<tr>
<td><strong>Session VI. Electrical Safety, Review, and Module Examination</strong></td>
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<tr>
<td>A. Basic Electrical Safety Guidelines</td>
<td></td>
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<tr>
<td>B. Working Near Energized Electrical Equipment</td>
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<tr>
<td>C. If Someone Is Shocked</td>
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<tr>
<td>D. Review</td>
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<tr>
<td>E. Module Examination</td>
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<tr>
<td>1. Trainees must score 70% 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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</table>
MODULE OVERVIEW

This module introduces the uses of slings and common rigging hardware. Trainees will learn basic inspection techniques, hitch configurations, and load-handling safety practices, as well as how to use American National Standards Institute hand signals.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed the following: Core Curriculum: Introductory Craft Skills, Modules 00101-04 through 00105-04. This module is an elective. To receive a successful completion, you must take this module or Modules 00107-04 and 00108-04.

OBJECTIVES

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

1. Identify and describe the use of slings and common rigging hardware.
2. Describe basic inspection techniques and rejection criteria used for slings and hardware.
3. Describe basic hitch configurations and their proper connections.
4. Describe basic load-handling safety practices.

PERFORMANCE TASKS

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

1. Select and inspect appropriate slings for a lift.
2. Given various loads, determine the proper hitch to be used.
3. Select and inspect appropriate hardware and/or lifting equipment.
4. Demonstrate and/or simulate the proper techniques for connecting hitches.
5. Demonstrate the proper use of all hand signals according to ANSI B30.2 and B30.5.
6. Describe or demonstrate pre-lift safety checks.
7. Demonstrate and/or simulate how to lift the load level.
8. Describe and/or demonstrate loading and disconnecting safety precautions.

MATERIALS AND EQUIPMENT LIST

| Transparencies | One liter of water |
| Markers/chalk | Anchor shackles and chain shackles |
| Blank acetate sheets | Various types of pins, including: |
| Transparency pens | Screw pin shackle |
| Pencils and scratch paper | Round pin or straight pin shackle |
| Overhead projector and screen | Safety shackle |
| Whiteboard/chalkboard | Damaged shackles and pins |
| Appropriate personal protective equipment | Damaged and undamaged eyebolts |
| Copies of your local code | Undamaged lifting clamps |
| OSHA 29 CFR 1926 | Rusty or corroded lifting clamps |
| Identification tags for slings | Wire brush to clean lifting clamps |
| Copies of Figure 15 with the callouts covered | Damaged and undamaged rigging hooks |
| Damaged slings or photos of damaged slings | Module Examinations* |
| Two glasses | Performance Profile Sheets* |

*Located in the Test Booklet.
SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment. Always work in a clean, well-lit, appropriate work area.

NOTE

Due to liability issues, trainees under the age of 18 should not perform hoisting maneuvers; therefore, trainees under 18 should not perform the demonstration aspect of Performance Task numbers 4, 7, and 8. The instructor may choose to have trainees simulate the concepts underlying the tasks by using alternative methods.

If you do not have access to rigging hardware or equipment, there are many resources available to you including local contractors, rigging equipment manufacturers, or even your local Training Program.

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 Basic Rigging. 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><strong>Session I. Slings, Part One</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Synthetic Slings</td>
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<tr>
<td><strong>Session II. Slings, Part Two</strong></td>
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<tr>
<td>A. Alloy Steel Chain Slings</td>
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<td>B. Wire Rope Slings</td>
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<tr>
<td>C. Performance Testing (Task 1)</td>
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<td><strong>Session III. Hitches</strong></td>
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<tr>
<td>A. Vertical Hitch</td>
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<td>B. Choker Hitch</td>
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<tr>
<td>C. Basket Hitch</td>
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<tr>
<td>D. Performance Testing (Task 2)</td>
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<tr>
<td><strong>Session IV. Rigging Hardware, Part One</strong></td>
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<tr>
<td>A. Shackles</td>
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<td>B. Eyebolts</td>
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</tbody>
</table>
Session V. Rigging Hardware, Part Two
A. Lifting Clamps
B. Rigging Hooks
C. Performance Testing (Task 3)

