

# ATCM-2500: FUNDAMENTALS OF CONCRETE CURING

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## Cuyahoga Community College

**Viewing: ATCM-2500 : Fundamentals of Concrete Curing**

**Board of Trustees:**

March 2020

**Academic Term:**

Fall 2020

**Subject Code**

ATCM - Appd Indus Tech-Cement Masonry

**Course Number:**

2500

**Title:**

Fundamentals of Concrete Curing

**Catalog Description:**

Study of fundamentals associated with concrete curing, reason for curing and types of curing. Includes sealers and densifiers for concrete.

**Credit Hour(s):**

1

**Lecture Hour(s):**

1

## Requisites

**Prerequisite and Corequisite**

Departmental approval: admission to Cement Mason's apprenticeship program.

## Outcomes

**Course Outcome(s):**

Select and utilize the appropriate curing agent or compound for a specific application.

**Objective(s):**

1. Match terms and definitions associated with the curing of concrete.
2. State the reasons for curing concrete.
3. Match types of curing to their methods of applications.
4. Discuss the proper time to cure concrete.
5. List factors that regulate and affect the length of curing time.
6. State the advantages of using a curing compound.
7. State minimum curing requirements for concrete.
8. List the types of curing agents and products.
9. Explain the uses of curing compounds and curing films.

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**Course Outcome(s):**

Select and utilize appropriate sealers and densifiers for a specific application.

**Objective(s):**

1. Match terms and definitions associated with sealers and densifiers.
2. State the reasons for using sealers and densifiers.
3. Match types of sealers and densifiers to their methods of applications.
4. Discuss the proper time to seal and densify concrete.
5. State the advantages of using a sealer or densifier 7.

6. List the types of sealers and densifiers.
  7. Explain the uses of sealers and densifiers.
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**Methods of Evaluation:**

1. All students will be evaluated during the first two weeks and mid-term. Progress reports will be issued per procedure. Additional course valuations and final examination are detailed below:
  - a. Quizzes
  - b. Tests
  - c. Class participation
  - d. Group activities
  - e. Class projects

**Course Content Outline:**

1. Terms and definitions associated with curing
  - a. Curing
  - b. Shrinkage
  - c. Creep
  - d. Efflorescence
  - e. Impermeability
  - f. Bleeding
  - g. Abrasion resistance
2. Reasons for curing concrete
  - a. Ensure fully develop strength
  - b. Ensure fully developed durability
  - c. Improve impermeability
  - d. Improve resistance to abrasion
  - e. Reduce efflorescence
  - f. Control plastic shrinkage
  - g. Control cracks
  - h. Minimize creep
3. Types of curing and methods of application
  - a. Water
  - b. Mechanical
  - c. Membrane compounds
4. Proper time to cure
  - a. As soon as possible after placement
  - b. After finishing
  - c. Sufficiently hard
5. Factors that regulate and affect length of curing time
  - a. Type and content of cement
  - b. Mix properties
  - c. Required strength of concrete
  - d. Size and shape of concrete mass
  - e. Weather
  - f. Exposure conditions
6. Factors that affect curing
  - a. Temperature
  - b. Moisture
  - c. Wind
  - d. Placing and finishing time
7. Advantages of using a curing compound
  - a. Forms good moisture barrier
  - b. Increases concrete strength
  - c. Increases concrete durability
  - d. Increases surface friction properties
  - e. Resists most alkalies
  - f. Resists some oils and fuels

- g. Compatible with most concrete coverings
- h. Easy and quick to apply
- 8. Minimum curing requirements for concrete
  - a. Time and temperature
  - b. Specifications
- 9. Terms and definitions associated with sealing and densifying
  - a. Sealing
  - b. Densifying
  - c. Shrinkage
  - d. Creep
  - e. Efflorescence
  - f. Impermeability
  - g. Bleeding
  - h. Abrasion resistance
- 10. Reasons for sealing and densifying
  - a. Ensure fully develop strength
  - b. Ensure fully developed durability
  - c. Improve impermeability
  - d. Improve resistance to abrasion
  - e. Reduce efflorescence
  - f. Control plastic shrinkage
  - g. Control cracks
  - h. Minimize creep
- 11. Types of sealing and densifying and methods of application
  - a. Compounds
  - b. Agents
- 12. Proper time to seal and densify
  - a. As soon as possible after placement
  - b. After finishing
  - c. Sufficiently hard
- 13. Advantages of using a sealers and densifiers
  - a. Forms good moisture barrier
  - b. Increases concrete strength
  - c. Increases concrete durability
  - d. Increases surface friction properties
  - e. Resists most alkalies
  - f. Resists some oils and fuels
  - g. Compatible with most concrete coverings
  - h. Easy and quick to apply
- 14. Minimum sealing and densifying requirements for concrete
  - a. Time and temperature
  - b. Specifications

#### Resources Other

1. 29 CFR. 1926 OSHA Construction Industry Regulations. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926.2019>.
2. Intro to OSHA handouts
3. OSHA DVD
4. CPWR, OSHA 500, current edition, CPWR, Silver Spring, MD, 2015 · <https://www.opcmia.org/training/>
5. Concrete and Cement Masonry, Developed by the Curriculum and Instructional Materials Center for the Trade and Industrial Education Division Oklahoma Department of Career and Technology Education, 2002

Key: 240