

CONCRETE II

STUDY GUIDE

REVISED DECEMBER 2000

Concrete II Study Guide

Examination: The Concrete II examination is based on the following references. It will be 2 hours in length and is an open-book examination. All of the printed references can be used as long as there are no added markings.

References:

1. ACI 302.1R, Guide for Concrete Floor and Slab Construction.
2. ACI 318, Building Code Requirements for Structural Concrete, chapters 1-7.
3. "ACI Manual of Concrete Inspection", Publication SP-2.
4. ACI 309R, Consolidation of Concrete.
5. ACI 347R, Guide to Formwork for Concrete.
6. CRSI "Manual of Standard Practice".
7. NCMA TR 156, "Inspection of Concrete Masonry Construction".
8. ASTM C 94, Ready-Mixed Concrete.
9. ASTM C 270, Mortar for Unit Masonry.
10. ASTM C 780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
11. ASTM C 109, Compressive Strength of Hydraulic Cement Mortars.
12. ASTM C 1019, Sampling and Testing Grout.
13. ASTM C 1314, Constructing and Testing Masonry Prisms Used to Determine Compliance with Specified Compressive Strength of Masonry.
14. CRSI video, "Field Inspection of Reinforcing Bars", 25 minutes.
15. "Design and Control of Concrete Mixtures", Portland Cement Association Thirteenth Addition.

Learning Objectives:

- I. Knowledge of ACI and ASTM concrete requirements.
 - A. Understand reasons for and criteria for maximum coarse aggregate size in a concrete mix.
 - B. Know how to evaluate proper consolidation techniques to include possible results of improper consolidation.
 - C. Knows the effects of ground granulated blast furnace slag (Newcem).
 - D. Know the various testing methods and acceptance criteria for evaluation and acceptance of deficient compressive strength cylinders to include acceptance as is, ACI 318 (paragraph 5.6.2.3), non-destructive testing, cores (ACI 318, paragraph 5.6.4.4), and structural modification.
 - E. Familiar with the standard specifications for ready-mixed concrete addressed in ASTM C 94 to include availability time, batch to placement time, slump and air content tolerances, maximum mixing revolutions,

- mixing requirements after water is added, sampling, minimum temperatures and testing frequencies.
- F. Understands the reasons for and the requirements specified for durability in ACI 318.
 - G. Understands the basic principles of concrete floor and slab construction to include site preparation, proper placement of reinforcement and concrete, finishing and curing.
- II. Can interpret plans, specifications, shop drawings and details for material, dimension, size and location.
- III. Can perform visual inspection of reinforcing steel placement.
- A. Demonstrate an ability to extract dimensions, placement and material requirements from plans and supporting tables and sections.
 - B. Have a working knowledge of the proper placement of reinforcing steel and welded wire fabric to include size, type, proper identification and placement tolerances, lap splices, cover, condition, and field bending.
- IV. Has knowledge of proper handling and placement of epoxy – coated rebar.
- A. Knows the purpose and intent of coated bars or mesh to include the need for compatible supports and wires and specialized storage and handling requirements.
 - B. Awareness of the need for and how damage occurs to the protective coating and how proper repairs are accomplished.
- V. Can inspect reinforced masonry (storage & placement of materials, mixing, grout & mortar, reinforcement and anchorage).
- A. Know the different types and designations of masonry mortar including differences between laboratory-designed mortar and field-mixed mortar.
 - B. Demonstrate a knowledge of how to determine if the materials and components for structural masonry are in accordance with contract documents.
 - C. Have a working understanding of masonry placement requirements to include reinforcing steel and other embedded components, mortar thicknesses and tolerances, and requirements of grouting operations.
- VI. Can properly monitor and test grout and mortar.
- A. Know the techniques and requirements for taking mortar cubes, grout prisms and masonry prisms.
 - B. Understand the storage and handling differences among mortar cubes, grout prisms and masonry prisms.

- VII. Can inspect basic vertical and horizontal formwork.
 - A. Demonstrate a knowledge of the basic criteria for suitable formwork construction to include inspection requirements.
 - B. Know the principles and criteria for early formwork removal to include reshoring.

- VIII. Can inspect batch plant operations.