

Introduction to ACI/CRSI Adhesive Anchor Installer Certification Program

Developed by: American Concrete Institute: John Nehasil, Managing Director Certification & Chapters
Mike Morrison, Manager - New Program Development
Presented by: Peter A. Giessel, ACI Alaska Structural Director





Massachusetts Turnpike Authority

Adhesive Anchor
Installation...
Seems Simple Enough?





Massachusetts Turnpike Authority

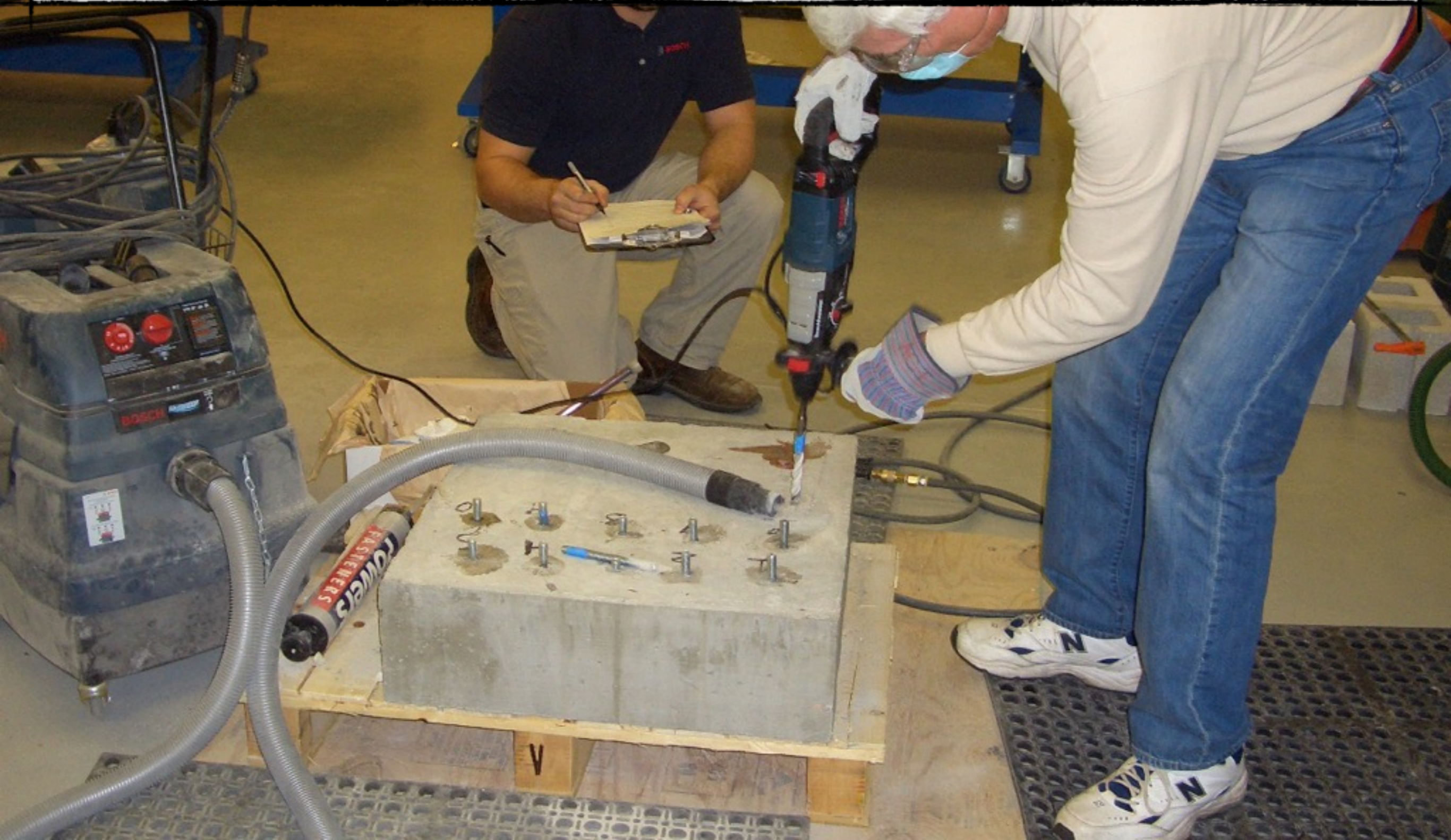
Adhesive Anchor
Installation...
Seems Simple Enough?

Right?