Session VI. Sling Stress and Hoists
A. Sling Stress
B. Chain Hoists

Session VII. Rigging Operations and Practice, Part One
A. Rated Capacity
B. Sling Attachment
C. Hardware Attachment
D. Performance Testing (Task 4)

Session VIII. Rigging Operations and Practice, Part Two
A. Load Control
B. ANSI Hand Signals
C. Review
D. 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.
E. Performance Testing (Tasks 5–8)
   1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
   2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.
MODULE OVERVIEW

This module covers the history of the industrial coatings trade, and the types of jobs and work environments that are found in the field. It describes apprenticeship, training programs, and career opportunities. The responsibilities and characteristics a worker should possess are also described.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Modules 00101-04 and 00106-04.

OBJECTIVES

When you have completed this module, you will be able to do the following:

1. Define the composition and purpose of different industrial coatings.
2. Discuss some of the causes of premature failure of coatings.
3. Define and list the components of process control.
4. Define quality control and quality assurance.
5. State the purpose of preparing test sections for demonstration processes.
6. Explain some of the preparation and application methods and how some of the coatings are used.
7. Identify the responsibilities of a person working in the industrial coatings profession.
8. State the personal characteristics of a professional.
9. Explain the importance of safety in working with industrial coatings.

PERFORMANCE TASKS

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

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Copy of an employee manual
Company policy and procedures manual
Company safety manual
Sample coatings specifications
Common hand tools, including:
   Hand abrasives
   Scrapers and putty knives
   Wire brushes
   Chipping hammers

Common power tools with related safety instruction manuals, including:
   Grinders and sanders
   Power wire brushes
   Needle guns and air chisels
   MBXTool
   Vacuum shrouds

Various types of respirators
Micrometers
Comparators
Job announcements for an industrial coating and lining application specialist from local newspapers or trade journals
Copies of the Trade Terms Quiz*
Module Examinations**

* Located at 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.

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 5 hours are suggested to cover *Introduction to the Trade*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

<table>
<thead>
<tr>
<th>Topic</th>
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<td><strong>Session I. Industrial Coatings; Corrosion Control; Tools</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Preview of Industrial Coatings</td>
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<td>C. Definition of and Reasons for Coating</td>
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<tr>
<td>D. Corrosion Overview</td>
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<td>E. Coatings Failure Causes</td>
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<tr>
<td>F. Tools of the Trade</td>
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<td>G. Process Control</td>
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<tr>
<td><strong>Session II. Professional Roles; Career Opportunities; Construction Training:</strong></td>
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<tr>
<td>Review and Testing</td>
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<tr>
<td>A. Coating Professional Roles</td>
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<tr>
<td>B. Keys to Professional Success</td>
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<td>C. Career Opportunities</td>
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<td>D. Formal Construction Training</td>
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<td>E. Review</td>
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<td>F. Module Examination</td>
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<tr>
<td>1. Trainees must score 70% or higher to receive recognition from NCCER.</td>
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Surface Preparation
Annotated Instructor’s Guide

MODULE OVERVIEW

This module describes various surface preparation techniques, including solvent cleaning, hand tool cleaning, power tool cleaning, abrasive blasting, and waterjetting. It explains how both steel and concrete structures are prepared for coating application. It also discusses overcoating, debris management, and safety.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Modules 00101-04 and 00106-04; and Industrial Coating and Lining Application Specialist Level One, Module 69101-09.

OBJECTIVES

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

1. Define surface preparation and list reasons for its importance.
2. Define the goals of surface preparation.
3. Recognize the surface conditions of steel substrates, mill scale, and steel fabrication surface defects.
4. State surface preparation methods and reasons for coating galvanized steel, weathering steel, and other metals.
6. State how, when, and why to use solvents, hand tools, and power tools for cleaning.
7. State how, when, and why dry abrasive blasting is done.
8. State how, when, and why water cleaning is done.
10. State when overcoating is used, and how surfaces are prepared for overcoating.

