American Concrete Institute

ACI Certification

Now and the Future

Presented by: Michael Morrison Manager, Certification Program Development

NATIONAL CONCRETE CONSORTIUM

Kalispell, MT Fall 2019

ACI Certification

Now Serving the Industry with 30 Programs

It started with…

- Concrete Field Testing Technician
- 35 Years
- 25,000 Annually

ACI Certification

30 Programs
3 Practice Areas

- Laboratory & Field Programs
- Craftsmen / Construction Specialist Programs
- Inspector Programs

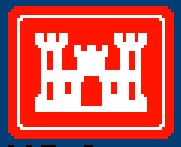
ACI Certification

30 Programs
3 Practice Areas

- Largest certifying body in the concrete industry
- 135,000 active certifications
- 600,000+ exams administered to date
- Certified individuals residing in 54 countries
- Certification programs in English, Spanish, Chinese & French

ACI Certification - Endorsements

The following participate with ACI in programs to improve the quality of concrete construction:



Certification is Specified or Suggested…

In over 40 of ACI's Documents

121R-08 Guide for Concrete Construction Quality Systems in Conformance with ISO 9001

View the full document.

214R-11 Guide to Evaluation of Strength Test Results of Concrete

View the full document.

301-10 Specifications for Structural Concrete

View the full document.

301M-10 Specifications for Structural Concrete

View the full document.

305R-10 Guide to Hot Weather Concreting

View the full document.

309R-05 Guide for Consolidation of Concrete

View the full document.

318-08 Building Code Requirements for Structural Concrete and Commentary

View the full document.

318-11 Building Code Requirements for Structural Concrete and Commentary

Certification is Specified…

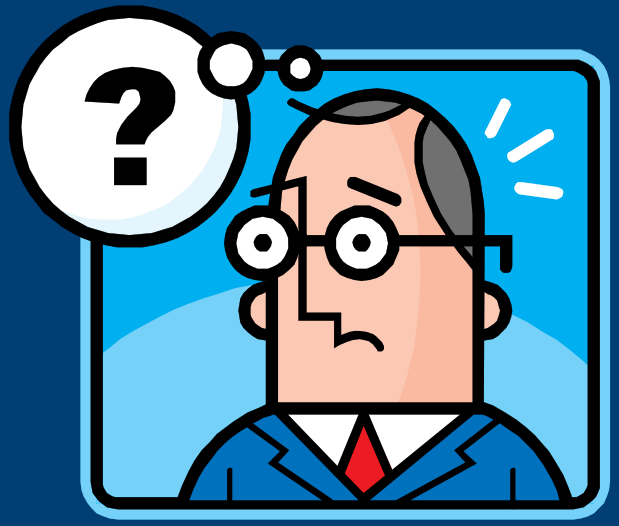
- Wal-Mart & Best Buy require ACI Flatwork Finisher
- New York City Dept. of Buildings requires
- - ACI CCSI, CFTT and Adhesive Anchor Installer
- Numerous DOT's Specify ACI Certified Field Techs
- ASTM Test Methods Specify Certified Personnel
- ACI Codes, Specifications and Guides PCI Plant
- Accreditation requires it
- US Army Corps Of Engineers requires it

ACI Certification

- Certification Programs – How and Why
- New Programs Available Now
- Programs Under Development
- Which ones are Important to me?

ACI Certification Programs

- How are the programs built?
- Who builds them?



ACI Certification Programs

- Industry Driven
- ACI Committee Sponsored
- Subject Matter Expert Developed




New Program Development

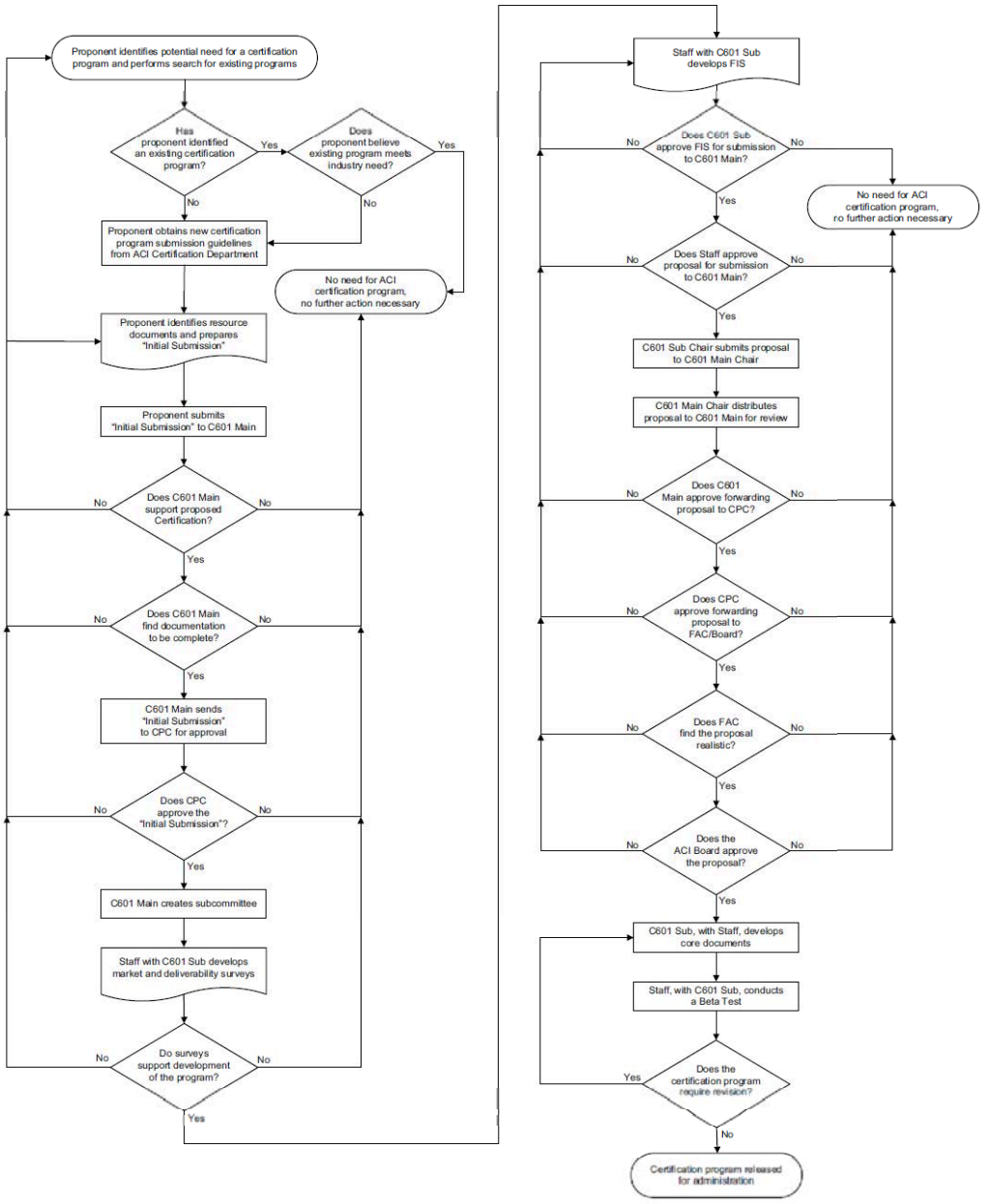
ACI Committee or Industry Driven -

- Identify the potential need
- Identify reference materials
- Feasibility

New Program Flowchart

American Concrete Institute

New ACI Certification Program Development Flowchart



New Program Development

ACI Committee or Industry Driven -

- Identify the potential need
- Identify reference materials
- Feasibility
- Basis for the program / Justify the need
- CPC for approval to investigate

New Program Development

Next Steps -

- Certification Development Committee is formed w/ SME's
- Industry Survey
- Feasibility is developed and confirmed
- Chapter / Sponsoring Group Survey
- Financial Impact Statement (FIS)
- CPC/FAC/BOD for approval to develop

New Program Development

Next Steps -

- Finalize Reference Materials
- Develop a **J**ob **T**ask **A**nalysis *(body of knowledge)*
- Develop exams based on **JTA**

New Program Development

Next Steps -

- Develop Workbook / Study Pack
- Write and Vet exams
- Host Pilot Program(s)
- Revisions based on Pilot Program
- Program goes to market

New Program Development

How Long Does This Take?

Depends on…

- Complexity of program content
- Committee members commitment
- Urgency / Need for program
- Minimum of 2 years / as much as 4 years

ACI Certification

Program Growth –

- Adhesive Anchor Installer (2011)
- Masonry Field Testing Technician (2014)
- Masonry Laboratory Testing Technician (2014)
- Concrete Quality Technical Manager (2016)
- Adhesive Anchor Installation Inspector (2017)
- Cement Physical Tester Technician (2017)
- Self-Consolidating Concrete Testing Technician (2018)
- Decorative Concrete Flatwork Finisher (2018)
- EN Concrete Field Testing Technician (2018)

ACI Certification

Program Growth

- Adhesive Anchor Installation Inspector (2017)
- Cement Physical Tester Technician (2017)
- Self-Consolidating Concrete Testing Technician (2018)
- Decorative Concrete Flatwork Finisher (2018)
- EN Concrete Field Testing Technician (2018)

ACI Certification

Program Growth

Programs available in 2019

- Post-Installed Concrete Anchor Installation Inspector – ***June***
- Shotcrete Inspector - ***November***
- Non-Destructive Testing (NDT) Specialist I - ***December***
- Concrete Flatwork Finisher *(Re-organized)* - ***August***

Programs available in 2020 and beyond

- Concrete Construction Sustainability Assessor
- EN Concrete Strength Testing Technician