Drill





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P
1-22-11

Drill, Clean



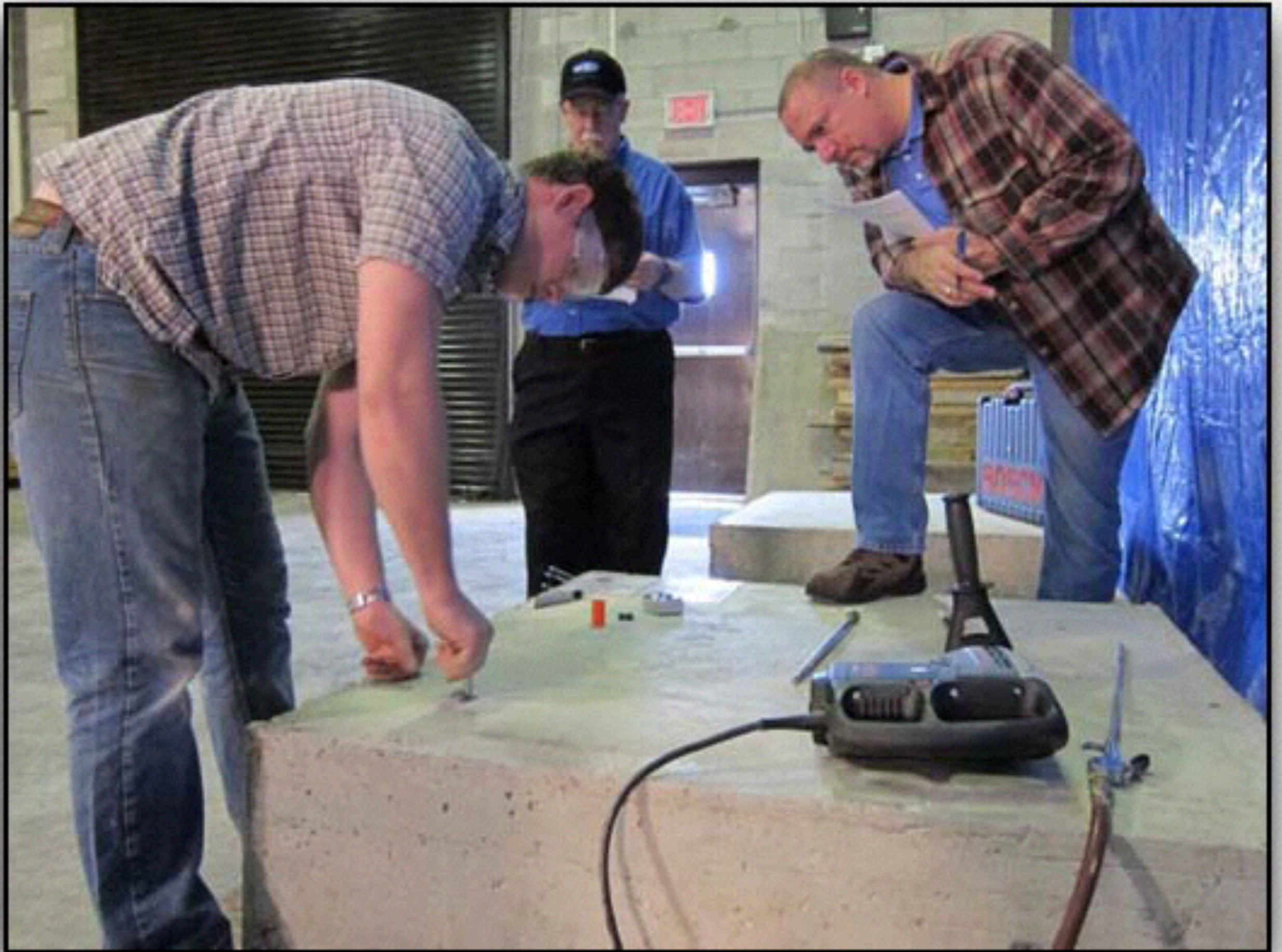


FLAMMABLE
KEEP FIRE AWAY

CAUTION
READ INSTRUCTIONS
BEFORE USING
THIS TOOL
FOR YOUR PROTECTION
AND THE PROTECTION
OF OTHERS
ALWAYS USE PROPER
SAFETY PRECAUTIONS
AND WEAR EYE
PROTECTION
ALWAYS USE THE
CORRECT TOOL
FOR THE JOB
ALWAYS USE THE
CORRECT DRILL
BIT FOR THE
MATERIAL
ALWAYS USE THE
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SPEED FOR THE
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MOTION FOR THE
MATERIAL

Drill, Clean, Inject





Drill, Clean, Inject, Install





Drill, Clean, Inject, Install, Protect





Massachusetts Turnpike Authority

Drill, Clean, Inject, Install,
Protect...

Simple Enough?





Massachusetts Turnpike Authority

Drill, Clean, Inject, Install,
Protect...

Simple Enough?

Don't bet on it.



A Field Study of Adhesive Anchor Installations

- ❖ Concrete International, January 2011



A Field Study of Adhesive Anchor Installations

❖ Concrete International, January 2011

A Field Study of Adhesive Anchor Installations

Theory and practice

BY PHILIPP GROSSER, WERNER FUCHS, AND ROLF ELIGEHAUSEN

For every fastening application, the starting point is choosing the correct product. This requires understanding the loads to be resisted and following a defined design method. It also requires establishing the exact location of the fixing point, anticipating the environmental conditions during installation and service, and knowing the installation procedures for the fastener or anchor.

For adhesive anchors, the designer must select a product that is adequate for the conditions in service and that has been evaluated for compliance with code requirements.

out what can be improved with regard to the use of adhesive anchors, adhesive anchor installations with injection systems were monitored on 23 job sites in five locations scattered over the U.S. Critical aspects were examined to determine gaps between actual and recommended practice and to come up with proposals to improve installation practices.