PERFORMANCE TASKS

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

1. Perform solvent cleaning.
2. Perform hand tool cleaning.
3. Perform power tool cleaning.
4. Identify and assist in the setup of dry abrasive blast cleaning equipment.
5. Identify and assist in the setup of wet abrasive blast cleaning equipment.
6. Identify and assist in the setup of water cleaning and jetting equipment.

MATERIALS AND EQUIPMENT LIST

| Overhead projector and screen | Coating specifications |
| Whiteboard/chalkboard | Copies of industry standards for surface preparation |
| Markers/chalk | Variety of solvents, with related product data sheets and MSDSs |
| Pencils and scratch paper | Variety of chemical strippers, with related product data sheets and MSDSs |
| Appropriate personal protective equipment, including: | Samples of defects in steel fabrication |
| Eye protection | Samples of properly prepared metal |
| Face protection | Samples of several types of surfaces |
| Work gloves | |
| Respirators | |
| Protective clothing | |

(continued)
SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. The module requires trainees to use chemicals and solvents. Ensure that all trainees are briefed on chemical safety procedures. This module also requires trainees to perform abrasive blasting and water cleaning. Ensure that all trainees have the proper protective equipment and are briefed on all appropriate 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.

New Concepts for Coating Protection of Steel Structures – Stp 841: A Symposium by D.M. Berger, R.F. Wint, Steel Structures Painting Council (U.S.), ASTM Committee D-1 on Paint and Related Coatings and Material.
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 100 hours are suggested to cover *Surface Preparation*. 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><strong>Session I.  Introduction to Surface Preparation; Safety</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Surfaces and Surface Preparation</td>
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<tr>
<td>C. Personal Safety and Personal Protective Equipment</td>
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</table>

| Session II-IV. Solvent Cleaning |  |
| A. Solvent Cleaning |  |
| 1. Laboratory |  |
| Have trainees practice performing solvent cleaning. This laboratory corresponds to Performance Task 1. |  |

| Session V-VII. Hand Tool Cleaning |  |
| A. Hand Tool Cleaning |  |
| 1. Laboratory |  |
| Have trainees practice performing hand tool cleaning. This laboratory corresponds to Performance Task 2. |  |

| Session VIII-XI. Power Tool Cleaning |  |
| A. Power Tool Cleaning |  |
| 1. Laboratory |  |
| Have trainees practice performing power tool cleaning. This laboratory corresponds to Performance Task 3. |  |

| Session XI-XIV. Dry and Wet Abrasive Cleaning |  |
| A. Measure the pressure of the air at the blast nozzle and the nozzle orifice. |  |
| 1. Laboratory |  |
| Have trainees practice performing tests with a nozzle pressure gauge and nozzle aperture gauge. |  |
| 2. Laboratory |  |
| Have trainees practice measuring surface profile using a surface profile gauge and Testex Tape. |  |
| B. Wet and Dry Abrasive Cleaning |  |
| 1. Laboratory |  |
| Have trainees practice identifying wet and dry abrasive blast cleaning equipment and PPE. Have them assist a qualified person in setting up the equipment for use. This laboratory corresponds to Performance Tasks 4 and 5. |  |

| Session XV-XVIII. Water Cleaning and Waterjetting |  |
| A. Water Cleaning and Waterjetting |  |
| 1. Laboratory |  |
| Have trainees practice identifying water cleaning and waterjetting equipment and PPE. Have them assist a qualified person in setting up the equipment for use. This laboratory corresponds to Performance Task 6. |  |
Session XIX-XXX. Surface Preparation of Masonry and Concrete; Safety and Debris Management

A. Surface Preparation of Masonry and Concrete
   1. New Concrete
   2. Old Concrete

B. Safety and Debris Management

Session XXXI-XL. 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 various types of industrial coatings and explains how to prepare and mix them. It also describes hazardous waste-handling procedures.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Modules 00101-04 and 00106-04; and Industrial Coating and Lining Application Specialist Level One, Modules 69101-09 and 69102-09.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. State the purpose of each coating component.
2. List physical properties of paints.
3. List basic coating additives.
4. State the purpose for solvents (thinners) in cleaning.
5. State the difference between convertible and non-convertible coatings.
7. Identify conditions that must be considered before selecting a coating/lining.
8. Describe the coverage of coatings and learn to calculate wet- and dry-film thickness.
9. Locate and practice safety procedures listed on the material safety data sheet (MSDS).
10. List safety equipment and correct personal protective equipment (PPE) for use during coatings mixing operations.
11. Describe disposal techniques for hazardous and non-hazardous waste.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Calculate dry film thickness (DFT).
2. Read and understand an MSDS.

