

ATCM-2510: FUNDAMENTALS OF CONCRETE JOINTS

Cuyahoga Community College

Viewing: ATCM-2510 : Fundamentals of Concrete Joints

Board of Trustees:

March 2020

Academic Term:

Fall 2020

Subject Code

ATCM - Appd Indus Tech-Cement Masonry

Course Number:

2510

Title:

Fundamentals of Concrete Joints

Catalog Description:

Study of joints in concrete to include types, depths, locations, sealants, maintenance and reason for joints.

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 the correct type of joint for specific concrete application.

Objective(s):

1. Match terms and definitions associated with joints in concrete.
2. Match types of basic joints to their purposes.
3. Identify types of control (contraction) joints.
4. Identify types of isolation (expansion) joints.
5. Identify types of construction joints.
6. Identify types of decorative joints.
7. State reasons for using joints in concrete slabs.

Course Outcome(s):

Select the correct depth of concrete joints for specific types of concrete.

Objective(s):

1. Name factors to consider when designing joint system for slabs.
2. Explain reasons for different depths of concrete joints.
3. Describe ways to achieve different depths.

Course Outcome(s):

Identify the correct location to install concrete joint for specified thickness of concrete.

Objective(s):

1. Name factors to consider when designing joint systems for slabs.
 2. Select variables to consider when deciding joint locations.
 3. Name factors that affect spacing of joints.
-

Course Outcome(s):

Select correct sealant and apply to specified job.

Objective(s):

1. Describe uses and reasons for sealing joints and how to maintain them.
 2. List types of materials used in joints.
 3. List types of equipment used to cut joints and apply sealants.
 4. Identify types of water stops.
-

Methods of Evaluation:

1. All students will be evaluated during the first two weeks and at 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 activity
 - e. Class projects

Course Content Outline:

1. Terms and definitions associated with joints in concrete
 - a. Joint
 - b. Tensile stress
 - c. Slab
 - d. Sub-grade
 - e. Expansion material
 - f. Sealant
 - g. Thermoplastic
 - h. Elastomer
 - i. Silicone
 - j. Acrylic
 - k. Polyurethane
 - l. Mastic
2. Types of basic joints and their purpose
 - a. Control (contraction)
 - b. Isolation (expansion)
 - c. Construction
 - d. Decorative
3. Types of controls
 - a. Tooled control joint
 - b. Sawed control joint
 - c. Control joint with crack inducer anchored in the subgrade
 - d. Sawed contraction joint with steel dowel
 - e. Longitudinal joint
 - f. Skewed joint
4. Types of isolation (expansion) joints
 - a. Tooled isolation joint with pre-molded expansion material
 - b. Tooled isolation (expansion) joint with pre-molded expansion material held down for sealant
 - c. Tooled isolation joint with pre-molded expansion material and a capped steel rod
 - d. Finger expansion joint
 - e. Sliding plate expansion joint
5. Timing to cut concrete

- a. Tooled or sawed cut joint
 - b. Tooled or sawed cut joint with smooth steel rod
 - c. Tooled joint with keyway
 - d. Tooled joint with keyway and deformed steel rod
6. Types of decorative joints
 - a. Tooled decorative joint
 - b. Tooled decorative joint with expansion joint
 - c. Tooled open joint for filling
 - d. Decorative joint with metal spacer
 7. Reasons for using joints in concrete slabs
 - a. Eliminate random cracks
 - b. Allow expansion and contraction
 - c. Separate adjoining parts at designated locations
 - d. Temporarily separate two successive placements of concrete
 - e. Allow stress relief
 - f. Control transverse and longitudinal cracking
 - g. Divide slabs into suitable spacing
 8. Factors to consider when designing joint systems for slabs
 - a. Types of cracks that may develop
 - b. How to control cracks
 - c. How to provide adequate load transfer across joints
 - d. How to prevent joints from faulting
 - e. How to provide properly shaped sealant reservoirs
 - f. How to provide adequate sealants to minimize infiltration into the joints
 9. Variables to consider when deciding joint locations in slabs
 - a. Tensile stress
 - b. Slab size
 - c. Vertical movement
 - d. Horizontal movement
 - e. Variations in slab thickness
 - f. Locations of rigid objects
 10. Factors that affect spacing of joints in slabs
 - a. Water content of concrete
 - b. Temperature and humidity changes
 - c. Subgrade restraint
 - d. Slab thickness
 - e. Shrinkage potential of the concrete
 - f. Curing environment
 - g. Absence or presence of distributed reinforcement
 11. Types of equipment used to cut joint sand apply sealants
 - a. Joints
 - b. Gasoline driven power saw
 - c. Electric hand saw
 - d. Pneumatic powered sealer
 - e. Air powered gun
 12. Types of materials used in joints
 - a. Compressible
 - b. Wood
 - c. Plastic
 - d. Metal
 13. Types of sealants used in joints
 - a. Acrylic
 - b. Elastomer
 - c. Lead
 - d. Mastic
 - e. Polyurethane
 - f. Silicone
 - g. Thermoplastic

14. Types of depths for different thickness of concrete
 - a. Saw cut depth selection
 - b. Hand tool joint depth selection
 - c. Expansion material depth selection

Resources Other

1. 29 CFR. 1926 OSHA Construction Industry Regulations
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
6. Euclid Chemicals. www.euclidchemical.com

Top of page

Key: 241