ACI Certification

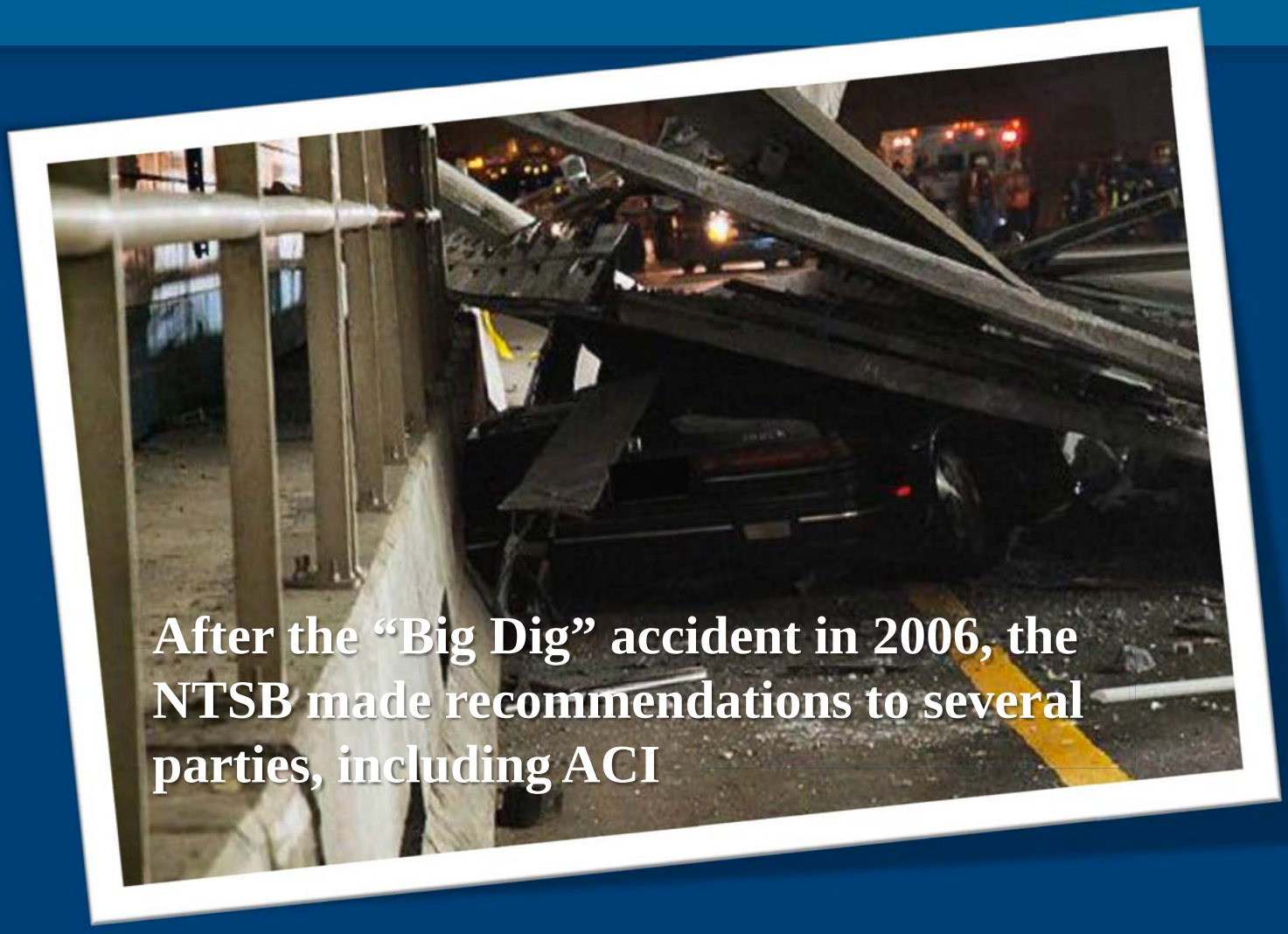
Which Programs are Important to Me?

Programs Now Available…

Concrete Anchors -

- Adhesive Anchor Installer
- Adhesive Anchor Installation Inspector
- Post-Installed Concrete Anchor Installation Inspector

Boston Big Dig Tunnel Fatality - 2006



Boston Big Dig Tunnel Fatality - 2006

Adhesive Anchor Installer - Learning Objectives

Read – Comprehend – Execute

Adhesive Anchor Installer

Late 2009 to mid-2011
Program is developed….

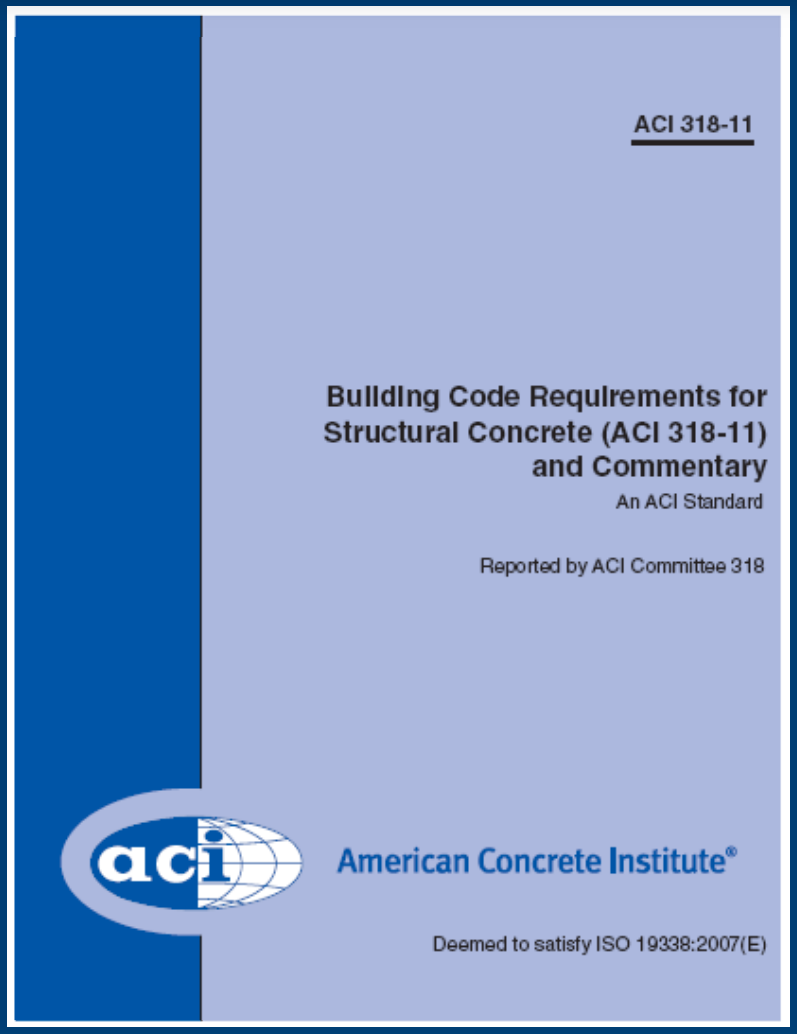
Measures the skill set and technical knowledge of an individual relative to the proper installation of **A**dhesive **A**nchors

Adhesive Anchor Installer

Program Delivery

- Available in 40+ states
- Train the Trainer
- Includes review session
- Hands-on Demo/Practice
- Must demonstrate skills
  - Drilling
  - Cleaning & preparing
  - Injection & Inserting
  - Vertical Down
  - Overhead Installations

318-11 / Published July 2011



Certified Installers are Required

Industry Awareness of the AAI Program

ACI/CRSI Adhes… Installer Certifica… Adopted at Los A… National Laborat…

by Michael J. Morrison and John K. Conn

In May 2015, the Rocky Mountain Chapter – ACI was contracted by Los Alamos National Laboratories (LANL) to make an on-site visit and execute ACI/CRSI's Adhesive Anchor Installer (AAI) certification program. LANL wanted 60 of their employees to obtain this certification. This group included 50 installers and 10 inspectors. The installers represented the local Ironworkers, Carpenters, Electrical and Masonry Workers unions. LANL employs approximately 900 full-time construction workers and this was the first session of what both parties expect will potentially become an annual program.

Running 60 candidates through the program presented some logistic challenges, but we were able to solve them by organizing two, 2-day program sessions. Day 1 featured classroom review in the morning followed by a hands-on practice session in the afternoon, with Day 2 reserved for the written and performance exams. This solution also limited jobsite staffing issues at LANL, as only half of the 60 employees would be out at any given time.

Qualifications of a Certified Adhesive Anchor Installer

A certified Adhesive Anchor Installer is an individual who has demonstrated the ability to read, comprehend, and execute instructions to properly install adhesive anchors in concrete. The Installer must also demonstrate possession of the knowledge to properly assess ambient conditions, concrete condition, materials, equipment, and tools for installing adhesive anchors and determine when it is appropriate to proceed with installation of an adhesive anchor or when additional guidance from a supervisor/foreman/project engineer is needed.

Positive Fe…

ACI staff i… Activities, and… Program Deve… the Rocky Mou… initiative. The p… Best Engineerin… CO, and Past Pr… committee of the… assisted by Scott… Kumar & Associ… dent of the Rocky… for the AAI progr… Technician, U.S. B… Director and Suppl… certification progra…

Three overhead… to get all attendees …

Preparing for the retaining … Scott Hougerd (right), Rocky…

www.concreteinte…

Anchor Provisions Undergo Significant Changes in the 2012 International Building Code

By Andra Hoermann-Gast, MSc., Dipl. Ing.

Since its introduction in 2000, the International Building Code® (IBC) has been the preferred model code for states, municipalities and other jurisdictions throughout the U.S.

The publication of the 2012 IBC represents another milestone in the I-Code legacy. Notable improvements in the 2012 IBC include significant changes to the provisions for anchors in concrete by way of reference in Section 1912 to ACI 318-11, Building Code Requirements for Structural Concrete, and a new ACI standard, ACI 355.4-11. Taken together, these documents provide the basis for the qualification and design of adhesive anchors.

At present the most widely recognized requirements for qualification and design of adhesive anchor systems are given in AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements, an Acceptance Criteria published by ICC Evaluation Service (ICC-ES). This document establishes requirements that permit post-installed adhesive anchors in concrete elements to be recognized in ICC-ES Evaluation Service Reports (ESRs). Prior to publication of the 2012 IBC, procedures for establishing the design strength of adhesive anchors used to create connections between structural concrete and attachments have not existed in the code. Past editions of ACI 318 have specifically excluded … anchors from the … Appendix D – Anc… Concrete. Accordi… basis for the de… of AC308 in 20… allow recognition… anchors in con… alternative to … anchors and … expansion … anchors unde… of IBC Section… to Concrete. … Even with t… necessary … in order … control r… to accom… standar… The ne… Adhes… asses…

Construction Technical Note
CTN–M–3–11

Technical Note

Suggested General Drawing Notes for Adhesive Anchors

Introduction

Adhesive anchor design provisions and installation requirements for certain orientations and loading conditions were incorporated into the Appendix D provisions of ACI 318-11, *Building Code Requirements for Structural Concrete* [2011]. These provisions were in response to the issues associated with the Big Dig Tunnel accident in Boston and the subsequent recommendations of the National Transportation Safety Board [2007]. The adhesive anchor design provisions in the Building Code have been harmonized into the Appendix D CCD model, whereas in the past the design was under the purview of the individual anchorage manufacturers.

To assist the design Engineer in coordinating the adhesive anchor design into cohesive construction and installation requirements for the design drawings, CRSI has prepared this Technical Note presenting recommended General Notes for Adhesive Anchor Installation. As appropriate, the individual notes have been augmented with commentary for the Engineer / Specifier. Many of the notes are consistent with the requirements in ACI 318, and the adhesive material qualification requirements stipulated in ACI 355.4 [2011]. Other notes outline proper installation techniques, and the necessary qualifications of the anchor installer. The certification requirements of ACI 318 are highlighted in the notes, and recommended inspection and proof-load testing requirements are presented. The latter requirements represent recommendations from the Concrete Anchor Manufacturer's Association (CAMA) [2011].

Suggested Drawing Notes

Materials

1. The adhesive anchor system used for post-installed anchorage to concrete shall conform to the requirements of the most recently published ACI 355.4, *Acceptance Criteria for Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary*. The anchor system shall be one of the following:

   a. *[Comment: Provide a list of products]*

   b. An approved equal meeting ACI 355.4 and the minimum bond stress values below. Bulk-mixed adhesives are not permitted.