MATERIALS AND EQUIPMENT LIST
Overhead projector and screen
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Manufacturers’ literature on coatings
Samples of powder and pipeline coatings or manufacturers’ literature on powder and pipeline coatings

MSDS for solvents or other coating product
Concrete blocks
Concrete coatings
Safety video/DVD
TV/VCR/DVD player
Copies of the Trade Terms Quiz*
Module Examinations**
Performance Profile Sheets**

* Located at 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. The module requires trainees to observe the use of chemicals and solvents. Ensure that all trainees are briefed on chemical 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.


Preventing Occupational Fatalities in Confined Spaces, NIOSH Alert: January 1986, DHHS (NIOSH publication No. 86-110).

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 Industrial Coatings. 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.

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<tr>
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<tbody>
<tr>
<td>Session I. Introduction to Protective Coatings; Coating Material Properties; Curing Mechanisms</td>
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</tr>
<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Coating Material Properties</td>
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<td>C. Curing Mechanisms</td>
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<tr>
<td>Session II. Service Conditions; Concrete Coatings; Specialty Coatings</td>
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<td>A. Service Conditions</td>
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<td>Session III. Coating Safety; Mixing and Thinning</td>
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<td>A. Coating Safety</td>
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<td>B. Mixing and Thinning</td>
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<tr>
<td>C. Laboratory</td>
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Have trainees practice performing DFT calculations. This laboratory corresponds to Performance Task 1.
Session IV. Material Safety Data Sheets
A. MSDS
B. Laboratory
Have trainees practice reading and understanding an MSDS sheet.
This laboratory corresponds to Performance Task 2.

Session V. Waste Management
A. Waste Management

Session VI. 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 basic coating application. It describes the information found in coating specifications and product data sheets. It covers protective coverings and how to use them, as well as the equipment and techniques used to mix various types of coatings.

Also included are descriptions of equipment and ways to apply coatings manually using brushes, rollers, and mitts. It also describes spraying methods such as conventional air spray, HVLP, airless, and air-assisted airless spray.

This module describes the environmental conditions necessary when applying coatings, and the quality control and inspections required during coating application. Common coating application failures are discussed, along with ways to remedy them. Specialty spray systems and their application methods are also briefly covered.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Modules 00101-04 and 00106-04; and Industrial Coating and Lining Application Specialist Level One, Modules 69101-09 through 69103-09.

OBJECTIVES

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

1. Locate information about application equipment and other things on a coating specification and a product data sheet (PDS).
2. Mix one or more of the following using proper PPE:
   - Single-component coatings
   - Multi-component liquid coatings
   - Coatings with a powder component
   Consider the importance of mixing time and the condition and appearance of the mixed material.
3. Describe induction time and pot life in relationship to material temperature.
4. Define viscosity, list the methods of viscosity control, and reduce the viscosity of coatings.
5. Install protective coverings and discuss the safe use of basic application equipment (setup, operation, adjustment, cleanup) on simple structures; list the strengths, weaknesses, and limitations of each piece; and identify basic application equipment problems with:
   - Brush, roller, mitt
   - Trowel, squeegee
   - Spray (air, airless, air-assisted airless, HVLP)
6. Demonstrate correct application techniques with:
   - Brush, roller, mitt
   - Trowel, squeegee
   - Spray (air, airless, air-assisted airless, HVLP)
7. Describe and demonstrate striping procedures.
8. Recognize the importance of the following during coating application operations:
   - Impact of environmental conditions on application and drying
   - Achieving correct thickness of each coating layer
   - Achieving a pinhole/holiday-free lining
9. Identify application defects during and after coating.
10. Describe how to calculate wet film thickness (WFT) from DFT, how to measure WFT, and explain how to calculate percentage of thinners by volume.
11. Recognize the importance of achieving a cured and a solvent-resistant film.
PERFORMANCE TASKS

