

Job-Task Analysis (JTA) for ACI Certification of Adhesive Anchor Installation Inspector

Assessment Methods:

Written examinations—general (understand concepts) or working (know specific facts) knowledge

RESOURCES:

ACI-CRSI Adhesive Anchor Installer Workbook CP-80

ACI 318-14 Building Code Requirements for Structural Concrete, *Chapter 17 Anchoring to Concrete and Chapter 26 Construction Documents and Inspection*

ACI 355.4 Qualification of Post-Installed Adhesive Anchors in Concrete, *Chapters 1–3 and 10–13*

CAMA Special Inspection Guidelines for Post-Installed Anchors

Concrete International Adhesive Anchor Installation and Inspection

Concrete International Inspecting Adhesive Anchors on the Job – Do's and Don'ts

ICC 2015 International Building Code, *Chapter 17 Special Inspections and Tests*

ICC-ES Evaluation Report – Powers 1000+

INSTALLATION

ACI-CRSI Adhesive Anchor Installer Workbook, CP-80

Items listed in this INSTALLATION section reflect the responsibilities of Installers—it is the Inspector's duty to know the Installer's responsibilities so that the Inspector may accurately and completely perform inspection duties as assigned.

Preparing for Installation – [Chapter 2](#)

- Verify that adhesive is suitable for the intended application (dry, water-filled, submerged, overhead)
- Review manufacturer's printed installation instructions (MPII)
- Review material safety data sheet (MSDS)
- Select appropriate personal protective equipment (PPE)
- Verify concrete temperature falls within range for selected product
- Evaluate concrete condition, age, cracks, expansion joints, thickness, etc. ([Chapter 4](#))
- Verify and layout anchor locations according to specifications

Drilling Anchor Holes – [Chapter 3](#)

- Adjust equipment components according to specifications
- Determine proper depth, diameter, and rod size for hole according to specifications
- Select appropriate drilling machine and bits as per manufacturer specifications
- Drill hole perpendicular to concrete
- Verify that hole depth and diameter meet pre-determined specifications
- Take appropriate action if drilling hits reinforcing steel or other obstructions

Cleaning Anchor Holes – [Chapter 4](#)

- Determine appropriate cleaning method per manufacturer instructions
- Select appropriate equipment to clean holes
- Visually inspect debris coming from hole during drilling
- Remove water-concrete particle slurries
- Remove debris from drill hole using appropriate cleaning method

Job-Task Analysis (JTA) for ACI Certification of Adhesive Anchor Installation Inspector (Continued)

Injecting Adhesive Using Cartridge Systems – Chapter 5

- Verify adhesive expiration date
- Identify cartridge storage temperature requirements
- Verify that proper nozzle is selected with complete mixing element
- Assemble adhesive cartridge and nozzle per MPII
- Confirm that hole is clean prior to injecting adhesive
- Insert adhesive assembly into dispenser
- Select equipment suitable for installation location (horizontal to overhead)
- Discard initial adhesive and confirm proper mixing
- Inject adhesive per MPII (rate, application, method, avoid air entrapment)
- Determine minimum depth of adhesive fill
- Determine appropriate adhesive working (gel) time

Installing Anchors – Chapter 6

- Identify most appropriate installation technique per MPII
- Select the anchor appropriate for the adhesive system in use
- Inspect anchor element for contaminants and clean if needed
- Inspect anchor element for damage and replace if needed
- Insert anchor element into borehole per MPII
- Verify accurate final embedment depth based on length of protruding anchor element
- Verify that adhesive fills hole uniformly around the anchor, approximately flush with surface
- Take corrective action if air pockets are noted during installation
- Ensure that anchor remains undisturbed until adhesive is fully cured

Installing Adhesive Capsule Systems – Chapter 7

- Verify adhesive expiration date
- Identify capsule storage temperature requirements
- Confirm that material has not solidified inside capsule
- Confirm that hole is clean prior to capsule insertion
- Insert capsule into hole per the MPII

