



NATIONAL CONSTRUCTION DEFECT CONFERENCE



The Roosevelt New Orleans | November 14-15, 2024

Best Practices for Expert Test Selection and Evaluation



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Best Practices for Expert Test Selection and Evaluation

Perrin National Construction Defect
Conference November 15, 2024



Ken Quigley, PE

CCA Construction Consulting Associates, LLC

- CCA LLC - Engineering, Architectural, and Construction Consulting Firm
- Specialist in forensic matters
- Structural engineer with over 40 years experience
- 20 years experience in forensic engineering
- CCA is your one-stop shop for expertise in the built environment



Stephanie Chesney

Cozen O'Connor

Stephanie is an experienced litigator, focusing on business and commercial litigation matters, including catastrophic injury, employment, general liability, education, products liability, construction, and premises liability matters.

She represents clients from pre-suit through trial and has extensive courtroom experience defending claims across Massachusetts, Maine, and New Hampshire state and federal courts. She also has additional experience providing risk transfer and tender advice to clients and advising regarding risk mitigation strategies.

A portrait of Keith Lazere, a man with short dark hair, wearing a dark suit jacket, a white shirt, and a patterned tie. The portrait is partially obscured by a dark blue diagonal graphic element that extends from the top right towards the bottom left.

Keith Lazere

Cozen O'Connor

A shareholder in Anderson Kill's New York office and also serves as the firm's Deputy General Counsel. He focuses his practice on Corporate and Commercial Litigation at the trial and appellate levels in state and federal court.

He represents clients in sophisticated commercial and business litigations involving business torts, fraud, breach of contract, corporate and partnership disputes, and debtor and creditor rights. His extensive litigation experience encompasses business arenas including real estate, construction, aviation, hospitality, maritime, media, technology, finance and insurance.



Kevin Follett

RiverStone Group

Executive Claims Analyst

35 years in insurance industry. Experienced executive Litigation Representative. Skilled in Construction Defect, NY LL, BI and CGL Strong senior claims professional with a degree focused in finance.

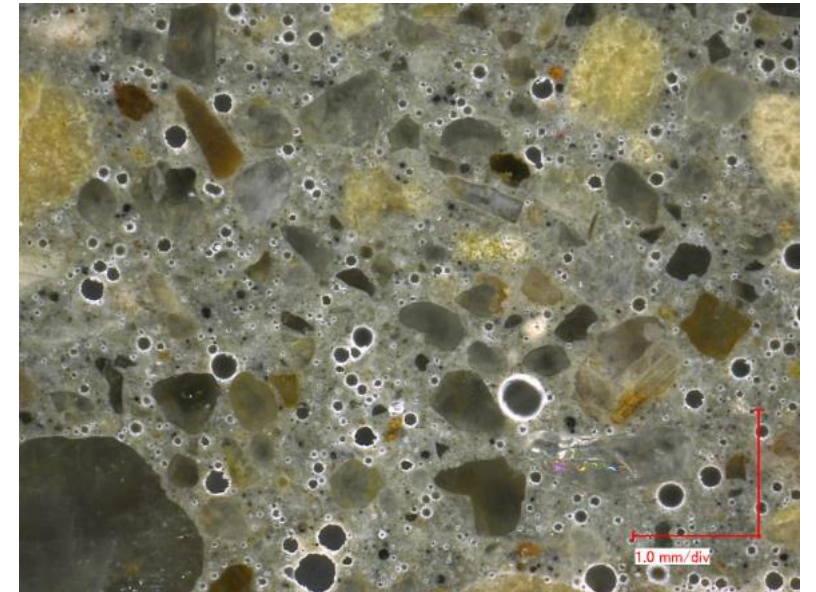
Learning Objectives

- Audience CD attorneys and adjusters
- Learn the appropriate methods an expert should follow when selecting tests.
- Discuss how to make sure the expert conducts proper tests without limiting the expert.
- Review case studies of tests conducted on matters and determine whether the tests were appropriate