2. The adhesive anchors selected from paragraph 1, above, shall be supplied as an entire system. The system shall include, but is not limited to, the new adhesive cartridge, a clean mixing nozzle, extension tube, a dispensing gun, and all manufacturer recommended supplies for properly cleaning the drilled hole.

3. Anchorage design is in accordance with Appendix D of ACI 318-11. For adhesive anchors, the following minimum values for bond stress were assumed for the design using the above adhesive anchor assemblies:

   a. Cracked concrete bond stress: τ_{cr} = _____ psi

   b. Uncracked concrete bond stress: τ_{uncr} = _____ psi

   [Comment: Table D.5.5.2 of ACI 318-11 lists minimum characteristic bond stress values for outdoor and indoor applications. Manufacturers also have these values available for their specific products.]

4. All-threaded rod *(eyebolts, threaded studs, internal threaded parts)* to be used in adhesive anchor assemblies shall conform to ASTM A36, A193 (Grade B7), A307, B348

CRSI

…chor …ification …date

…the United States, …ot shown on the …he map represents …d for a Sponsoring …rtification programs …ion, surrounding … Sponsoring Groups …on programs on the …ams in multiple …eir region. …icate that the …in that city has …d an AAI orientation …rently offering the …rogram. Blue pins indicate Sponsoring Groups slated for AAI orientation in 2014. More than 50 Sponsoring Groups will eventually offer the AAI program.

Review seminars and exams were offered at both the 2013 and 2014 World of Concrete events. This program also enjoys international exposure, as ACI's Taiwan Chapter offers the program. Sponsoring Groups in South America, Central America, Canada, and the Mideast are also on the schedule for AAI orientation. The Adhesive Anchor Installer workbook and exams are currently

…tification locations in the United States: orange pins indicate Sponsoring …gone through orientation and are prepared to offer AAI Certification …indicate AAI programs that are expected to be in operation by the …arter of 2014. (Note: Honolulu, HI, and Taipei, Taiwan, have also gone …rientation program and are offering AAI Certification in their regions.)

ICC/ES Evaluation Service Report (ESR)

January 2014 –

ICC Updates **all**

Adhesive Anchor Service Reports

…reflect design provisions of 318-11

ICC EVALUATION SERVICE — Most Widely Accepted and Trusted

ICC-ES Evaluation Report — **ESR-2508**

Reissued May 2014

This report is subject to renewal July 1, 2015.

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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 19—Post-Installed Concrete Anchors

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® SET-XP® EPOXY ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 and 2006 *International Building Code®* (IBC)
- 2009 and 2006 *International Residential Code®* (IRC)

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® SET-XP® Epoxy Adhesive Anchors are used to resist static, wind and earthquake (seismic Design Categories A through F) tension and shear loads in cracked and uncracked normal-weight concrete having a specified compressive strength, f'_c, of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

The anchor is an alternative to anchors described in Sections 1911 and 1912 of the 2009 and 2006 IBC. The anchors may also be used where an engineering design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The SET-XP Epoxy Adhesive Anchor System is comprised of the following components:

- SET-XP epoxy adhesive packaged in cartridges
- Adhesive mixing and dispensing equipment
- Equipment for hole cleaning and adhesive injection

SET-XP epoxy adhesive is used with continuously threaded steel rods or deformed steel reinforcing bars. The manufacturer's printed installation instructions (MPII) are included with each adhesive unit package as shown in Figure 1 of this report.

3.2 Materials:

3.2.1 SET-XP Epoxy Adhesive: SET-XP epoxy adhesive is an injectable, two-component, 100 percent solids, epoxy-based adhesive mixed as a 1-to-1 volume ratio of hardener-to-resin. SET-XP is available in 8.5-ounce (251 mL), 22-ounce (650 mL), and 56-ounce (1656 mL) cartridges. The two components combine and react when dispensed through a static mixing nozzle attached to the cartridge. The shelf life of SET-XP in unopened cartridges is two years from the date of manufacture when stored at temperatures between 45°F and 90°F (7°C and 32°C) in accordance with the MPII.

3.2.2 Dispensing Equipment: SET-XP epoxy adhesive must be dispensed using Simpson Strong-Tie manual dispensing tools, battery-powered dispensing tools or pneumatic dispensing tools as listed in Tables 7 and 8 of this report.

3.2.3 Equipment for Hole Preparation: Hole cleaning equipment consists of hole-cleaning brushes and air nozzles. Brushes must be Simpson Strong-Tie hole cleaning brushes, identified by Simpson Strong-Tie catalog number series ETB. See Tables 7 and 8 in this report, and the installation instructions shown in Figure 1, for additional information. Air nozzles must be equipped with an extension capable of reaching the bottom of the drilled hole.

3.2.4 Anchor Materials:

3.2.4.1 Threaded Steel Rods: Threaded anchor rods, having diameters from $^3/_8$ inch to $1^1/_4$ inch (9.5 mm to 31.7 mm), must be carbon steel conforming to ASTM F1554, Grade 36, or ASTM A193, Grade B7; or stainless steel conforming to ASTM A193, Grade B6, B8, or B8M. Table 2 in this report provides additional details. Threaded bars must be clean, straight and free of indentations or other defects along their lengths.

3.2.4.2 Steel Reinforcing Bars: Steel reinforcing bars are deformed reinforcing bars (rebar), having sizes from No. 3 to No. 8, and No. 10, must conform to ASTM A615 Grade 60. Table 3 in this report provides additional details. The embedded portions of reinforcing bars must be straight, and free of mill scale, rust, mud, oil, and other coatings that may impair the bond with adhesive. Reinforcing bars must not be bent after installation except as set forth in Section 7.3.2 of ACI 318, with the additional

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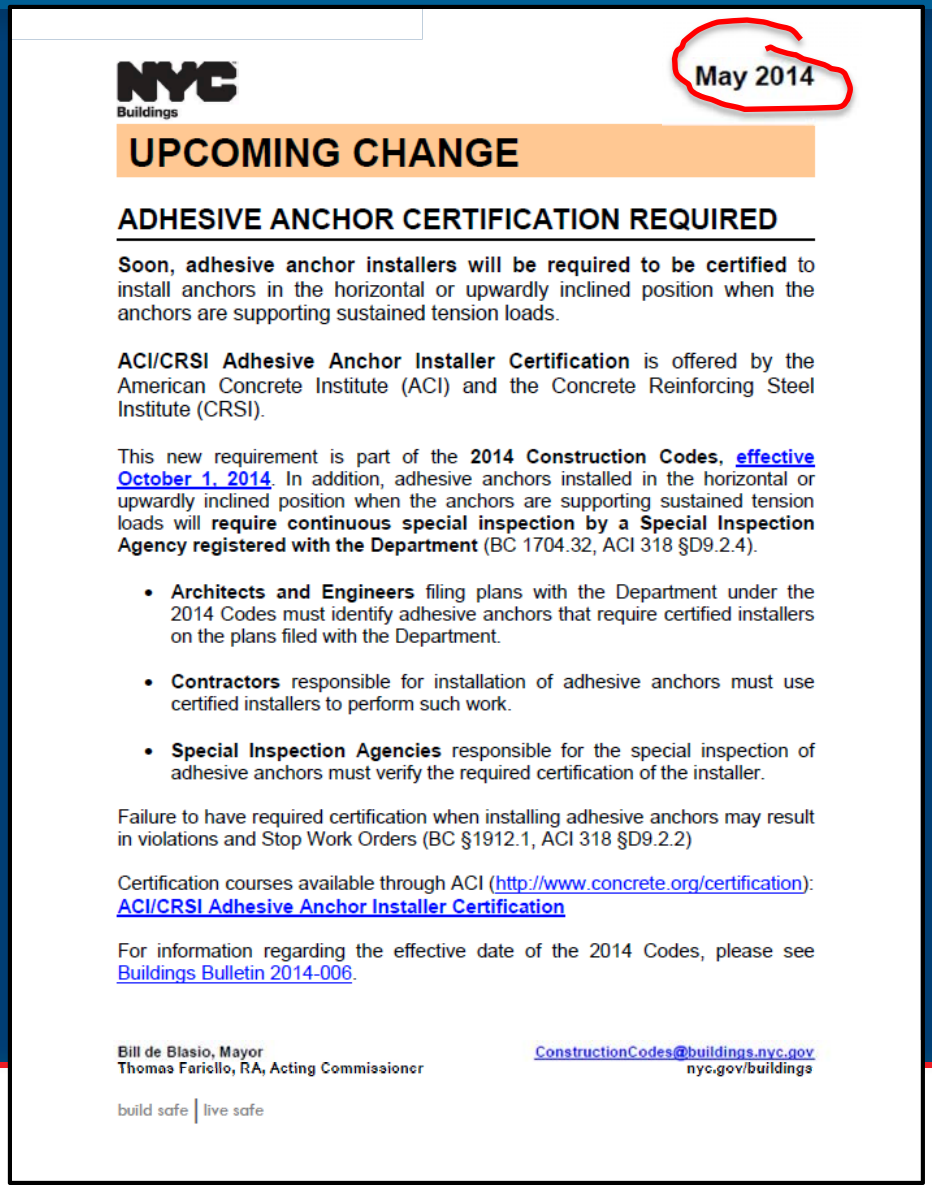
New York City – Dept. of Buildings

News Release About Changes

Installer Certification Required



NYC Buildings

May 2014

UPCOMING CHANGE

ADHESIVE ANCHOR CERTIFICATION REQUIRED

Soon, adhesive anchor installers will be required to be certified to install anchors in the horizontal or upwardly inclined position when the anchors are supporting sustained tension loads.

ACI/CRSI Adhesive Anchor Installer Certification is offered by the American Concrete Institute (ACI) and the Concrete Reinforcing Steel Institute (CRSI).

This new requirement is part of the **2014 Construction Codes**, **effective October 1, 2014**. In addition, adhesive anchors installed in the horizontal or upwardly inclined position when the anchors are supporting sustained tension loads will **require continuous special inspection by a Special Inspection Agency registered with the Department** (BC 1704.32, ACI 318 §D9.2.4).

- **Architects and Engineers** filing plans with the Department under the 2014 Codes must identify adhesive anchors that require certified installers on the plans filed with the Department.
- **Contractors** responsible for installation of adhesive anchors must use certified installers to perform such work.
- **Special Inspection Agencies** responsible for the special inspection of adhesive anchors must verify the required certification of the installer.

Failure to have required certification when installing adhesive anchors may result in violations and Stop Work Orders (BC §1912.1, ACI 318 §D9.2.2)

Certification courses available through ACI (http://www.concrete.org/certification): **ACI/CRSI Adhesive Anchor Installer Certification**

For information regarding the effective date of the 2014 Codes, please see Buildings Bulletin 2014-006.