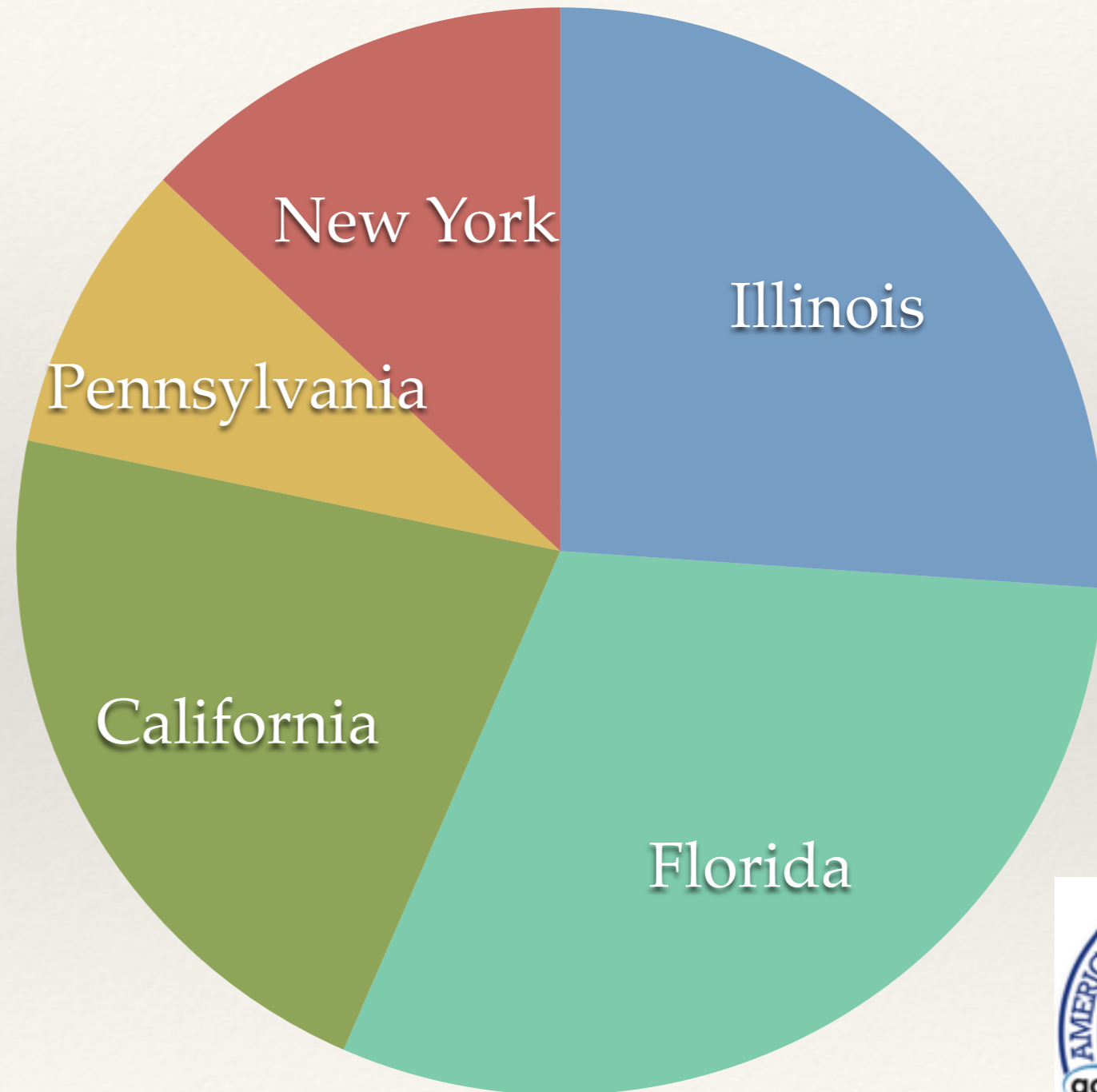
FIELD RESEARCH PROJECT

The installation of adhesive anchor systems was investigated at construction sites in California, Florida,