INSPECTION

CAMA Special Inspection Guidelines; CI Adhesive Anchor Installation and Inspection; CI Inspecting Adhesive Anchors on the Job – Do's & Don'ts

- Understand special inspector's role on the jobsite
- Understand items of importance when inspecting adhesive anchors prior to, during, and following installation
- Know warning signs of potential deviation from construction documents and MPII

ACI 318-14 Building Code Requirements for Structural Concrete, Chapter 17 Anchoring to Concrete

- Understand inspection requirements for adhesive anchors as derived from ACI 318
- Know minimum age requirement of concrete relative to using adhesive anchors
- Know adhesive anchor systems installed horizontally or upwardly inclined must meet requirements of 355.4
- Know qualification requirements for installers

Job-Task Analysis (JTA) for ACI Certification of Adhesive Anchor Installation Inspector (Continued)

- Know specifics related to proof loading of adhesive anchors: triggers for proof loading requirement, objective of proof loading, how proof loading of adhesive anchors is conducted, minimum requirements for definition of a proof loading program
- Know minimum installer certification and inspection intensity requirement for adhesive anchors installed horizontally or upwardly inclined and resisting sustained tension loads
- Understand location and manner in which the requirements of ACI 355.4 are referenced in ACI 318

ACI 318-14 Building Code Requirements for Structural Concrete, Chapter 26 Construction Documents and Inspection & 2015 IBC, Chapter 17 Special Inspections and Test

- Understand basis for special inspection in the IBC
- Know when periodic or continuous special inspection is required
- Understand when anchors require continuous special inspection
- Know the three sources for adhesive anchor inspection requirements
- Know special inspector qualifications
- Know who retains the services of the special inspector
- Understand employment of approved agencies for special inspection
- Know about access to work for purposes of special inspection
- Statement of special inspections – preparation, content
- Understand potential conflict of interest situations for special inspectors
- Know and understand minimum reporting requirements
- Understand the relevant references to ACI 318 in the IBC

ACI 355.4 Qualification of Post-Installed Adhesive Anchors in Concrete, Chapters 1–3 and 13

- Understand the significance of the standard
- Understand the scope of the standard
- Know notations and definitions – *the following 8 specific notations selected:*

C_{ac} Critical edge	d_o Diameter of drilled hole	S_{min} Min. anchor spacing
C_{min} Minimum edge	h_{ef} Effective embedment depth	T_{inst} Specified tightening torque
d_a Outside dia. of post-installed anchor	h_{min} Min. member thickness	
- Know definitions of terms specific to AAI – *the following 13 specific definitions selected:*

Adhesive anchor system	Capsule anchor system	MPII
Anchor	Cartridge systems	Saturated concrete
Anchor category	Cure time	Shelf life
Anchor installation	Dry concrete	
Bulk adhesives	Gel time	
- Know and understand the variables and options for qualification
- Understand definition of special inspection
- Know who specifies inspection procedures for each type of anchor system and where to find this information
- Understand definition of continuous special inspection
- Know the seven minimum items to verify
- Understand definition of periodic special inspection
- Understand what proof loading is
- Understand the contents of a proof loading program
- Know the minimum and maximum load levels
- Know the minimum amount of time the proof load is applied

Job-Task Analysis (JTA) for ACI Certification of Adhesive Anchor Installation Inspector (Continued)

ICC-ES Evaluation Report

- Verification of the applicability of the evaluation report to the adhesive anchor system being installed
- Verification the evaluation report has not expired or been replaced
- Know how to identify the product and equipment necessary for the installation
- Understand the scope, significance, and information in the report
- Understand general information about the product
- Understand parameters of installation of product
- Know when periodic and continuous inspection are required
- Understand conditions of use
- Know installation procedures per MPII
- Know limitations related to concrete, temperature, and product
- Understand handling and storage of the product
- Know types of anchors allowed
- Know information related to spacing, edge distance, and member thickness
- Understand embedment requirements
- Understand limitations on anchor types
- Know product requirements for periodic and special inspection
- Understand product specific allowable installation directions
- Understand content and importance of manufacturers printed installation instructions