

INTRODUCTION TO CONCRETE CONSTRUCTION AND FINISHING

OBJECTIVES

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

1. Define terms associated with concrete construction.
2. Identify the composition and characteristics of concrete.
3. Identify the uses of concrete as a building material.
4. Identify the effect of craftsmanship on finished concrete.
5. Explain the concrete construction process.
6. Identify site operation work requirements.
7. Explain the career potentials in concrete construction and finishing.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Small container of cement
Small container of sand
Small container of gravel
Small container of water
Transparencies
Module Examinations
Markers/chalk
Pencils and paper

HOW TO USE THIS INSTRUCTOR'S GUIDE

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- Introduction/Overview
- Classroom, and/or Demonstration, and/or Laboratory
- Class Break
- Classroom, and/or Demonstration, and/or Laboratory
- Summary

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In this Instructor's Guide, the terms classroom, demonstration, and laboratory are defined and used as follows.

Classroom: Sessions are designed for lectures, group discussions, coaching, and additional activities. Trainees should be encouraged to actively participate.

Demonstration: Instructors will demonstrate all procedures before trainees attempt them. Instructors should make sure that trainees can point out all safety procedures during demonstrations to be assured of the proper use of equipment by trainees.

Laboratory: Instructors will facilitate all laboratory activities, coach trainees as they practice the procedures, monitor trainee progress, and provide feedback. The instructor will make sure that safety rules are followed at all times and that protective equipment is worn.

NCCER Standardized Craft Training Programs

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MODULE OVERVIEW

This module introduces the Concrete Finishing trainee to the methods and procedures used in concrete finishing.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 10 hours or four sessions of training time are suggested to cover *Introduction to Concrete Construction and Finishing*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Four 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; What is Concrete?; Uses of Concrete	1.0.0 – 3.1.4
2	Uses of Concrete	3.2.0 – 3.2.7
3	Laboratory/Field Trip	3.2.0 – 3.2.7
4	Importance of Craftworkers; Careers in Concrete Construction and Finishing; Work Requirements Review/Practice Questions Module Examination	4.0.0 – 6.4.0

Optional References for Advanced Study

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.

Concrete Construction and Estimating, Craig Avery, Craftsman Book Company, Carlsbad, CA, 1991.

Concrete Manual, International Conference of Building Officials, Whittier, CA, 1992.

Concrete Parking Lots: Eight Steps to Quality Construction, Videotape, Portland Cement Association, Skokie, IL.

Concrete Technology, Third Edition, George R. White, Delmar Publishers, Inc., Albany, NY, 1991.

Design and Control of Concrete Mixtures, Thirteenth Edition, Portland Cement Association, Skokie, IL, 1988.

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Guide for Concrete Floor and Slab Construction, ACI 302.1R-96, American Concrete Institute, Farmington Hills, MI, 1997.

The Contractor's Guide to Quality Construction, American Concrete Institute, Farmington Hills, MI, 1997.

SAFETY REQUIREMENTS

OBJECTIVES

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

1. Describe and wear different types of safety gear for the work site.
2. State the guidelines for dressing appropriately for concrete work.
3. Describe how to safely handle concrete when forming, placing, curing, and finishing.
4. Describe safety precautions to follow when working in extreme heat and cold.
5. Describe safety precautions to follow when working with hazardous materials.
6. Describe proper procedures for handling and maintaining concrete construction tools safely.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment:
 Hard hats Hearing protectors
 Safety glasses Face shields
 Knee pads Knee boards
 Rubber gloves Rubber boots
 Safety shoes Dust masks
 Respirators Safety harnesses
Concrete hand tools
Power float or trowel
Hand sprayer
Concrete saw
Carbon monoxide meter

Materials

Trainee Task Module
Pencils and paper
Markers/chalk
OSHA standards
Company safety manual
Operator's manuals for concrete equipment
Material Safety Data Sheets
Transparencies
Module Examinations
Performance Profile Sheets

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- Summary

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MODULE OVERVIEW

This module provides an overview of safety requirements specific to Concrete Finishing activities. It covers general work site safety, use and care of hand and power tools, hazardous and toxic chemicals, and the importance of appropriate personal protective equipment.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

- Core Curricula
- Concrete Finishing Level 1, Module 23101

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 5 hours or two sessions of training time is suggested to cover *Safety Requirements*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Accident Prevention and First Aid Demonstration of Safety Equipment	1.0.0 – 4.4.0
2	Environmental Conditions; Surface Grinders Demonstration of Care of Tools Module Examination Performance Profile Examination	5.0.0 – 6.5.8

Optional References for Advanced Study

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.