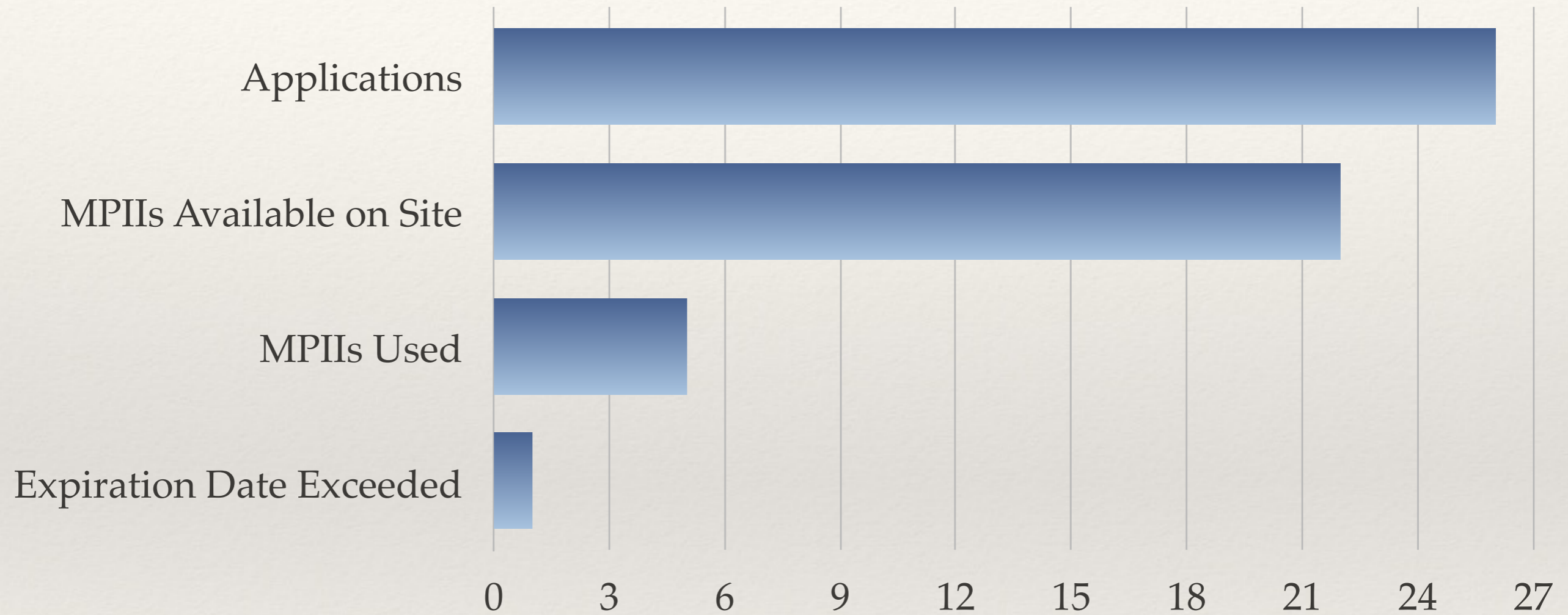


A Field Study of Adhesive Anchor Installations

- ❖ Job Sites
- ❖ 23 Total



A Field Study of Adhesive Anchor Installations



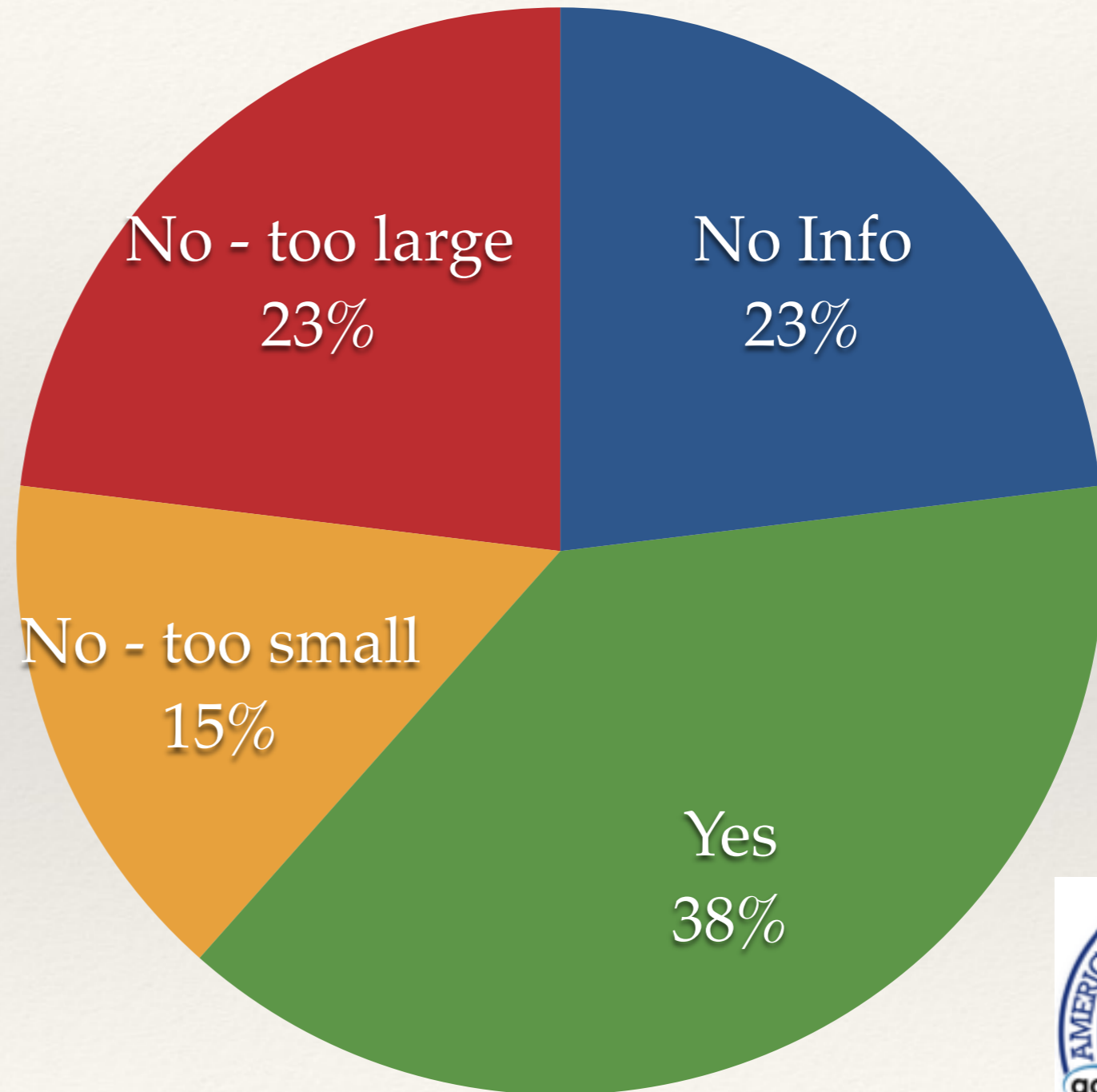
A Field Study of Adhesive Anchor Installations

- ❖ Was drill bit size per MPIIs?



A Field Study of Adhesive Anchor Installations

- ❖ Was drill bit size per MPIIs?



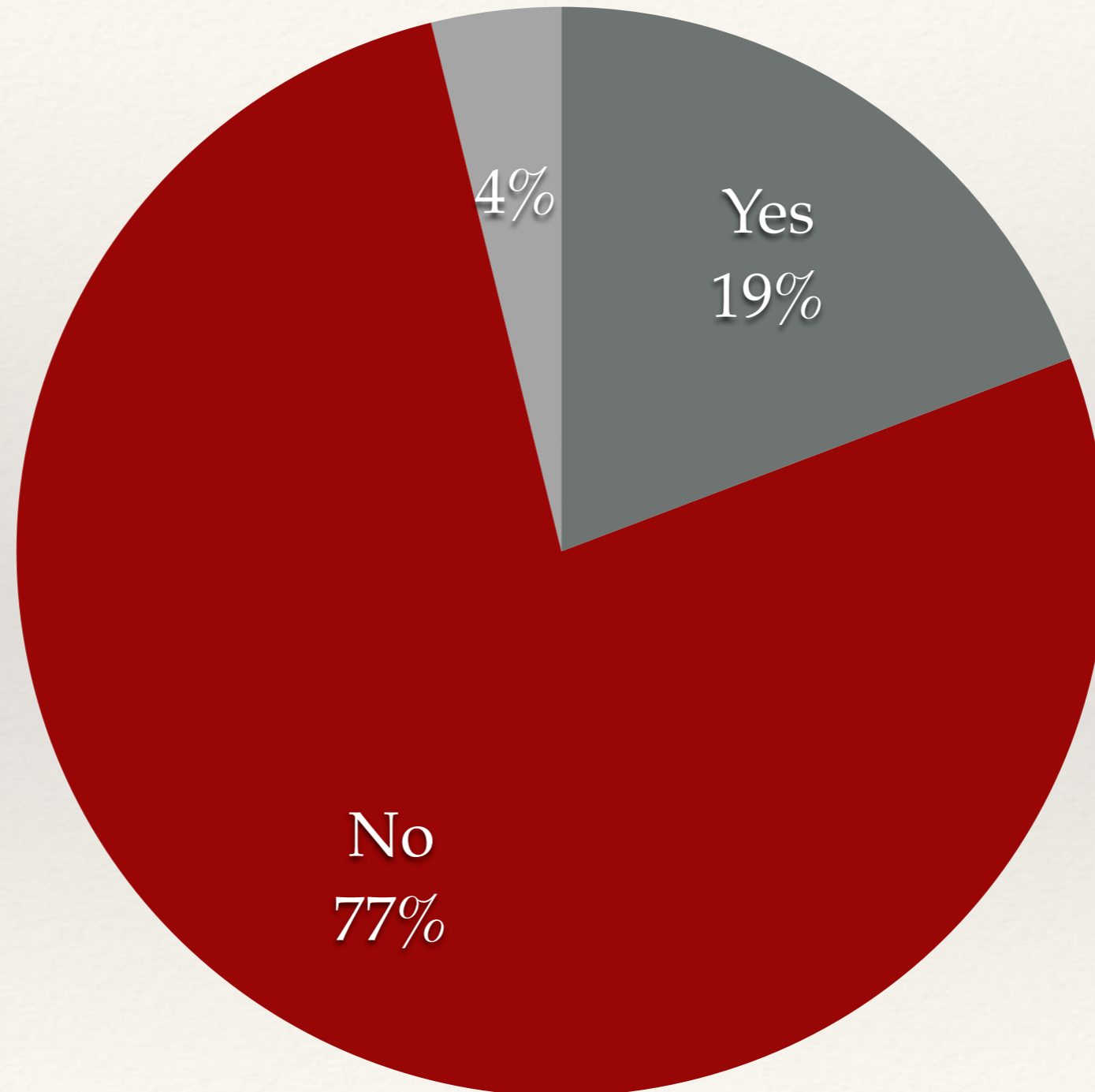
A Field Study of Adhesive Anchor Installations

- ❖ Was drill hole cleaned per the MPIIs?