Types of Tests - Concrete Petrographic ASTM C856

Microscopic Examination of Concrete

- Water to Cement Ratio
- Air Content
- Chemical Attack
- Alkali Silica Reactions (ASR)
- Freeze Thaw Damage
- Paste Carbonation
- Strength of Concrete
- Coating Failure or Delamination
- Moisture Vapor Issue
- Improper Curing
- Consolidation
- Porosity of Paste
- Corrosion of Reinforcing Steel
- Fire Damage
- Cause of Cracking
- Sulfate Attack
- Improper Finishing
- Seismic Damage
- Supplemental Cementitious Material
- Aggregate Mineralogy
- Aggregate Segregation
- Topping Verification
- Water Content



Types of Tests - Concrete Strength

- Destructive
- Compression Test
- Pullout test - directly measure tensile strength
- Non Destructive
- Rebound Hammer - Strength
- Ultrasonic Pulse Velocity Damages



Types of Tests Water Intrusion

AAMA 501 Methods of Test for Exterior Walls

AAMA 501.1 Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure

AAMA 501.2 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage

AAMA 501.3 Field Check of Water and Air leakage through Installed Exterior Windows, Curtain Walls, and Doors by Uniform Air Pressure Difference

AAMA 502 Specification for Field Testing of Windows and Sliding Glass Doors

AAMA 503 Specification for Field Testing of Metal Store Fronts, Curtain Walls and Sloped Glazing Systems

AAMA/NWWDA 101/IS.2 Voluntary Specification for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

ASTM E 331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

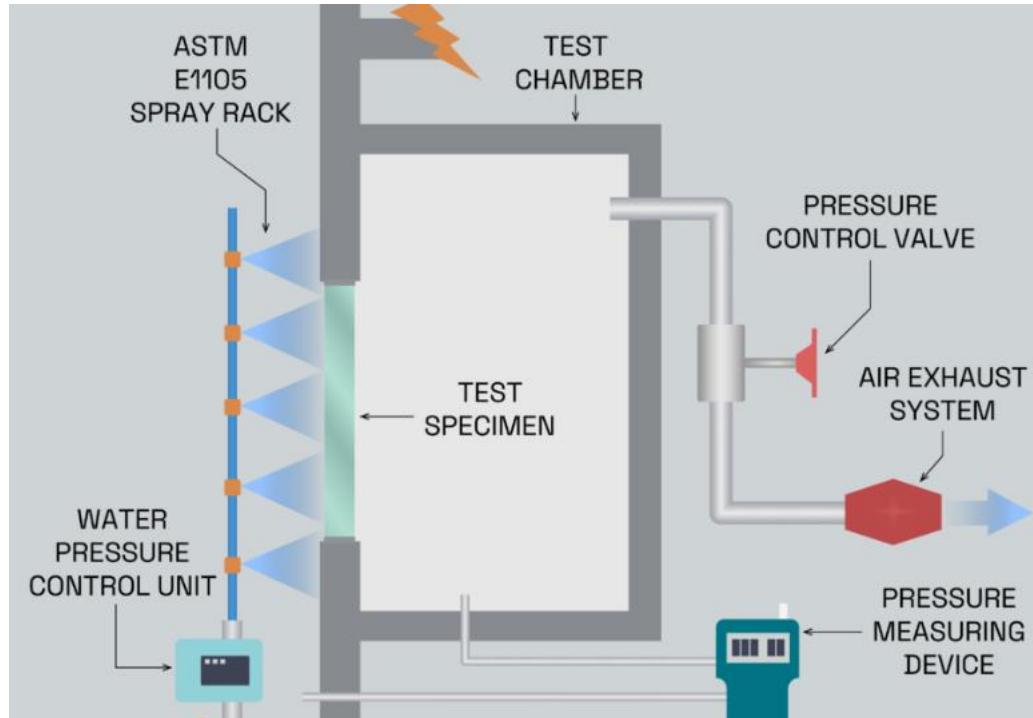
ASTM E 547 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential

