

## Job-Task Analysis (JTA) for ACI Certification of Shotcrete Nozzleman

### HOW TO USE THIS JTA:

For each of the following assessment methods, the Candidate must:

#### On the written examination:

- **Understand** the following general concepts, which may not have specified values, procedures, or measurements; *and*
- **Know** the following specific procedures or values; performance of these items may also be assessed on the performance examination.

#### On the performance examination:

- **Perform**—or describe verbally, where allowed—the following tasks or steps, which are part of the specified procedure; knowledge of these items may also be assessed on the written examination.

### RESOURCES IN THIS PROGRAM:

ACI CCS-4 *Shotcrete for the Craftsman*

#### **ACI CCS-4 *Shotcrete for the Craftsman***

- Understand the basic properties of concrete
- Know composition of concrete (main ingredients, typical proportions, and how mixed)
- Understand the fundamentals of concrete (workability, consolidation, hydration, curing, strength)
- Know the different types of cements
- Know supplemental cementitious materials
- Know the difference between fine and coarse aggregate
- Understand aggregate size distribution
- Know harmful substances in aggregates
- Know the definition of potable water
- Know the various types of admixtures
- Understand the w/cm and how water content affects concrete
- Know the definition of shotcrete
- Know the difference between wet-mix and dry-mix shotcrete processes
- Know the different types of dry-mix shotcreting equipment
- Know the different types of wet-mix shotcreting equipment
- Know the advantages of each process
- Know the difference between different types of nozzles
- Know generally how the shotcreting equipment operates
- Understand the effect of equipment layout
- Understand the importance of the air compressor capacity for quality work
- Understand the importance of substrate surface preparation
- Know the impact of rebound and overspray on quality
- Understand the requirements for proper encapsulation of reinforcement
- Understand the different techniques required for vertical vs. overhead placement
- Understand how compaction and proper encasement of rebar affect the quality of the shotcrete
- Understand the techniques required for shooting corners and obstacles
- Understand how curing affects concrete strength and durability
- Understand how to limit early-age plastic shrinkage cracking

## **Job-Task Analysis (JTA) for ACI Certification of Shotcrete Nozzleman (Continued)**

- Understand the finishing process
- Understand hot and cold weather shotcrete placement
- Know the safety hazards of the shotcrete process
- Understand the test methods of shotcrete
- Identify shotcrete crew members and describe their responsibilities
- Describe weather conditions and their effect on shotcrete
- Demonstrate the verification steps of the ACI performance test panel integrity
- Demonstrate plugged hose safety procedure
- Demonstrate proper hand signals to communicate with the wet-mix pump/dry-mix gun operator
- Execute proper start-up procedure (nozzle clear, hose connectors secure, etc.)
- Perform shotcrete placement following proper sequence to minimize rebound and overspray entrapment
- Perform shotcrete placement using proper movement to encapsulate reinforcement
- Shoot a test panel exhibiting the ability to properly encase embedded reinforcement