A Field Study of Adhesive Anchor Installations

- ❖ Was drill hole cleaned per the MPIIs?



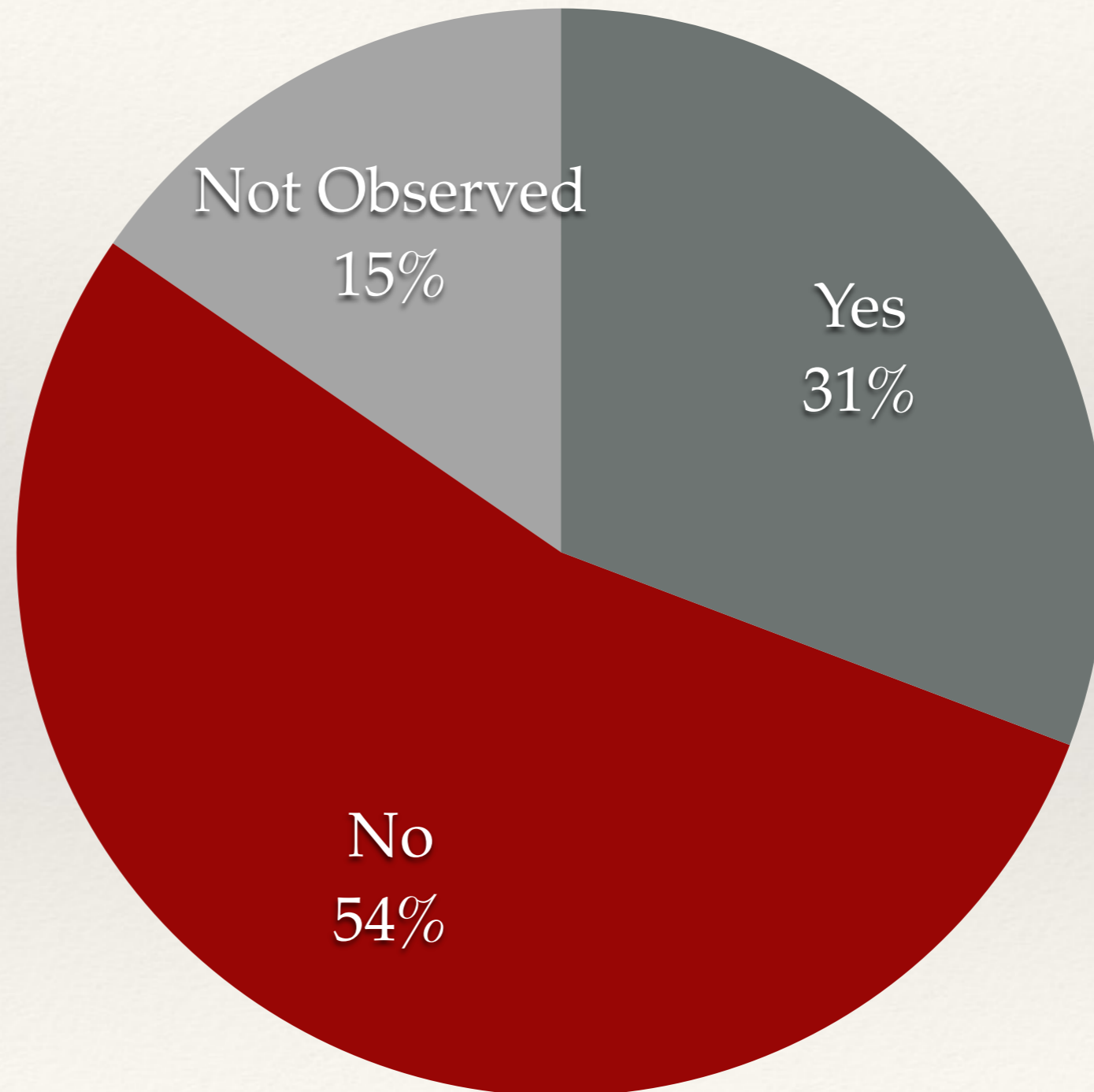
A Field Study of Adhesive Anchor Installations

- ❖ Was mortar dispensed prior to injection?



A Field Study of Adhesive Anchor Installations

- ❖ Was mortar dispensed prior to injection?



Video:
Why the Program?

(click next to start)



American Concrete Institute

Video: Why the Program?



American Concrete Institute

Video: Why the Program?



American Concrete Institute

Video: Why the Program?