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TRANSPARENCY 2

TASK MODULE 23102, SAFETY REQUIREMENTS

PERFORMANCE PROFILE TASKS

- 1. Layout, inspect, and put on a safety harness with necessary strap adjustments.**
- 2. Check operation of respirators, place on face, and adjust properly.**

PROPERTIES OF CONCRETE

OBJECTIVES

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

1. Describe the properties of concrete.
2. Explain how the properties of concrete are used in construction.
3. Determine how the ingredients of concrete influence mix, placement, finishing, durability, and performance.
4. Describe quality-control tests on concrete ingredients, fresh concrete, and hardened concrete.
5. Mix a test batch of concrete.
6. Perform a slump test.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Mixing boards (plywood)
Hoes
Square-end shovels
Buckets or cubic foot boxes
Slump test kits
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Transparencies
Pencils and paper
Markers/chalk
Example specification sheets
Example reinforcing steel bars
Portland cement
Sand
Aggregate
Water
Admixture samples
Module Examinations
Performance Profile Sheets

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MODULE OVERVIEW

This module introduces the trainee to the properties of concrete and the components that make up the concrete mixture. Chemical and physical properties of cement, aggregate, and various types of admixtures are described. Basic tests used to determine properties such as slump and ultimate strength are explained.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 and 23102

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 10 hours or four sessions of training time are suggested to cover *Properties of Concrete*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Four 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Components; Concrete Production	1.0.0 – 3.3.3
2	Properties of Concrete; Testing and Quality Control Demonstration/Laboratory	4.0.0 – 5.3.4
3	Laboratory/Site Visit	2.0.0 – 5.2.0
4	Module Examination Performance Profile Examination	

Optional References for Advanced Study

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TRANSPARENCY 2

TASK MODULE 23103, PROPERTIES OF CONCRETE

PERFORMANCE PROFILE TASKS

- 1. Mix a test batch of concrete.**
- 2. Perform a slump test.**

TOOLS AND EQUIPMENT

OBJECTIVES

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

1. Name the tools used in placing and finishing concrete.
2. Name the power equipment used in placing and finishing concrete.
3. Describe how each tool is used.
4. Describe how the power equipment is used.
5. Associate trade terms with the appropriate tools and equipment.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment
Steel tape
Engineer's rule
Carpenter's level
Builder's level
Straightedge
Rake
Come-along
Bullfloat
Shovel
Highway straightedge
Darby
Rubber float
Finishing trowel
Walking trowel
Pointing trowel

Hand-held jointer
Basic edger
Pair edgers
Radius edger
Finishing broom
Water broom
Hand stone
Hand-held concrete vibrator
Gasoline-powered concrete saw
Electric grinder
Walk behind power trowel

Materials

Trainee Task Module
Transparencies
Markers/chalk
Pencils and paper
Module Examinations
Performance Profile Sheets

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MODULE OVERVIEW

This module introduces the Concrete Finishing trainee to the tools and equipment used in placing and finishing concrete.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23103

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 7½ hours or three sessions of training time are suggested to cover *Tools And Equipment*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Three 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Placing and Finishing Tools; Equipment	1.0.0 – 3.17.0
2	Laboratory/Site Visit	1.0.0 – 3.17.0
3	Equipment; Module Examination Performance Profile Test	3.13.0 – 3.17.0

Optional References for Advanced Study

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TRANSPARENCY 2

TASK MODULE 23104, TOOLS AND EQUIPMENT

PERFORMANCE PROFILE TASKS

- 1. Identify selected hand tools and their components.**
- 2. Identify selected power tools and equipment.**

PREPARING FOR PLACEMENT

OBJECTIVES

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

1. Describe basic site layout using levels and measuring tools.
2. Properly locate, grade, and build forms for horizontal placement.
3. Perform compaction activities on subgrades.
4. Describe various joints and where to locate them.
5. Describe various reinforcements and how to place them.
6. Describe information needed when ordering concrete.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Engineer's level
Laser level
Level rods
Hand level
Measuring tape
Sandbox(es)
Shovels
Come-alongs
Hammers
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Transparencies
Markers/chalk
Pencils and paper
Construction stakes
Batter boards
Dimensional lumber (2 × 4 and 2 × 6)
Nails
String (mason's line) and cutter
Grease crayon or marking pen
Reinforcing steel
Waterstop
Site plan
Module Examinations
Performance Profile Sheets

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MODULE OVERVIEW

This module provides training in the required activities and methods used in preparing a site for placing concrete. Topics include the processes from site excavation through ordering the concrete. Proper placement and inspection of formwork is emphasized.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23104

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 12½ hours or five sessions of training time are suggested to cover *Preparing for Placement*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Five 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Grade and Subgrade Preparation	1.0.0 – 2.5.2
2	Formwork; Surveying/Laboratory	3.0.0 – 3.6.5
3	Joints, Reinforcement; Embedments and Waterstops; Tolerances; Ordering Concrete	4.0.0 – 8.4.0
4	Formwork; Construct Forms on Grade/Laboratory	3.0.0
5	Module Examination Performance Profile Examination	