Bill de Blasio, Mayor
Thomas Fariello, RA, Acting Commissioner

ConstructionCodes@buildings.nyc.gov
nyc.gov/buildings

build safe | live safe

City of Los Angeles - DBS

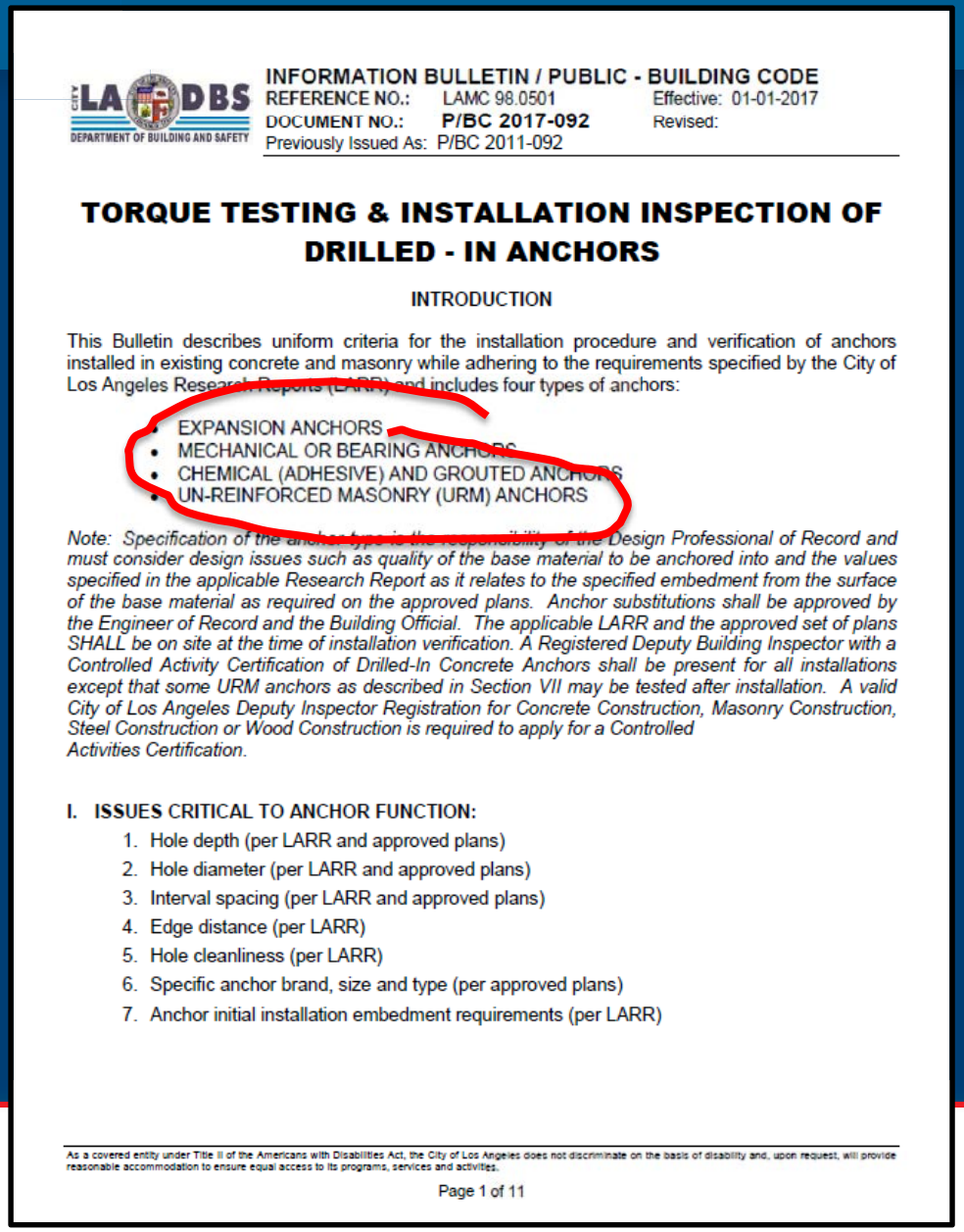
Jan 2017 –

Information Bulletin

Calls out requirements

Requires certified Installers.

Inspector program



LA DBS DEPARTMENT OF BUILDING AND SAFETY

INFORMATION BULLETIN / PUBLIC - BUILDING CODE
REFERENCE NO.: LAMC 98.0501 Effective: 01-01-2017
DOCUMENT NO.: **P/BC 2017-092** Revised:
Previously Issued As: P/BC 2011-092

TORQUE TESTING & INSTALLATION INSPECTION OF DRILLED - IN ANCHORS

INTRODUCTION

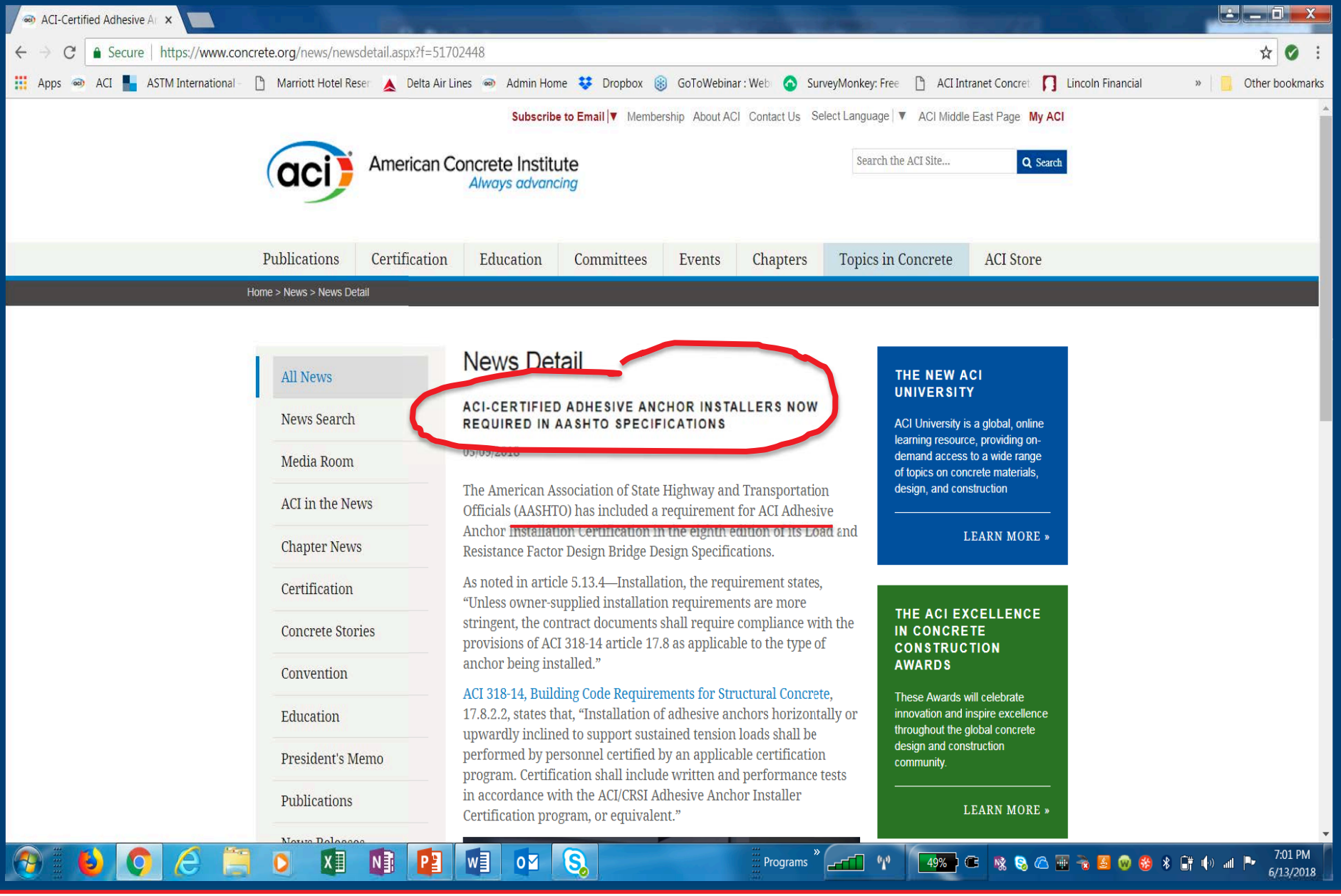
This Bulletin describes uniform criteria for the installation procedure and verification of anchors installed in existing concrete and masonry while adhering to the requirements specified by the City of Los Angeles Research Reports (LARR) and includes four types of anchors:

- EXPANSION ANCHORS
- MECHANICAL OR BEARING ANCHORS
- CHEMICAL (ADHESIVE) AND GROUTED ANCHORS
- UN-REINFORCED MASONRY (URM) ANCHORS

Note: Specification of the anchor type is the responsibility of the Design Professional of Record and must consider design issues such as quality of the base material to be anchored into and the values specified in the applicable Research Report as it relates to the specified embedment from the surface of the base material as required on the approved plans. Anchor substitutions shall be approved by the Engineer of Record and the Building Official. The applicable LARR and the approved set of plans SHALL be on site at the time of installation verification. A Registered Deputy Building Inspector with a Controlled Activity Certification of Drilled-In Concrete Anchors shall be present for all installations except that some URM anchors as described in Section VII may be tested after installation. A valid City of Los Angeles Deputy Inspector Registration for Concrete Construction, Masonry Construction, Steel Construction or Wood Construction is required to apply for a Controlled Activities Certification.

I. ISSUES CRITICAL TO ANCHOR FUNCTION:

1. Hole depth (per LARR and approved plans)
2. Hole diameter (per LARR and approved plans)
3. Interval spacing (per LARR and approved plans)
4. Edge distance (per LARR)
5. Hole cleanliness (per LARR)
6. Specific anchor brand, size and type (per approved plans)
7. Anchor initial installation embedment requirements (per LARR)