“Big Dig” accident in
2006, one dead

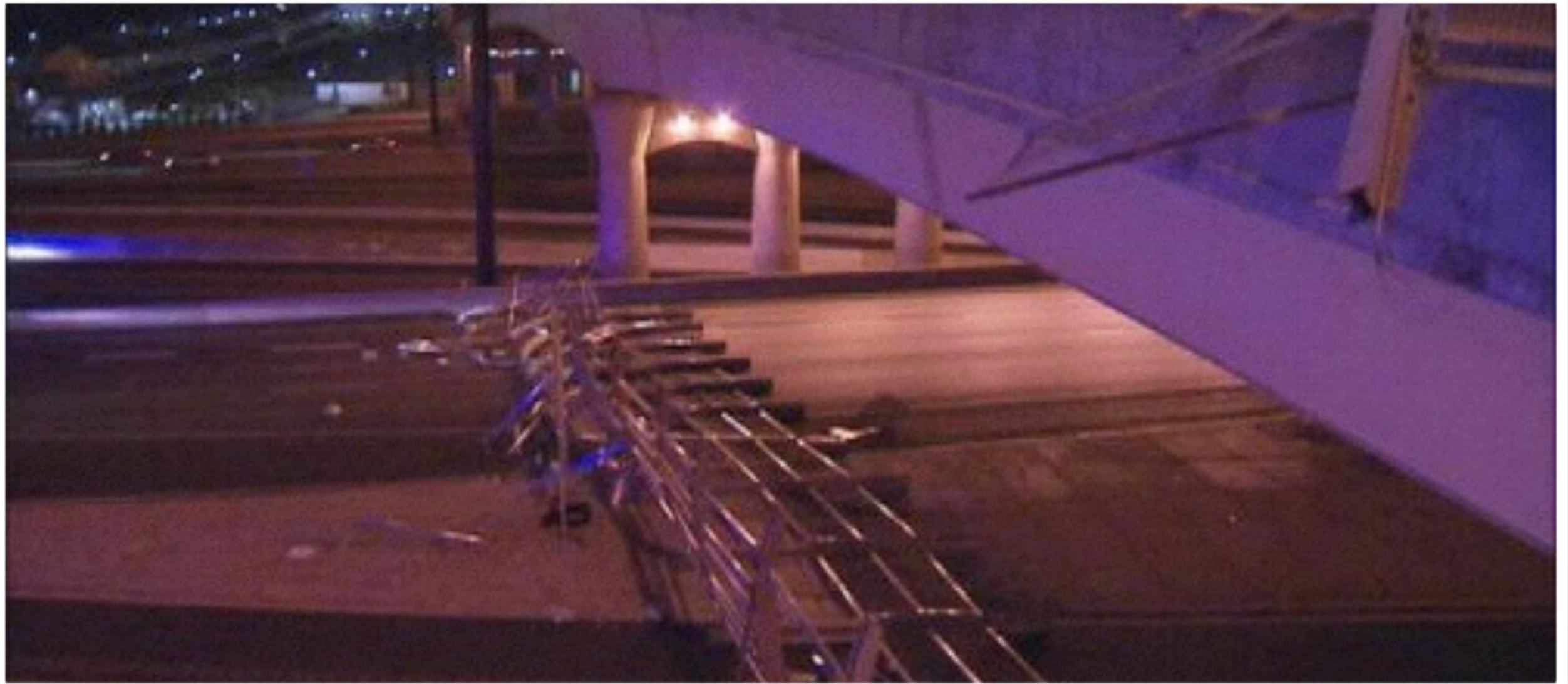




17TH STREET BRIDGE CANOPY FAILURE INVESTIGATION

WJE | ENGINEERS
ARCHITECTS
MATERIALS SCIENTISTS

Atlanta, Georgia



Atlanta Bridge Canopy Collapse

Canopy Failure

August 13, 2011 at 11:20 pm

- *Approximately 7 years after construction*
190 ft. long section of canopy-fence detached from south parapet and fell onto roadway below