Optional References for Advanced Study

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TRANSPARENCY 2

TASK MODULE 23105, PREPARING FOR PLACEMENT

PERFORMANCE PROFILE TASKS

- 1. Set a batter board.**
- 2. Locate and level a form.**
- 3. Build a slab form to grade with dimension lumber.**
- 4. Compact subgrade with a shovel and come-along.**

PLACING CONCRETE

OBJECTIVES

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

1. Describe how concrete is conveyed and placed.
2. Draw up a pre-placement checklist.
3. Demonstrate the use of equipment and tools for placing concrete.
4. Demonstrate the process of depositing, spreading, consolidating, and striking off concrete in a form.
5. Associate trade terms with the appropriate processes and equipment.

Note to the Instructor

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Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment
Sandbox(es)
Wheelbarrows
Come-alongs
Square-end shovels
Poker vibrators
Straightedges
Darbies
Highway straightedges
Bullfloats
Slab forms

Materials

Trainee Task Module
Transparencies
Pencils and paper
Markers/chalk
Example placing checklist
Module Examinations
Performance Profile Sheets
Concrete
Water
Aggregate

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Demonstration: Instructors will demonstrate all procedures before trainees attempt them. Instructors should make sure that trainees can point out all safety procedures during demonstrations to be assured of the proper use of equipment by trainees.

Laboratory: Instructors will facilitate all laboratory activities, coach trainees as they practice the procedures, monitor trainee progress, and provide feedback. The instructor will make sure that safety rules are followed at all times and that protective equipment is worn.

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MODULE OVERVIEW

This module provides an overview to the methods and procedures used in concrete placing, including the different types of tools and equipment used in placing.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23105

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 12½ hours or five sessions of training time are suggested to cover *Placing Concrete*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Five 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Prepare Checklist; Delivery at Site; Discharging Concrete	1.0.0 – 4.8.0
2	Depositing, Spreading, and Consolidating; Strike Off and Smoothing Methods	5.0.0 – 6.3.3
3	Placing and Leveling Concrete Slab/Demonstration	1.0.0 – 6.3.3
4	Placing and Leveling Concrete Slab/Laboratory	1.0.0 – 6.3.3
5	Module Examination Performance Profile Examination	

Optional References for Advanced Study

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.

Concrete Construction and Estimating, Craig Avery, Craftsman Book Company, Carlsbad, CA, 1991.

Concrete Manual, International Conference of Building Officials, Whittier, CA, 1992.

Concrete Parking Lots: Eight Steps to Quality Construction, Videotape, Portland Cement Association, Skokie, IL.

Concrete Technology, Third Edition, George R. White, Delmar Publishers, Inc., Albany, NY, 1991.

Design and Control of Concrete Mixtures, Thirteenth Edition, Portland Cement Association, Skokie, IL, 1988.

Finishing Concrete Flatwork, Videotape 32:00 minutes, Portland Cement Association, Skokie, IL, 1991.

Guide for Concrete Floor and Slab Construction, ACI 302.1R-96, American Concrete Institute, Farmington Hills, MI, 1997.

The Contractor's Guide to Quality Construction, American Concrete Institute, Farmington Hills, MI, 1997.

TRANSPARENCY 2

TASK MODULE 23106, PLACING CONCRETE

PERFORMANCE PROFILE TASKS

- 1. Place concrete using a wheelbarrow, square-end shovel, and come-along.**
- 2. Consolidate placed concrete using spading and a poker vibrator.**
- 3. Strike off placed concrete using a manual screed.**
- 4. Float concrete after striking off.**

FINISHING, PART ONE

OBJECTIVES

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

1. Describe the basic finishing process.
2. Use the following finishing hand tools: float, edger, groover, and trowel.
3. Mark and cut joints with a saw.
4. Apply a broom finish.
5. Apply a rubbing finish.
6. Associate trade terms with the appropriate processes and equipment.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment
Sandboxes (4 ft. × 4 ft.)
Hammers
Come-alongs
Square-end shovels
Straightedges
Darbies
Bullfloats
Hand floats
Edgers
Groovers
Trowels
Concrete saw(s)
Rubbing stone(s)
Chalk lines
Steel tape
Brooms
Wheelbarrows
Power saws

Materials

Trainee Task Module
Transparencies
Markers/chalk
Pencils and paper
Nails
Concrete (ready-mixed recommended)
Sand
Lime
Water
Dimensional lumber slab form
Burlap
Grout mixture
Marking pencils
Module Examinations
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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- Introduction/Overview
- Classroom, and/or Demonstration, and/or Laboratory
- Class Break
- Classroom, and/or Demonstration, and/or Laboratory
- Summary