ACI-Certified Adhesive A
Secure | https://www.concrete.org/news/newsdetail.aspx?f=51702448
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ACI-CERTIFIED ADHESIVE ANCHOR INSTALLERS NOW REQUIRED IN AASHTO SPECIFICATIONS
The American Association of State Highway and Transportation Officials (AASHTO) has included a requirement for ACI Adhesive Anchor installation certification in the eighth edition of its Load and Resistance Factor Design Bridge Design Specifications.
As noted in article 5.13.4—Installation, the requirement states, "Unless owner-supplied installation requirements are more stringent, the contract documents shall require compliance with the provisions of ACI 318-14 article 17.8 as applicable to the type of anchor being installed."
ACI 318-14, Building Code Requirements for Structural Concrete, 17.8.2.2, states that, "Installation of adhesive anchors horizontally or upwardly inclined to support sustained tension loads shall be performed by personnel certified by an applicable certification program. Certification shall include written and performance tests in accordance with the ACI/CRSI Adhesive Anchor Installer Certification program, or equivalent."
THE NEW ACI UNIVERSITY
ACI University is a global, online learning resource, providing on-demand access to a wide range of topics on concrete materials, design, and construction
LEARN MORE »
THE ACI EXCELLENCE IN CONCRETE CONSTRUCTION AWARDS
These Awards will celebrate innovation and inspire excellence throughout the global concrete design and construction community.
LEARN MORE »
Programs
49%
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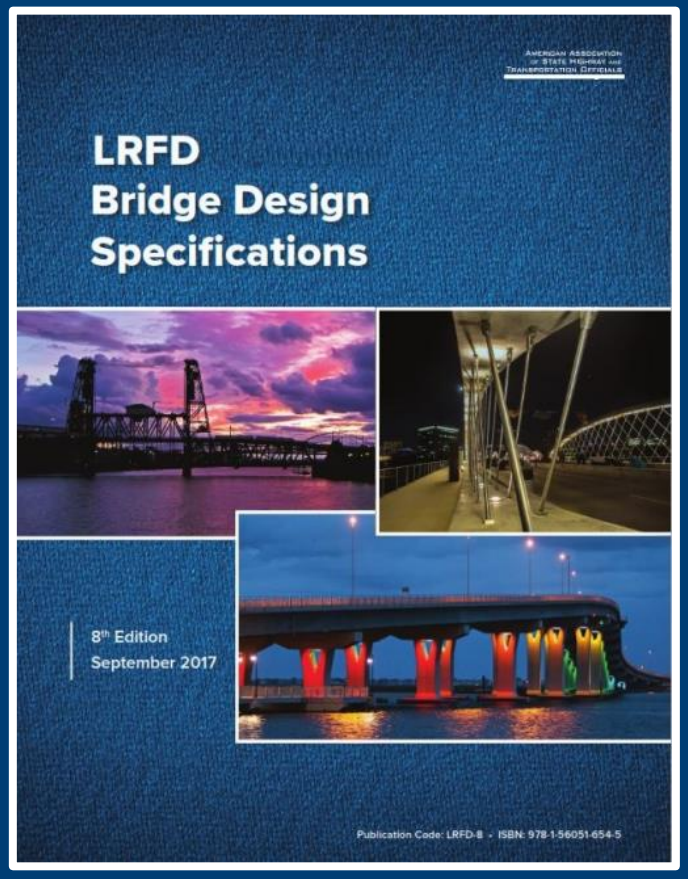
6/13/2018



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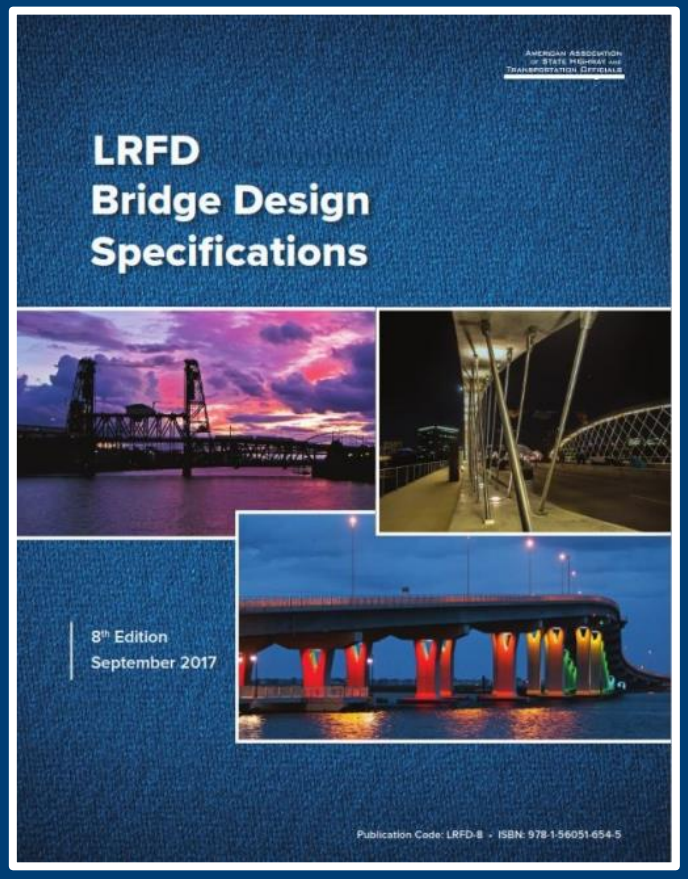
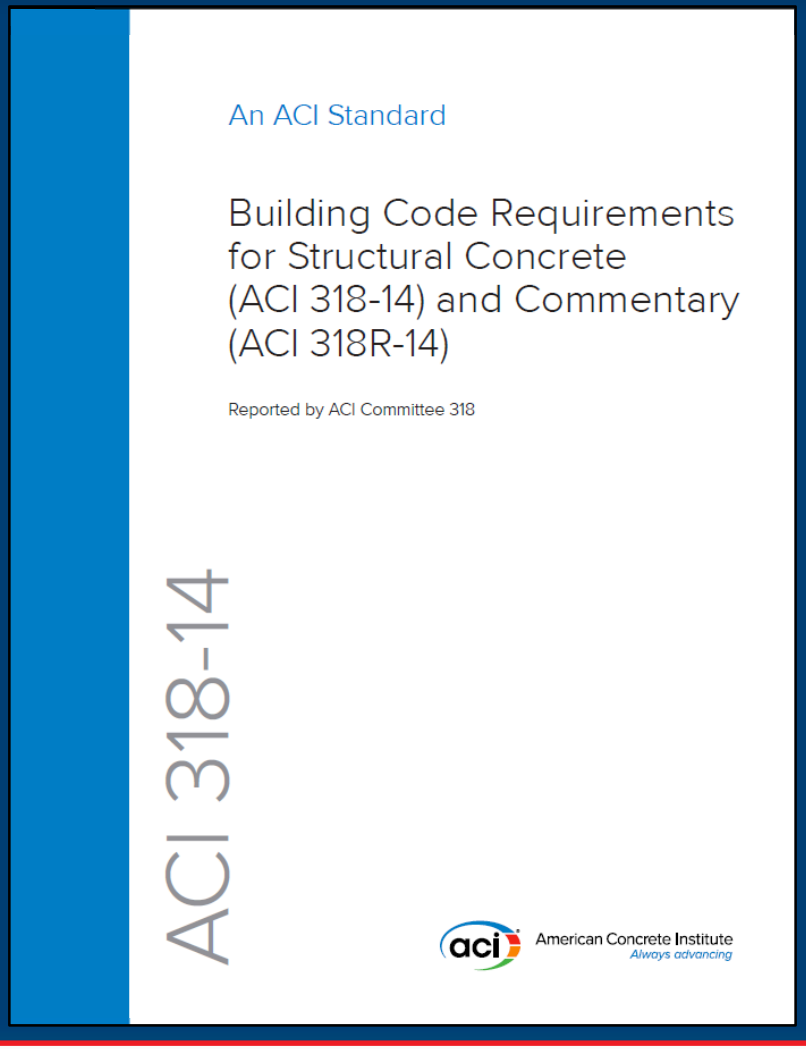


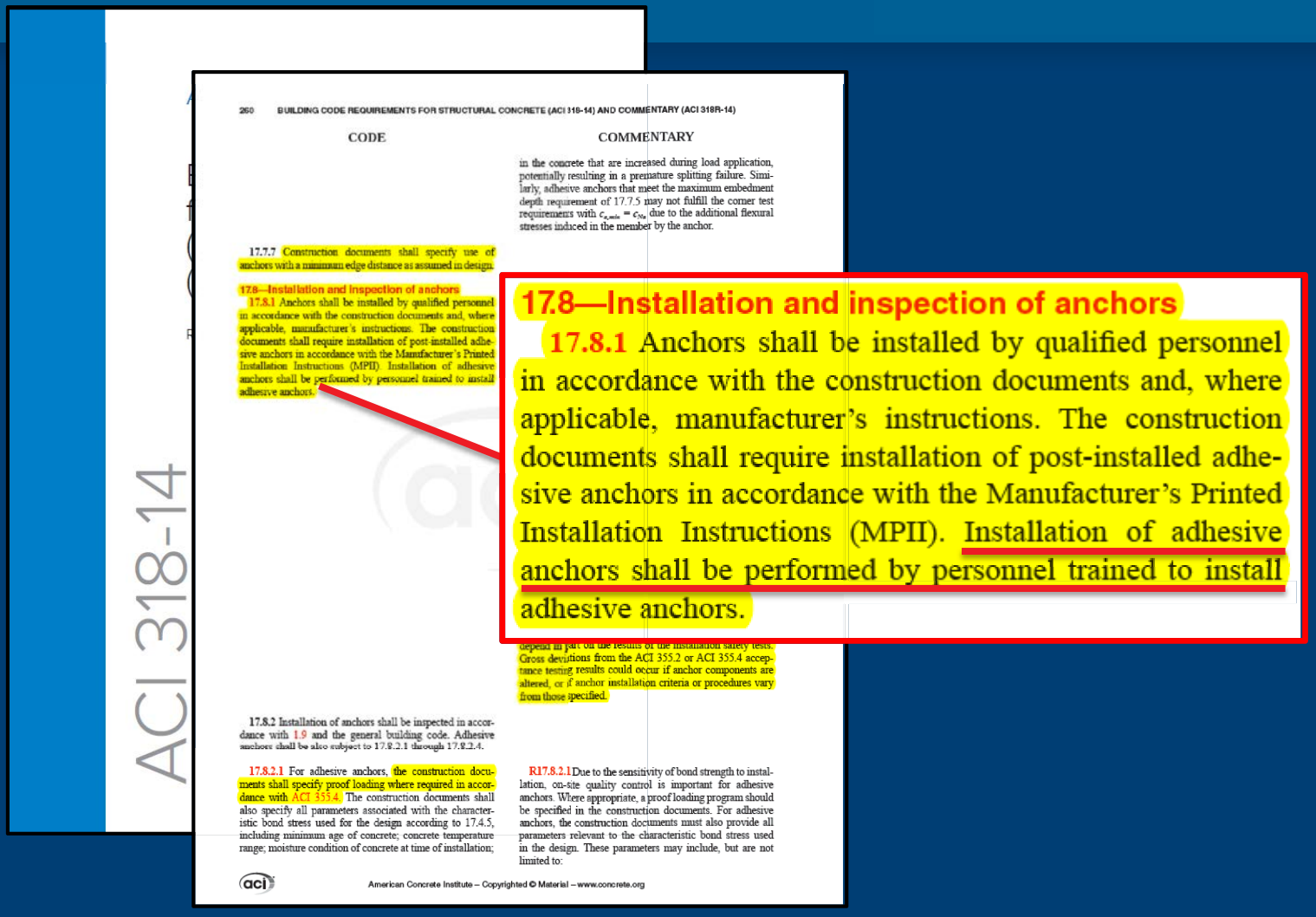
As noted in **article 5.13.4—Installation,** the requirement states,

"Unless owner-supplied installation requirements are more stringent, the contract documents shall require compliance with the provisions of ACI 318-14 article 17.8 as applicable to the type of anchor being installed."'

