

# ATCM-2531: CONCRETE RESTORATION

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## Cuyahoga Community College

**Viewing: ATCM-2531 : Concrete Restoration**

**Board of Trustees:**

October 2020

**Academic Term:**

Fall 2021

**Subject Code**

ATCM - Appd Indus Tech-Cement Masonry

**Course Number:**

2531

**Title:**

Concrete Restoration

**Catalog Description:**

Study of surface defects in concrete, and how to recognize, recommend preventative treatment, techniques and remedies to restore surface.

**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):**

Determine causes and solutions to concrete defects in floors, walls, and ceilings.

**Objective(s):**

1. Match terms and definitions associated with surface defects.
2. List types of surface defects.
3. State causes of surface defects.
4. List recommended guidelines for preventing surface defects.

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**Course Outcome(s):**

Select appropriate materials to use when repairing any defects in concrete.

**Objective(s):**

1. State methods of repairing surface defects.
2. Match terms and definitions associated with patching.
3. Reasons for patching concrete.
4. Recognize characteristics of a satisfactory concrete repair.

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**Course Outcome(s):**

Perform concrete repairs on floors, walls, and ceilings.

**Objective(s):**

1. Demonstrate the ability to resurface a floor with underlayment.
  2. Discuss the steps to take to prepare the floor area for repairs.
  3. Discuss the steps to take before patch form-tie holes.
  4. List the materials necessary to bond new concrete to old.
  5. Name methods used to repair concrete.
  6. Name guidelines for matching patch material to original concrete.
  7. Demonstrate the ability to patch a deep hole in a wall.
  8. Demonstrate the ability to patch a hole in a wall using epoxy material.
  9. Demonstrate the ability to patch a hole in a wall where water pressure exists.
  10. Demonstrate the ability to repair a hole in a finished floor.
  11. Demonstrate the ability to resurface a floor using epoxy material.
  12. Demonstrate the ability to resurface a floor using self-leveling material.
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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 evaluations and final examination are detailed below:
  - a. Quizzes
  - b. Tests
  - c. Class participation
  - d. Group activities
  - e. Hands-on projects

**Course Content Outline:**

1. Terms and definitions associated with patching
  - a. Honeycomb
  - b. Air pockets
  - c. Rock pocket
  - d. Laitance
  - e. Blemish
  - f. Dusting
  - g. Popout
  - h. Scaling
  - i. Spalling
  - j. Cracking
  - k. Blistering
  - l. Efflorescence
  - m. Dry pack
  - n. Bond
  - o. Underlayment
  - p. Curing compound
2. Reasons for patching concrete
  - a. Appearance
  - b. Serviceability
  - c. Soundness
  - d. Sealing
3. Characteristics of a satisfactory concrete repair
  - a. Bonded to the damaged concrete
  - b. Durable and impermeable
  - c. Crack and shrink resistant
  - d. Aesthetically appealing
  - e. Capable of withstanding applied loads
  - f. Similar to coefficient of expansion and contraction of existing concrete
4. Factor that control the method and/or extent of repairs
  - a. Types of structure
  - b. Exposure to environmental conditions

- c. Cost of repairs
  - d. Ease of application
  - e. Extent of interruption of traffic
5. Steps to take to prepare floor area for repairs
- a. Remove all oil, grease, and stains
  - b. Remove all loose or unsound material
  - c. Roughen area to be repaired to ensure proper bond
  - d. Thoroughly clean area with broom, air, or by hosing off with water
  - e. Apply specified bonding material
6. Materials used to bond new concrete
- a. Neat cement grout
  - b. Cement and sand grout
  - c. Bonding agent
  - d. Epoxy
7. Methods used to repair concrete
- a. Dry pack mortar method
  - b. Pre-packed concrete method
  - c. Conventional concrete method
  - d. Pneumatic mortar method
  - e. Epoxy mortar or concrete method
  - f. Surface overlay replacement method
  - g. Latex modified cement mortar or concrete method
8. Guidelines for matching patch material to original concrete
- a. Use neat cement grout to bond area
  - b. Use same ingredients as used in original mix when possible
  - c. Blend colors to match
  - d. Make samples

## Resources

Onton, Heiki and Karl Öiger. *Deterioration and Restoration of Old Reinforced Concrete Constructions: Reinforced Concrete Constructions*. 2010.

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## Resources Other

1. <https://www.opcmia.org/training/>
2. 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
3. American Concrete Institute. <https://www.concrete.org/> (<https://www.concrete.org/>) 2019

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