Visual Assessment – Anchor Holes

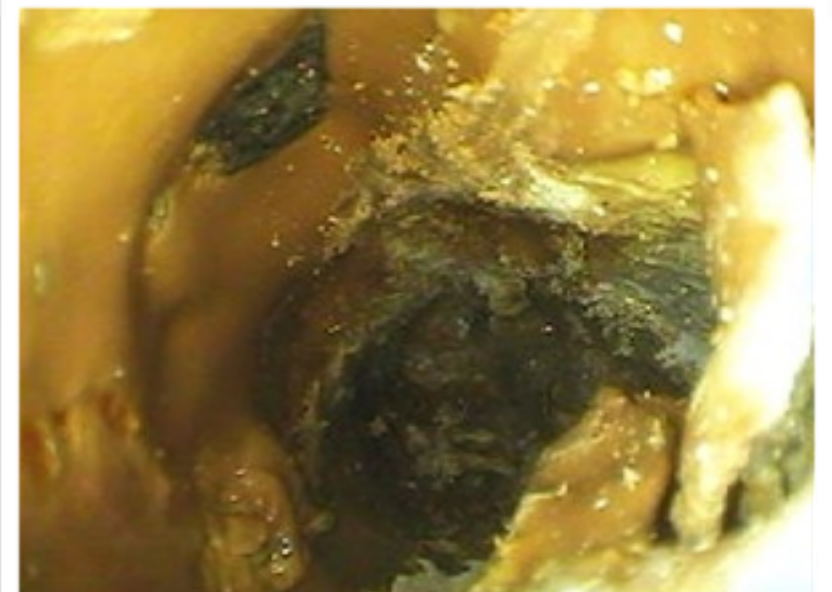
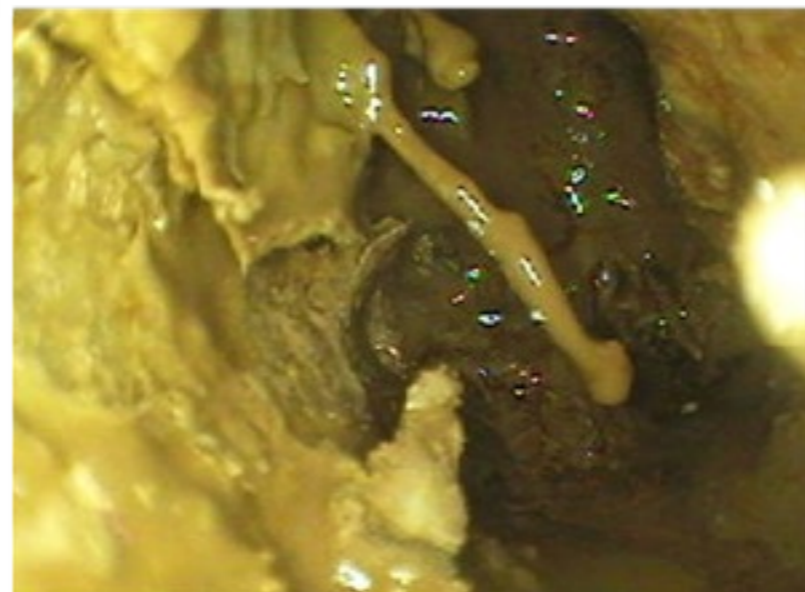
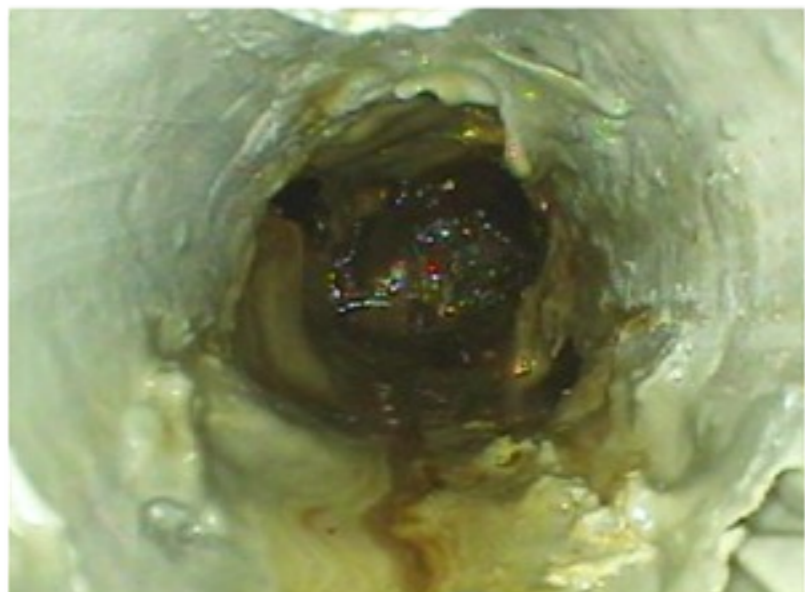
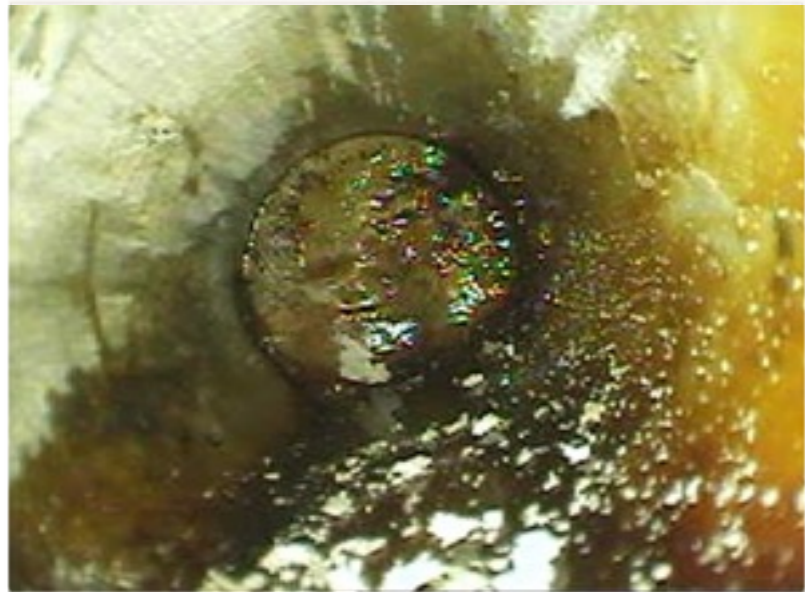
- Epoxy observations
 - Generally bonded to substrate concrete
 - Frequent voids/air pockets, especially in back 1.5” of hole
 - Varied in color
 - Opaque dark gray
 - Opaque light gray
 - Translucent brown
 - Wet epoxy components extracted at 3 locations