ACI 318-14


An ACI Standard
Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)
Reported by ACI Committee 318
ACI 318-14
American Concrete Institute
Always advancing

Chapter 17


ACI 318-14
260 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-14) AND COMMENTARY (ACI 318R-14)
CODE
COMMENTARY
17.7.7 Construction documents shall specify use of anchors with a minimum edge distance as assumed in design.
17.8—Installation and inspection of anchors
17.8.1 Anchors shall be installed by qualified personnel in accordance with the construction documents and, where applicable, manufacturer's instructions. The construction documents shall require installation of post-installed adhesive anchors in accordance with the Manufacturer's Printed Installation Instructions (MPII). Installation of adhesive anchors shall be performed by personnel trained to install adhesive anchors.
17.8.2 Installation of anchors shall be inspected in accordance with 1.9 and the general building code. Adhesive anchors shall be also subject to 17.8.2.1 through 17.8.2.4.
17.8.2.1 For adhesive anchors, the construction documents shall specify proof loading where required in accordance with ACI 355.4. The construction documents shall also specify all parameters associated with the characteristic bond stress used for the design according to 17.4.5, including minimum age of concrete; concrete temperature range; moisture condition of concrete at time of installation;
in the concrete that are increased during load application, potentially resulting in a premature splitting failure. Similarly, adhesive anchors that meet the maximum embedment depth requirement of 17.7.5 may not fulfill the corner test requirements with $c_{a,min} = c_{ac}$ due to the additional flexural stresses induced in the member by the anchor.
depend in part on the results of the installation safety tests. Gross deviations from the ACI 355.2 or ACI 355.4 acceptance testing results could occur if anchor components are altered, or if anchor installation criteria or procedures vary from those specified.
R17.8.2.1 Due to the sensitivity of bond strength to installation, on-site quality control is important for adhesive anchors. Where appropriate, a proof loading program should be specified in the construction documents. For adhesive anchors, the construction documents must also provide all parameters relevant to the characteristic bond stress used in the design. These parameters may include, but are not limited to:
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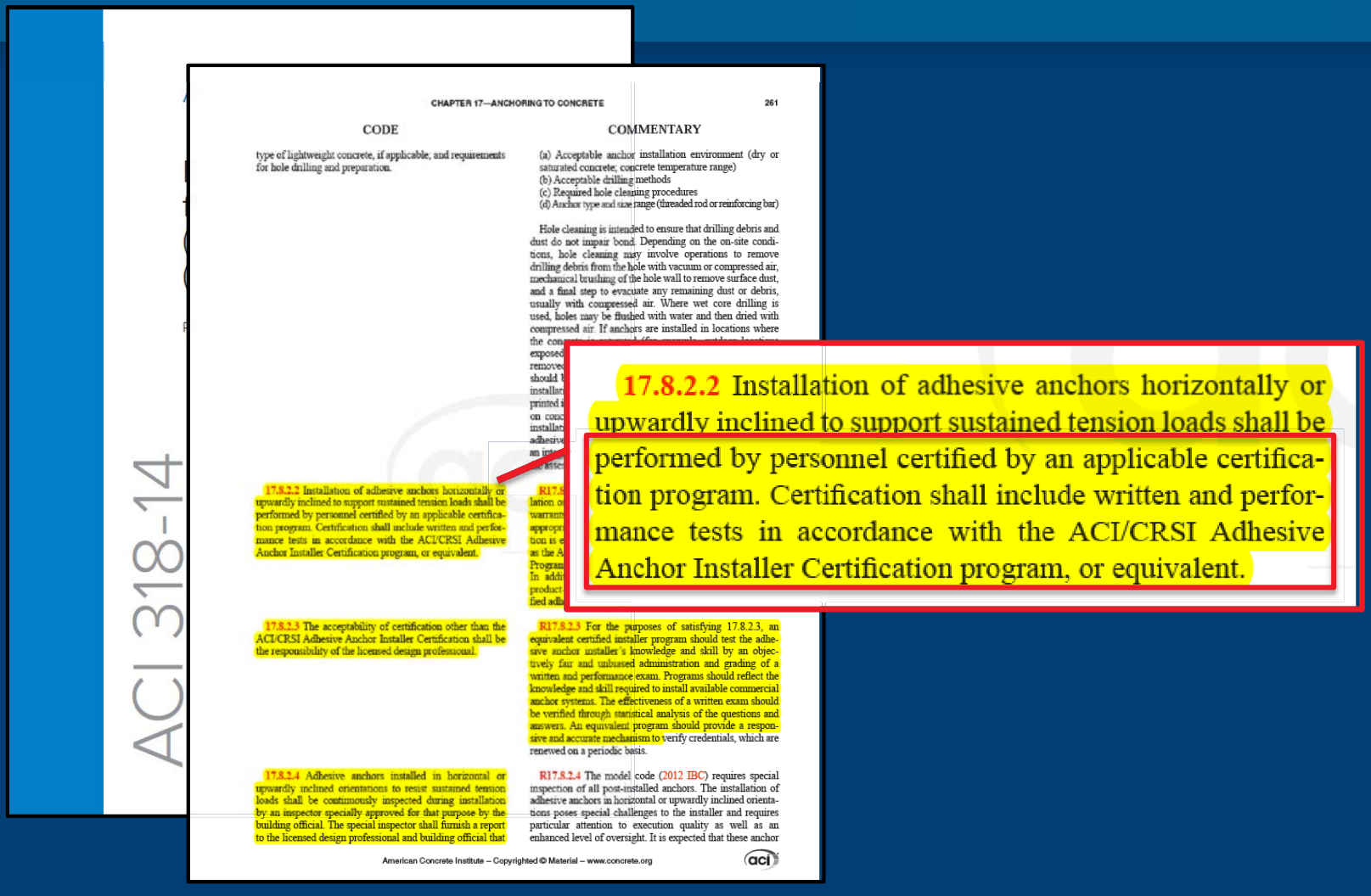
17.8—Installation and inspection of anchors
17.8.1 Anchors shall be installed by qualified personnel in accordance with the construction documents and, where applicable, manufacturer's instructions. The construction documents shall require installation of post-installed adhesive anchors in accordance with the Manufacturer's Printed Installation Instructions (MPII). Installation of adhesive anchors shall be performed by personnel trained to install adhesive anchors.

Chapter 17


ACI 318-14
CHAPTER 17—ANCHORING TO CONCRETE
261
CODE
COMMENTARY
type of lightweight concrete, if applicable, and requirements for hole drilling and preparation.
(a) Acceptable anchor installation environment (dry or saturated concrete, concrete temperature range)
(b) Acceptable drilling methods
(c) Required hole cleaning procedures
(d) Anchor type and size range (threaded rod or reinforcing bar)
Hole cleaning is intended to ensure that drilling debris and dust do not impair bond. Depending on the on-site conditions, hole cleaning may involve operations to remove drilling debris from the hole with vacuum or compressed air, mechanical brushing of the hole wall to remove surface dust, and a final step to evacuate any remaining dust or debris, usually with compressed air. Where wet core drilling is used, holes may be flushed with water and then dried with compressed air. If anchors are installed in locations where
17.8.2.2 Installation of adhesive anchors horizontally or upwardly inclined to support sustained tension loads shall be performed by personnel certified by an applicable certification program. Certification shall include written and performance tests in accordance with the ACI/CRSI Adhesive Anchor Installer Certification program, or equivalent.
17.8.2.3 The acceptability of certification other than the ACI/CRSI Adhesive Anchor Installer Certification shall be the responsibility of the licensed design professional.
R17.8.2.3 For the purposes of satisfying 17.8.2.3, an equivalent certified installer program should test the adhesive anchor installer's knowledge and skill by an objectively fair and unbiased administration and grading of a written and performance exam. Programs should reflect the knowledge and skill required to install available commercial anchor systems. The effectiveness of a written exam should be verified through statistical analysis of the questions and answers. An equivalent program should provide a responsive and accurate mechanism to verify credentials, which are renewed on a periodic basis.
17.8.2.4 Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by an inspector specially approved for that purpose by the building official. The special inspector shall furnish a report to the licensed design professional and building official that
R17.8.2.4 The model code (2012 IBC) requires special inspection of all post-installed anchors. The installation of adhesive anchors in horizontal or upwardly inclined orientations poses special challenges to the installer and requires particular attention to execution quality as well as an enhanced level of oversight. It is expected that these anchor
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17.8.2.2 Installation of adhesive anchors horizontally or upwardly inclined to support sustained tension loads shall be performed by personnel certified by an applicable certification program. Certification shall include written and performance tests in accordance with the ACI/CRSI Adhesive Anchor Installer Certification program, or equivalent.

AAI Inspector Certification

CONCRETE ANCHOR INSPECTOR PROGRAM

AAI Inspector Certification

ACI Committee or Industry Driven -

- Identify the potential need
- Identify reference materials
- Feasibility
- Justify the need / Basis for the program
- CPC for approval to investigate

Adhesive Anchor Installer Inspector -

318-11 – Appendix D and
318-14 Chapter 17 specify the following…

17.8.2.4 Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by an inspector specially approved for that purpose by the building official.

Adhesive Anchor Installer Inspector -

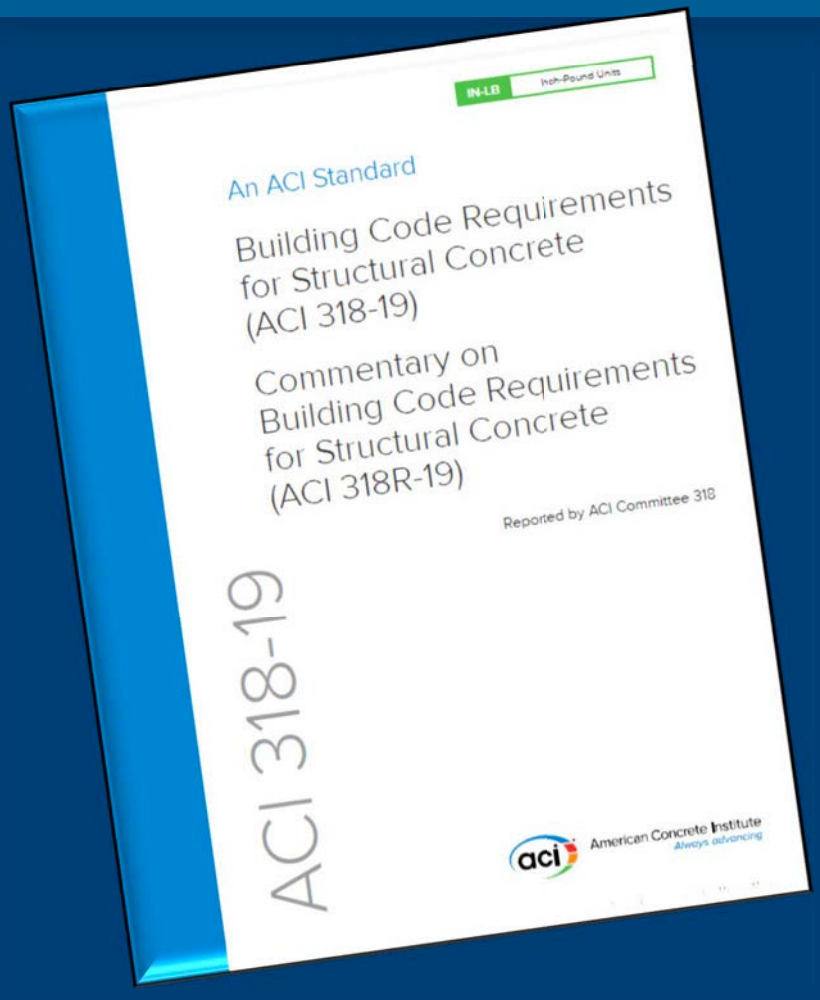
318-11 – Appendix D and

318-14 Chapter 17 specify the following…

17.8.2.4 Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by an inspector specially approved for that purpose by the building official.