ASTM E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference

ASTM E2128 Standard Guide for Evaluating Water Leakage at Building Walls

AAMA 511 Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products

Types of Tests Water Intrusion



AAMA 502.1

Types of Tests Soils

Specific Gravity - Density compared to weight of water

Dry Density

Atterberg Limits - Liquid Limit and Plastic Limits

Proctor's Compaction

Moisture Content

Sieve Analysis - Measures size of soil particles

Problems with Tests

- Expense
 - Expert and attorney bias toward testing (both sides)
 - Tests cost a lot of money

Problems with Tests

- In situ problems
 - Access, destruction of finish materials, safety
 - Hyper focused on a small area of a building
 - Different locations on a building are in different environments (statistics)
 - Test conditions do not match real life (wind on a whole wall versus pressure on a window)
- In-lab problems
 - Materials are in a different environment
 - Materials have been altered

Problems with Tests

- May (Will) not match the facts
- Materials change over time
- Construction quality control testing modified for forensic tests
 - Most tests were developed for quality control of materials and assemblies
 - Tests are modified for forensics. Some have been documented by the likes of AAMA, ACI, and ASTM.

Problems with Tests

- Destruction of Evidence
 - Evidence changes when touched, removed, spray water with water
 - Destructively tested – microscopic, strength tests
 - Strong evidence-handling protocols needed

Daubert and the Scientific Method

a) Expert Qualifications

i) Specific narrowly focused v. more general

(1) Example Structural Engineer v metallurgist v both

b) Scientific method includes tests

i) Observation

ii) Hypothesis

(1) Problem statement without assumptions

(2) Must fit observations

(3) Must fit industry norms

iii) Tests

(1) Must fit hypothesis

(2) Follow accepted protocols

(3) Must be consistent with all of the evidence

(4) Reports must be consistent with standards

(5) Deception in reports (“Leaks” v “Water Penetration”)

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Fact Examples - Concrete Petrographic Analysis

1. In NYC, at a 140-year-old building, the brick covering on a cast iron collapsed onto a parked priceless Rolls Royce Silver Shadow with the occupants still in the vehicle. The occupants (Plaintiffs) are OK but suffer emotional trauma.
2. Plaintiffs sued numerous parties, including the building's owner of a retail store (Defendant). The defendant had performed renovations within the space, including the storefront next to the collapse.
3. Plaintiff's expert claimed that the masonry was deteriorated and that Defendant should have observed and remedied this.
4. Plaintiff's expert is a Mechanical Engineer with little to no building experience.
5. Plaintiff's expert took mortar samples from the debris to perform a petrographic analysis to determine the tensile strength of the mortar.
6. Defendant's attorney pressured the Defendant's expert (a Structural Engineer) to perform the same test, but the expert did not. The expert claimed the mechanical engineer had no observation or hypothesis related to the low tensile strength of mortar. Note that masonry walls do not depend on the tensile strength of masonry materials, including mortar. Structural engineers consider the tensile strength to be zero.

Comments relative to Plaintiff's expert qualifications and the lack of observation and hypothesis affecting the admissibility of the test results. Photos from petrographic analysis do make beautiful exhibits.

Keith

Kevin

Stephanie

Fact Examples – Window Testing

1. In Austin, a concrete and masonry building built in 1910 was converted to condominiums.
2. After five years, a CD suit was filed by the condominium association, including the claim that all windows needed to be replaced.
3. The windows in the building were replaced as part of the renovation.
4. Five years after construction, with no evidence of water intrusion around the windows, the Plaintiff's expert decided to test the windows for water intrusion using pressure diffraction tests.
5. Plaintiff's expert report claimed that 1. there were differences in the caulking installed and the caulking shown on the design drawings and 2. that "leaks" occurred during the window testing.
6. Defendant's expert noted that 1. the caulking was performing and 2. that the word "leak" is not used In the standard AAMA 501.3.
7. Note that failure, according to AAMA 501.3, is when Water Penetration (a defined term) occurs. Water penetration is when water passes the plane parallel to the glass at the innermost part of the window. Water that passes this plane will cause the surrounding materials to become wet. Water on parts of the window are allowed.