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

1. Operate and maintain mixing blades/equipment.
2. Mix single-component coatings, multi-component liquid coatings, and coatings with powder component.
3. Filter/strain mixed coating.
4. Demonstrate the safe use of basic application equipment (setup, operation, adjustment, cleanup) on simple structures:
   • Brush, roller, mitt
   • Trowel, squeegee
5. Identify and assist with the setup of one or more types of spray equipment.
6. Demonstrate striping procedures using a brush.
7. Use and maintain a WFT gauge.
8. Measure WFT and calculate DFT.

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
- Coating specifications
- MSDSs for coating products
- Product data sheets (PDS) for coating products
- PDS for multi-component coating
- Protective sheeting
- Drop cloths
- Masking tape
- Coating mixing tools
- Dip roller trays and buckets
- Coating strainers and filters
- Single-component and multi-component coatings
- Coatings with a powder component
- WFT gauges
- Brushes
- Mitts
- Rollers
- Trowels
- Squeegees
- Spray application equipment
- Installations to be coated
- Copies of the Trade Terms Quiz *
- Module Examinations**
- Performance Profile Sheets**

* Located at 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.

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 105 hours are suggested to cover *Coating Application*. 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.

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<tr>
<th>Topic</th>
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<td><strong>Sessions I-IV. Introduction; Application Methods</strong></td>
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<td>A. Introduction</td>
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<td>C. Spray Methods</td>
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<td>D. Production Methods</td>
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<tr>
<td><strong>Sessions V-VI. Coating Specifications; Environmental Conditions; Coating Material Preparation; PDS; PPE</strong></td>
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<td>A. Typical Coating Specification</td>
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<td>B. Environmental Conditions</td>
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<td>D. Product Data Sheets</td>
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<td>E. Personal Protective Equipment; Respiratory Protection</td>
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<td><strong>Sessions VII-X. Mixing Coatings, Part One</strong></td>
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<td>B. Essential Terms</td>
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<td>C. Single-Component Coatings</td>
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<td>D. Plural-Component Liquid Coatings</td>
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<td>E. Liquid Coatings with a Powder Component</td>
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<tr>
<td>F. Laboratory</td>
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</table>

Have trainees practice mixing coatings. This laboratory corresponds to Performance Task 2.
Sessions XI-XIII. Mixing Coatings, Part Two
A. Mixing Equipment
   1. Laboratory
   Have trainees practice operating and maintaining mixing blades and equipment. This laboratory corresponds to Performance Task 1.
B. Straining and Thinning Guidelines
   1. Laboratory
   Have trainees practice filtering and straining mixed coatings. This laboratory corresponds to Performance Task 3.

Sessions XIV-XVI. Wet Film Thickness Measurement and Calculations
A. Wet Film Thickness
   1. Laboratory
   Have trainees practice using and maintaining a WFT gauge, measuring WFT, and calculating DFT. Also have them calculate the WFT required based on the specified DFT. This laboratory corresponds to Performance Tasks 7 and 8.
B. How WFT Affects Coating Application

Sessions XVII-XVIII. Protective Coverings
A. Sheeting and Drop Cloths
B. Tapes and Taping Guidelines
C. Tape Application

Sessions XIX-XXV. Hand Application of Coatings
A. Brush
B. Roller
C. Mitt
D. Trowel and Squeegee
E. Laboratory
   Have trainees practice brush, roller, mitt, trowel, and squeegee application techniques. This laboratory corresponds to Performance Task 4.