Post-Installed Concrete Anchor Installation Inspector

June 1, 2019



Post-Installed Concrete Anchor Installation Inspector

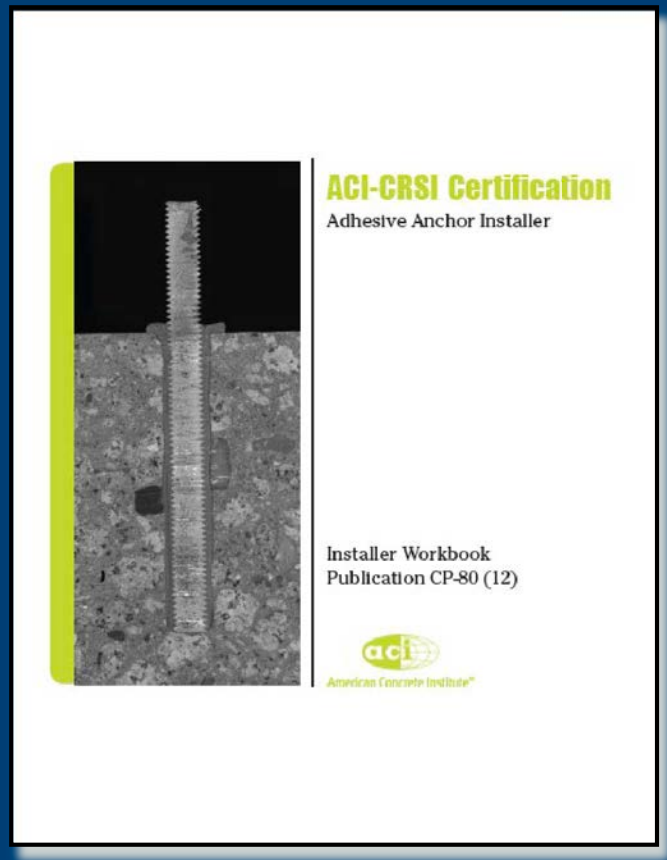
318-19 – Chapter 26.13.1.5 & .6 - Inspection

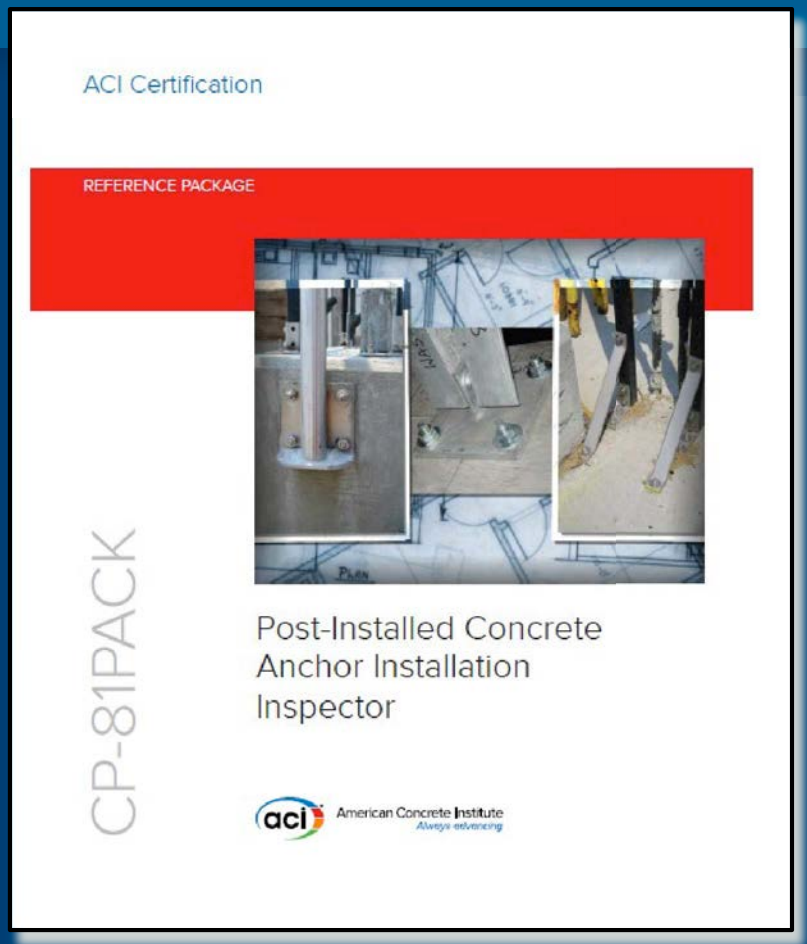
Couple of things here –

- ✓ Installation of mechanical anchors require Inspection by Certified Inspector.
- ✓ **ALL** adhesive anchor installations require Inspection by Certified Inspector.
- ✓ Inspector is now required to be approved by the Licensed Design Professional (LDP) and the Building Official.

Post-Installed Concrete Anchor Installation Inspector

Study Pack





Post-Installed Concrete Anchor Installation Inspector (PICAII)

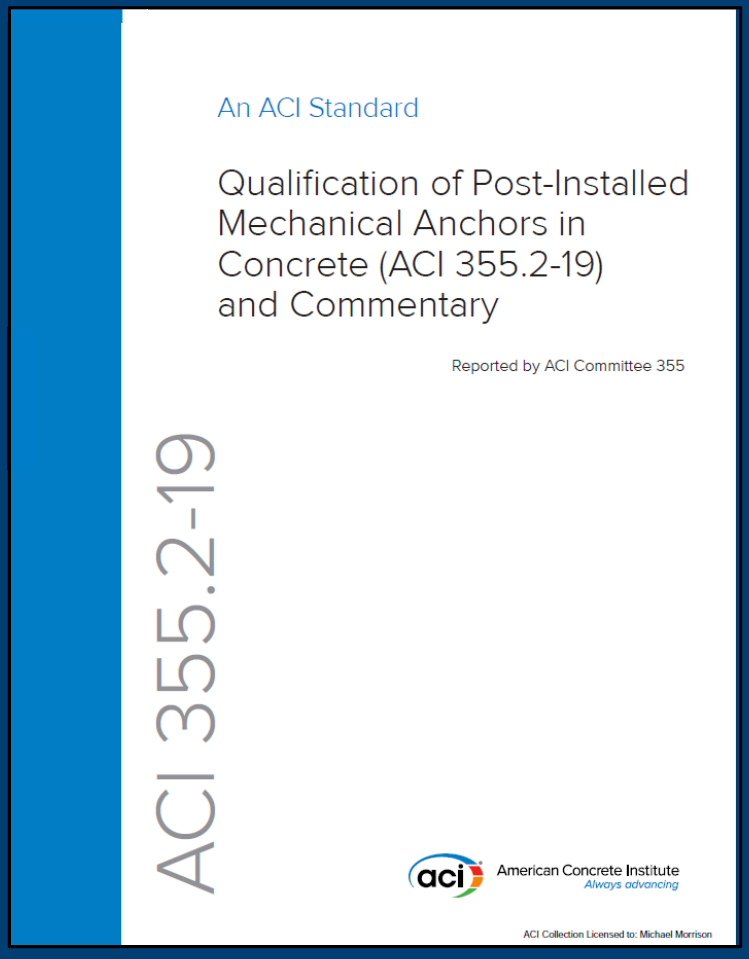
Post-Installed Concrete Anchor Installation Inspector…. What is it?

- Includes ALL content from the current AAII program
- Two additional documents added
  - ✓ 355.2 Mechanical Anchors & Screws
  - ✓ An ICC ESR for Mechanical Anchors

Post-Installed Concrete Anchor Installation Inspector

What is 355.2?

- Qualification Standard
- Similar to 355.4 - Adhesives
- Mechanical Anchors and Screws
- Chapters 1, 2, 3, & 6
- Commentary R1 to R4
- New Section in JTA



More Information…

More detailed information about all of the Concrete Anchor Programs is available on our website

www.concrete.org

ACI Certification

Concrete Quality Technical Manager

ACI Concrete Quality Technical Manager

- Initial interest in developing the QCTM program was driven in part by the implementation of the Prescriptive to Performance (P2P) Initiative.
- Additional interest generated by application to build two new units at Plant Vogtle Nuclear Power Plant, Waynesboro, GA and NESCC looking to resurrect the ACI Level III program.
- Subcommittee was formed in 2006.

ACI Concrete Quality Technical Manager

Concrete Quality Technical Manager –

This individual will have intimate knowledge of concrete, its components and their potential impact. They will apply this knowledge in the many applications in which we use concrete.

- normal, heavy, and lightweight concretes,
- CLSM, pervious, and high strength concrete
- durability issues, admixtures & aggregates, fly ash, slag
- evaluation of strength including obtaining cores
- general requirements for cast-in place structural concrete
- slabs on ground & code requirements for structural concrete.

ACI Concrete Quality Technical Mgr Job Task Analysis (JTA)

- Body of Knowledge
- Utilizes 21 of ACI's Codes, Guides and Specifications

Exam has Seven Sections

- ✓ Aggregates & Admixtures
- ✓ Cementitious Materials
- ✓ Proportioning Concrete Mixtures & Submittals
- ✓ Specialty Concretes *(CLSM, SCC, pervious)*
- ✓ Quality, Durability & Evaluation of Strength
- ✓ Codes & Specifications
- ✓ Practical Exam