Wet epoxy component extracted from inside hole 56B

Visual Assessment of Anchor Holes

❖ Videoscope observations

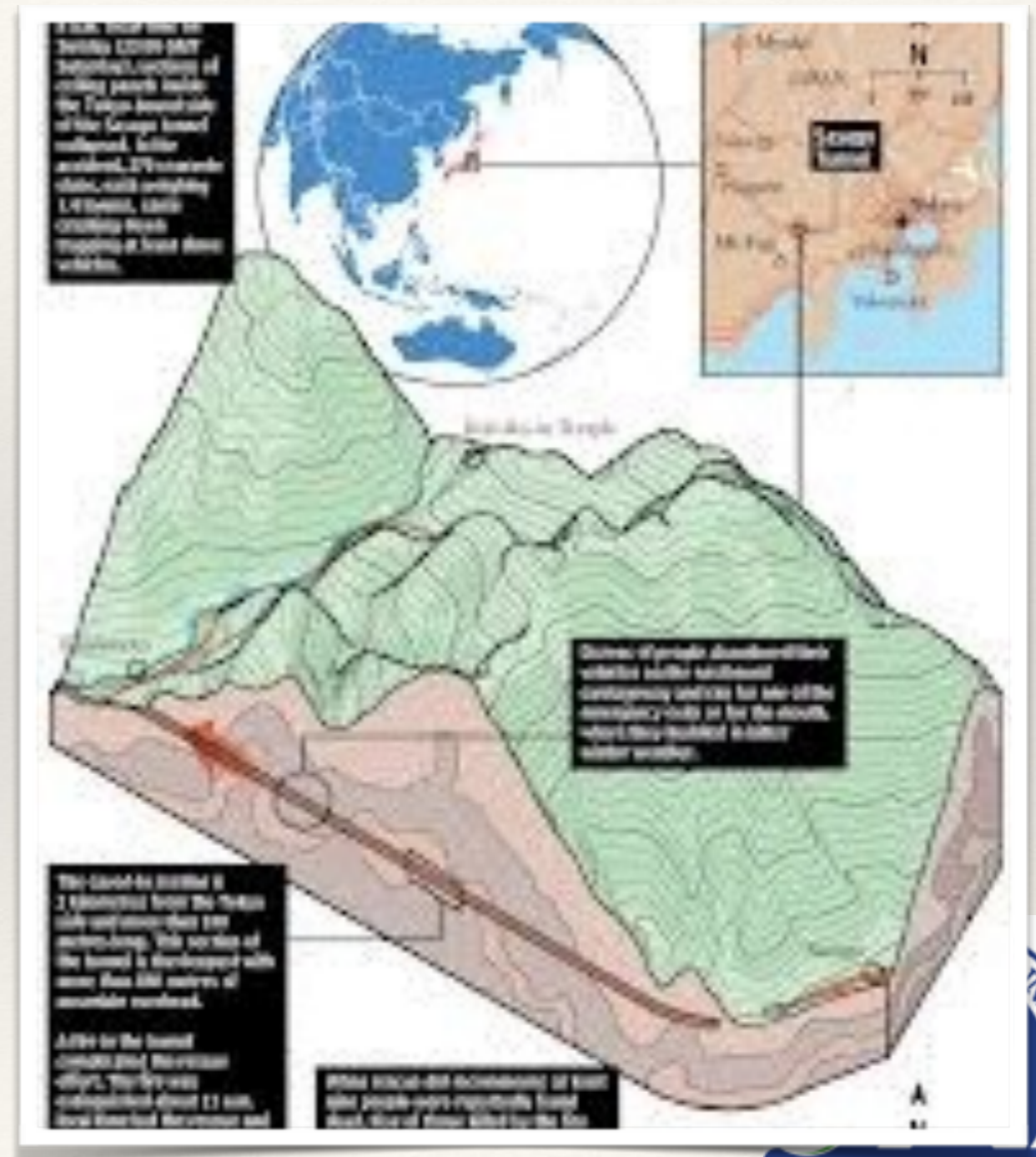




Laboratory Observations

Japan Sasago Tunnel

- ❖ Ceiling Panel Collapse
- ❖ December 2, 2012





Japan Sasago Tunnel

9 dead



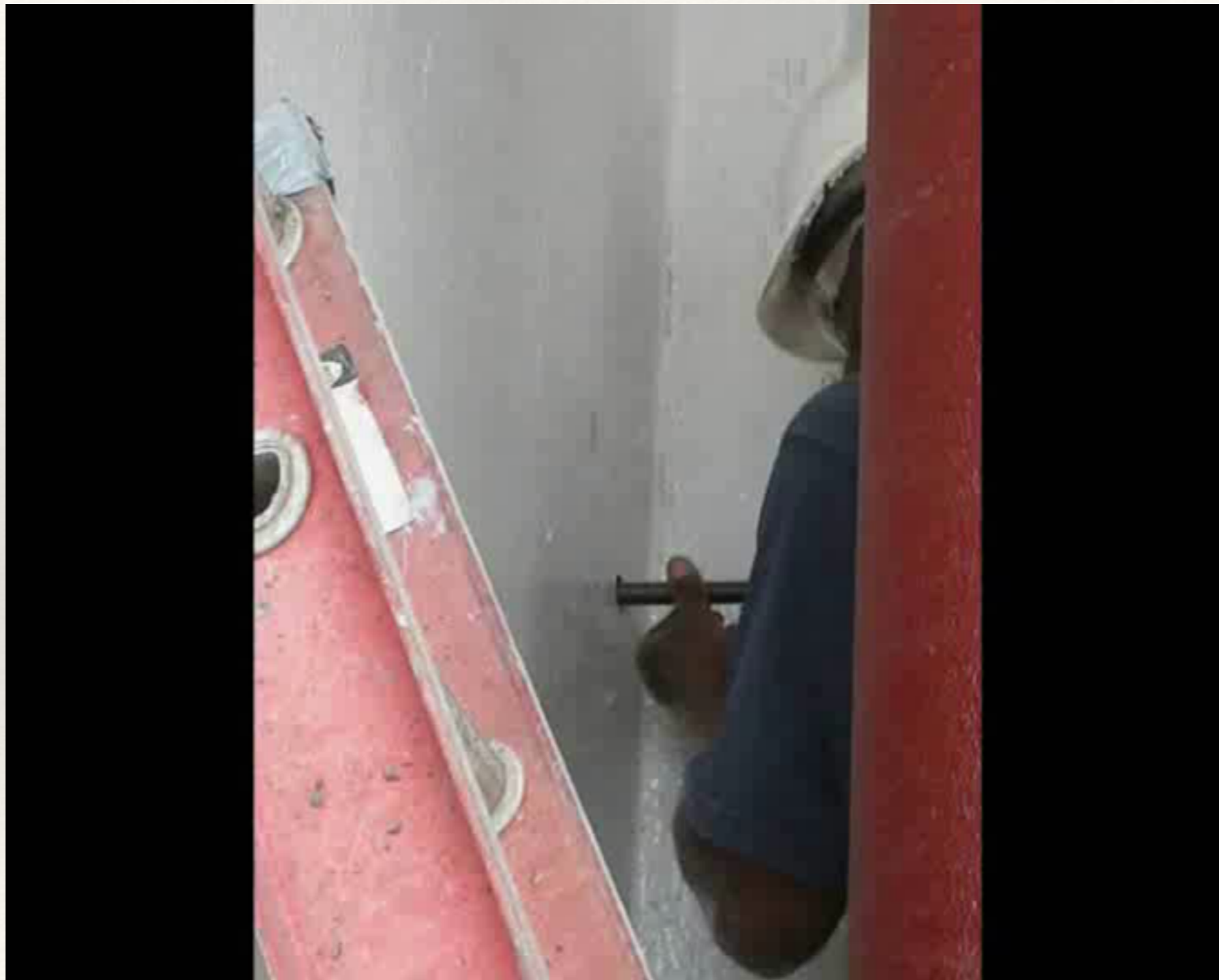
ACI's Response to NTSB Recommendations

As part of our overall response ACI...

- ❖ Partnered with the Concrete Reinforcing Steel Institute (CRSI) to identify criteria for an Adhesive Anchor Installer and develop a certification program
- ❖ Fast Track of a new document for Adhesive Anchors ACI 355.4 “Acceptance Criteria for Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary (Provisional Standard)”
- ❖ Change in 318-11 Building Code, Address Adhesive Anchors



Why do we need Certification?



Why do we need Certification?



Why do we need Certification?



ACI Alaska AAI Program

- ❖ Peter Giessel
- ❖ peter@giessel.org
- ❖ (907) 887-6356