Sessions XXVI-XXX. Spray Application of Coatings; Production Application
A. Spray Application Systems
B. Spray Guns
C. HVLP
D. Airless Spray
E. Air-Assisted Airless Spray
F. Troubleshooting Spray Application Systems
G. Laboratory
   Have trainees practice application techniques using air, airless, air-assisted airless, and HVLP spray equipment. This laboratory corresponds to Performance Task 5.
H. Production Methods of Application

Sessions XXXI-XXXV. Application of Specialty Coatings
A. Plural Component Spray Systems
B. Electrostatic Spray Systems
C. Powder Coating Spray Systems
D. Thermal Spray Systems
E. Flame, Arc, Plasma, HP/HVOF, and Gas Detonation Spray Systems
F. Hot Spray Systems
Sessions XXXVI-XXXVII. Application Issues; Film Curing
   A. Holidays and Pinholes
   B. Film Drying and Curing
   C. Curing and Recoating Issues

Sessions XXXVIII-XL. Equipment Cleanup and Breakdown; Quality Control
   A. Manual Equipment Cleaning
   B. Spray Equipment Cleaning
   C. Solvent and Non-Solvent Cleaners
   D. Quality Control
   E. Coating of Concrete

Sessions XLI-XLII. 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 addresses the health and safety concerns of industrial coating and lining application specialists. It describes some common containment methods, and explains the use of ventilation systems. It also describes equipment used to monitor the air for environmental protection and worker safety. These systems are required in order to comply with federal and state laws controlling work safety standards and environmental emissions.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum, Modules 00101-04 and 00106-04; and Industrial Coating and Lining Application Specialist Level One, Modules 69101-09 through 69104-09.

OBJECTIVES

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

1. Describe the required personal protective equipment (PPE).
2. List the reasons and methods for containment, ventilation, and dehumidification.
3. Name the industry standards for containment and ventilation.
4. Name containment classes.
5. List methods to verify containment effectiveness.
7. List and demonstrate safety procedures associated with disturbing coatings containing toxic materials.
8. Discuss methods to stay safe while working in a containment area.

PERFORMANCE TASK

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

1. Select the appropriate PPE for a given application.

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, including Tyvek® suits
- Samples of containment materials
- MSDSs, including an MSDS for a common solvent
- Examples of different types of respirators
- Cartridges for air-purifying respirators
- Industry standards, including SSPC Technology Guide No. 6
- Shaving cream or spray foam
- Decontamination tools
- Small pool
- Brushes
- Laboratory results from containment effectiveness testing
- OSHA Safety and Health Standards for the Construction Industry
- 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.

ADDITIONAL RESOURCES

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


The Paint and Coatings Resource Center (PCRC), www.paintcenter.org

Occupational Safety and Health Standard 1910.1025, Toxic and Hazardous Substances, Appendix A Substance Data Sheet for Occupational Exposure to Lead. Occupational Safety and Health Administration.


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 47½ hours are suggested to cover Health and Safety, Debris Management, Containment, and Ventilation. 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.

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<thead>
<tr>
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<tr>
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<tr>
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<td>B. Personal Protective Equipment (PPE)</td>
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<td>2. Eye and Face Protection</td>
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<td>3. Fall Protection</td>
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<td>4. Gloves</td>
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<td>5. Safety Shoes</td>
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<td>6. Hearing Protection</td>
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<tr>
<td>C. Laboratory</td>
<td>Have trainees select the appropriate PPE for a given application. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>Session III. Respiratory Protection</td>
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<td>Session V. Confined Spaces</td>
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<tr>
<td>A. Decontamination</td>
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<td>B. Hazard Communication</td>
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<td>C. Standards and Regulations</td>
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Sessions IX-XIII. Surface Preparation; Debris Collection; Containment Classes
   A. Surface Preparation Methods
   B. Debris Collection Methods
   C. Containment System Classes

Session XIV. Containment Enclosure Components

Session XV. Containment Ventilation System Components

Session XVI. Containment Effectiveness

Sessions XVII-XIX. Containment Failure; Hazardous Debris; Lead Poisoning; Review and Testing
   A. Containment Failure and Hazardous Debris
   B. Lead Poisoning
   C. Review
   D. 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.
   E. 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.
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