ACI Concrete Quality Technical Manager

To Obtain CQTM Certification -

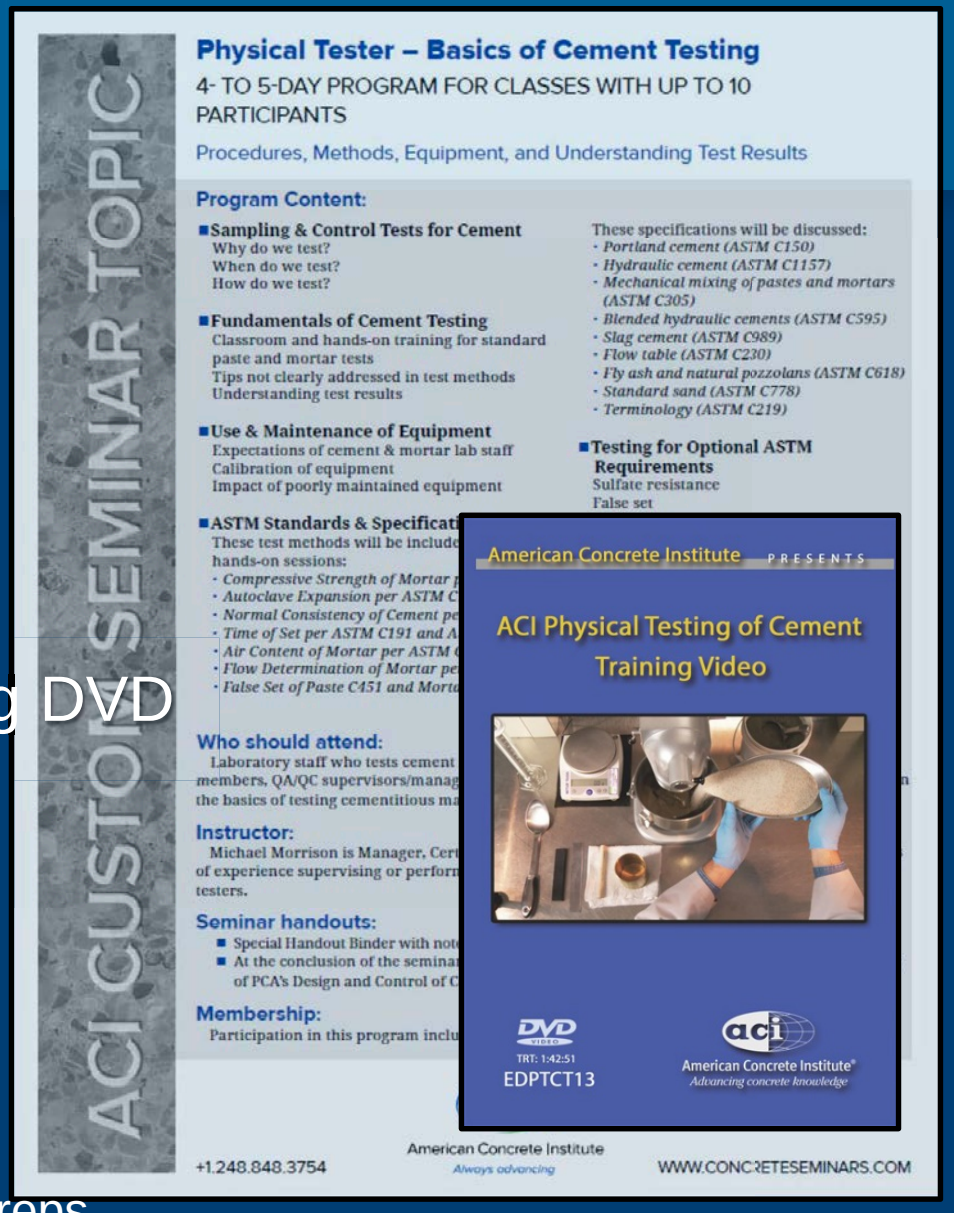
- Pass both the Written and the Practical Exams
- Meet Experience Requirements
- Meet Other Certification pre-requisites
  - ✓ Flatwork Finisher/Technician
  - ✓ Concrete Field Tech
  - ✓ Concrete Strength Tech

Cement Physical Tester

Released mid 2017 –

Why & How

- ✓ Industry Demand
- ✓ ACI In-House Seminars
- ✓ ACI Cement Tester Training DVD
- ✓ Survey Support
- ✓ Mfrs. Support
- ✓ CCRL Support
- ✓ SME's include
  - PCA, CCRL, CMEC, DOT,
  - Admixture and cement industry reps



Cement Physical Tester

Released in 2017 – Cement Physical Tester

- ✓ Written and performance exams
- ✓ Program based on 10 ASTM test methods
- ✓ Core Test Methods Physical Tests
- ✓ Written exam
- ✓ Practical exam on all 10 methods
- ✓ Regional sessions offered
- ✓ CCRL Inspections

Self Consolidating Concrete (SCC) Testing Technician

Released 2018 –
SCC Testing Technician

New Program Development

ACI Committee or Industry Driven -

- Identify the potential need
- Identify reference materials
- Feasibility
- Justify the need / Basis for the program
- CPC for approval to investigate
- SME's include
  - ASTM C09.47, ACI 237, DOT, PCI, CMEC

Self Consolidating Concrete (SCC) Testing Technician

Standards Included –

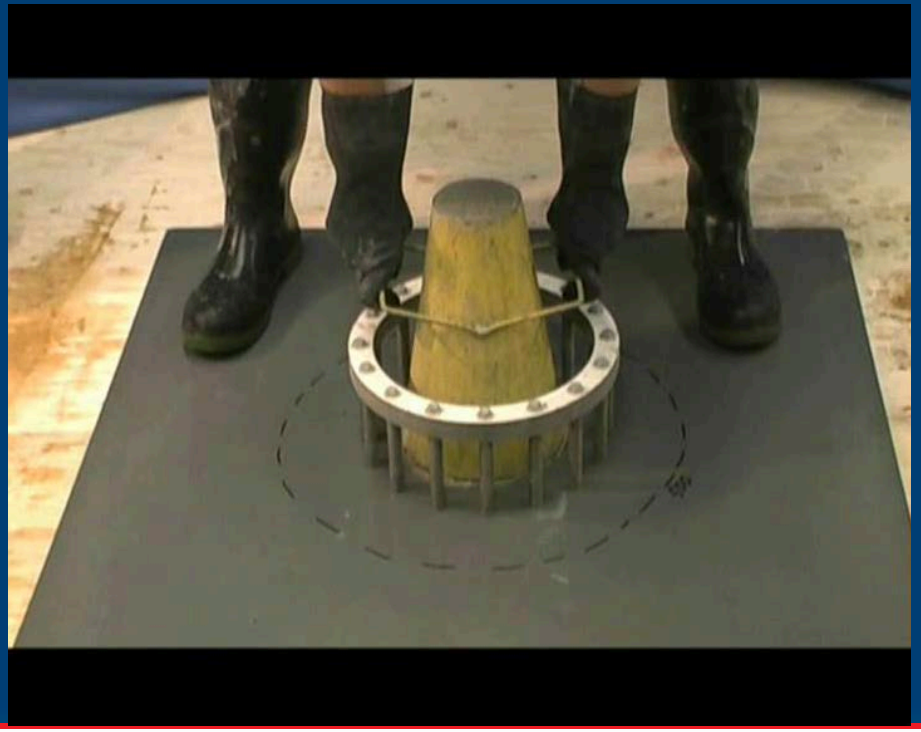
- ✓ ASTM C 1610, Static Segregation Column Technique
- ✓ ASTM C 1611, Slump Flow
- ✓ ASTM C 1621, SCC J-Ring
- ✓ ASTM C 1712, SCC Penetration Test
- ✓ ASTM C 1758, Fabrication of SCC Test Specimens

With small groups (10 or less) this is a one day program
- Inclusive of a review and practice session

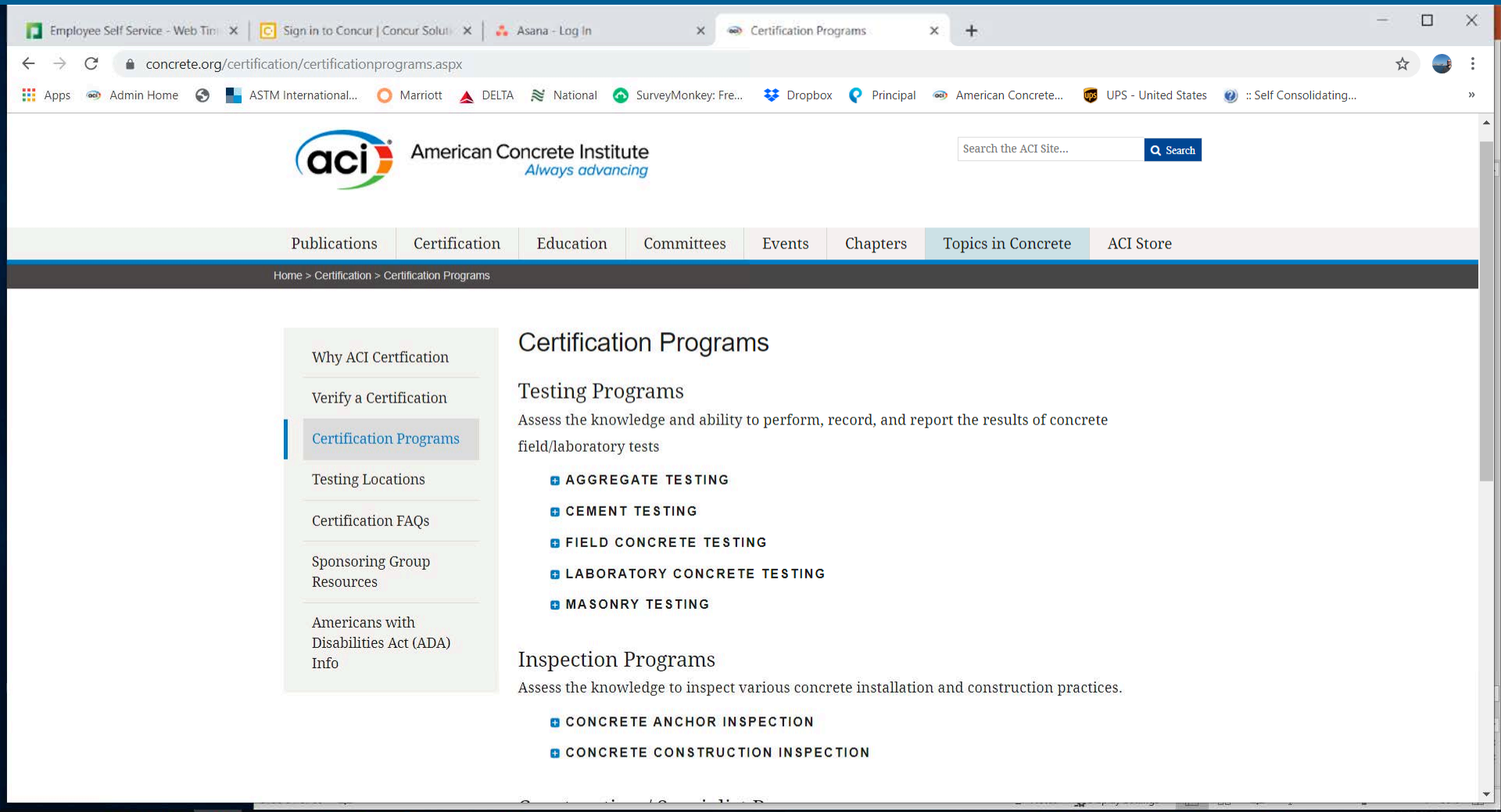
Self Consolidating Concrete (SCC) Testing Technician

Program Specifics -

- Training Modules Available - ACI University
- 75% Sponsoring Groups
- Industry Interest Strong
- DOT interest
- PCI considering
- NPCA interested



ACI Certification



American Concrete Institute

QUESTIONS?

ACI Certification

Serving the Industry with 30 Programs

NATIONAL CONCRETE CONSORTIUM

Presented by: Michael Morrison Manager, Certification Program Development

Kalispell, MT Fall 2019

Thank you

For the most up-to-date information please visit the American Concrete Institute at:
www.concrete.org