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MODULE OVERVIEW

In this module, basic finishing techniques for slabs and other horizontal structures are described. Use of floats, trowels, edgers, and groovers is explained and demonstrated. Requirements for cutting joints using different types of saws are presented. Hands-on practice is provided for finishing concrete slabs.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23106

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 20 hours or eight sessions of training time are suggested to cover *Finishing, Part One*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Eight 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Basic Finishing Processes; Edging Concrete; Jointing Concrete; Finishing Techniques; Surface Treatments	1.0.0 – 6.6.2
2	Floating Techniques – Demonstration/Laboratory	
3	Edging, Grooving, and Troweling – Demonstration/Laboratory	
4	Finishing Small Slab – Demonstration/Laboratory	
5	Finishing Small Slab – Laboratory	
6	Cutting Joints – Demonstration/Laboratory	
7	Finishing – Demonstration/Laboratory	
8	Module Examination Performance Profile Examination	

Optional References for Advanced Study

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.

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TRANSPARENCY 2

TASK MODULE 23107, FINISHING, PART ONE

PERFORMANCE PROFILE TASKS

- 1. Hand float, edge, groove, and trowel a 4 × 4 foot concrete slab.**
- 2. Apply a broom finish to a slab.**
- 3. Mark joints and cut them with a power saw.**
- 4. Apply a rubbing finish to a slab.**

CURING AND PROTECTING CONCRETE

OBJECTIVES

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

1. Describe the process of curing concrete.
2. Identify methods of curing concrete.
3. Describe how each method is applied.
4. Identify when each method is used.
5. Associate trade terms with the appropriate processes and equipment.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment
Manual compound sprayers

Materials

Trainee Task Module
Transparencies
Pencils and paper
Markers/chalk
Water
Plastic sheeting
Scrap lumber and rocks
Wide plastic tape
Samples of curing compounds
Module Examinations
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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- Classroom, and/or Demonstration, and/or Laboratory
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MODULE OVERVIEW

This module introduces the Concrete Finishing trainee to the methods and procedures used in curing and protecting concrete.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23107

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 5 hours or two sessions of training time are suggested to cover *Curing And Protecting Concrete*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½ -Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Importance of Curing; Curing Methods; Protection	1.0.0 – 4.5.0
2	Laboratory Test Module Examination Performance Profile Test	3.0.0 – 4.5.0

Optional References for Advanced Study

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.

Concrete Construction and Estimating, Craig Avery, Craftsman Book Company, Carlsbad, CA, 1991.

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TRANSPARENCY 2

TASK MODULE 23108, CURING AND PROTECTING CONCRETE

PERFORMANCE PROFILE TASKS

- 1. Spray a compound in a systematic total-coverage pattern over a marked slab surface.**
- 2. Cover a marked wet slab surface with plastic sheeting, sealed and wrinkle free.**

INTRODUCTION TO TROUBLESHOOTING

OBJECTIVES

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

1. Describe a basic troubleshooting methodology that can be used to identify a variety of concrete construction problems and their causes.
2. Identify problems with fresh concrete and describe ways to prevent them.
3. Identify different concrete defects such as crazing, cracking, dusting, scaling, popouts, and efflorescence, and describe ways to prevent them.

Note to the Instructor

Before teaching this module, you should review the details in this Instructor's Guide for Equipment and Supplies, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard/chalkboard
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Transparencies
Markers/chalk
Paper and pencils
Photographs of concrete problems
Module Examinations
Performance Profile Sheets

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MODULE OVERVIEW

This course introduces the Concrete Finishing trainee to the methods and procedures used in troubleshooting the placement and finishing of fresh and hardened concrete.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula

Concrete Finishing Level 1, Modules 23101 through 23108

Safety Considerations

Ensure that the trainees are equipped with Appropriate Personal Protective Equipment.

Teaching Time for This Module

Approximately 5 hours or two sessions of training time are suggested to cover *Introduction to Troubleshooting*. The training class session is a suggested 2½ hour time period, which includes at least one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Troubleshooting Method; Fresh Concrete; Hardened Concrete	1.0.0 – 4.11.0
2	Module Examination; Performance Profile Test	

Optional References for Advanced Study

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.

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Concrete Manual, International Conference of Building Officials, Whittier, CA, 1992.

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TRANSPARENCY 2

TASK MODULE 23109, INTRODUCTION TO TROUBLESHOOTING

PERFORMANCE PROFILE TASKS

1. Identify from a set of photographs the following problems:

- **Dusting**
- **Crazing**
- **Spalling**
- **Popouts**
- **Honeycombs**
- **Scaling**
- **Plastic shrinkage cracking**
- **Excess bleeding**
- **Drying-shrinkage cracks**
- **Bugholes**

