



DAVID L. AHEARN, P.E.
SENIOR MANAGING CONSULTANT

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David Ahearn is a Senior Managing Consultant with Engineering Systems Inc. (ESi). He performs scientific investigations and root cause analyses of failed components, structures, and systems. Common issues for analysis are determining contributions toward failure from design, manufacturing methods/material processes, use conditions, maintenance, or application. Investigations have included everyday items, such as roadways and consumer products to complex industrial material applications for refractory linings and computer components. In addition to components and structures, Mr. Ahearn has performed systems analyses for regulatory compliance, gap assessments, as well as code and safety compliance.

Mr. Ahearn has over ten years of civil engineering experience and over five years of hands-on construction and project management experience. As a civil engineer practitioner, his experience included site design (buildings, roads, parking, utilities, and accessibility), municipal planning, stormwater management, and water/wastewater treatment and piping. As a construction project manager, he has worked from the ground up on many residential projects, including new construction, remodeling, and repairs. Mr. Ahearn has investigated failures of water distribution pumps/piping, building collapse, building moisture intrusion, concrete and precast concrete structures, foundations, and soil systems. In addition to construction methods, Mr. Ahearn is an active member of the ANSI A10 committee on construction safety, contributing toward increased workplace safety.

Mr. Ahearn has over fifteen years of materials science experience, which has included materials characterization, testing, fractography, and failure analysis of glass, ceramics, refractories, concretes, and coatings. Some example material applications include cast-in-place and precast concrete, industrial refractory linings, glass and ceramic components, plumbing fixtures, pharmaceuticals, container glass, building glass, and industrial equipment components. Mr. Ahearn has performed hundreds of pharmaceutical manufacturing root cause investigations, including tableted oral dosages, liquid oral dosages, and transdermal patches. Mr. Ahearn also has extensive experience analyzing coatings used for adhesives, paints, and sealants.

Mr. Ahearn has published peer-reviewed engineering and scientific research and provided testimony regarding engineering analysis, materials science, and safety.

Education

M.S., Materials Science and Metallurgical Engineering, University of Alabama, 2008

B.S., Civil Engineering, University of Alabama, 2001

Licensed Professional Engineer (P.E.)

State of Alabama License No. 29542-E

State of Georgia..... License No. PE34313

Professional Affiliations/Honors

Scientific Society Memberships

American Society of Civil Engineers (ASCE)

Construction Materials

American National Standards Institute (ANSI)

A10 Construction Safety Committee

A10.18 Fall Protection – Chair

American Society for Testing and Materials (ASTM) Committees:

C12 Mortars and Grouts for Unit Masonry

C14 Glass & Glass Products

C14.07 Containers – Chair

C21 Ceramic Whitewares and Related Products

D19 Water & Water Resources

E34 Occupational Health and Safety

E34.10 Industrial Safety - Subcommittee Chair

American Ceramic Society

Engineering Ceramics, Glass & Optical Materials

NICE (National Institute of Ceramic Engineers)

Refractory Ceramics, Whitewares & Materials

Cement

Institute of Refractory Engineers (IRE)

American Concrete Institute (ACI)

National Council of Examiners for Engineering and Surveying (NCEES)

American Society of Safety Professionals (ASSP)

Positions Held

Engineering Systems Inc., Atlanta, Georgia

Senior Managing Consultant, 2020 – Present
Senior Consultant, 2008 – 2020

VIP, LLC, Charlottesville, Virginia

Project Manager, 2008

Metals and Materials Engineers (MME), Suwanee, Georgia

Project Engineer, 2006 – 2008

EEFS Company, PC, Bessemer, Alabama

Civil Engineer, 2003 – 2006

University of Alabama, Tuscaloosa, Alabama

Graduate Teaching Assistant, 2001 – 2003
Undergraduate Assistant, 2000 – 2001
Grader, 1999 – 2000

ELCCO, Inc., Enterprise, Alabama

Residential and Commercial Construction, 1998 – 2000

House Painting and Handyman ELCCO, Inc., Enterprise, Alabama

Owner/Operator, 1997 – 1998

Continued Education

GMP Investigations and Root Cause Analysis

44th International Good Manufacturing Conference, Athens, Georgia, 2020.

41st International Good Manufacturing Conference, Athens, Georgia, 2017.

10-Hr. OSHA Training for the Construction Industry

OSHA Training Institute, University of South Florida, American Safety Council, 2016.

Trends in Forklift Safety

American Society of Safety Engineers, 2016.

Safety Badging Course, New Stadium Project

HHRM – JV, Mercedes-Benz Stadium, Atlanta, 2015 and 2016.

Construction Safety Standards

American National Standards Institute, 2015.

Design Detailing to Mitigate and Control Cracking

American Concrete Institute, 2015.

Mycometer Operator, 2018

Scanning Electron Microscope Operation

University of Alabama, 2002

Tescan, 2020

Concrete Infrastructure, 2020

FRP Strengthening Techniques

Conventional Strengthening Techniques

Repair of Post-Tensioning in Existing Concrete Structures

Repurposing Existing Buildings

Evaluation of Foundation Distress and Causation for Distress in Building Structures, 2020

Publications/Presentations

Publication: James R. Varner, David L. Ahearn, "Fracture Modes and Appearances in Ceramics," *Fractography*, Vol 12, *ASM Handbook*, Edited By Craig J. Schroeder, Ronald J. Parrington, Joseph O. Maciejewski, James F. Lane, ASM International, 2024, p 502–514

Presentation: "Engineering Approach to Property Loss," Claims and Litigation Management (CLM) Alliance, Atlanta, GA, March 2017.

Presentation: "CAPA and Complaint Investigations," Medical Device Regulations Conference – Quality Workshop, Athens, GA, August 2016.

Presentation: "Adhesive Cold Flow, Package Integrity, Probe Tack, Peel Testing, Mechanical Peel from Release Liner, Shear," QA Manufacturing, Noven Pharmaceuticals, Miami, FL, April 2016. (cGMP Training)

Presentation: "Root Cause Analysis," QA Manufacturing, Noven Pharmaceuticals, Miami, FL, February 2016. (cGMP Training)

Presentation: "Fundamentals of Adhesion," QA Manufacturing, Noven Pharmaceuticals, Miami, FL, February 2016. (cGMP Training)

Presentation: "Non-Destructive Testing in Forensic Analysis," Georgia Institute of Technology, Atlanta, GA, November 2014. (Invited)

Presentation: "Materials Science in Civil Engineering and Construction," University of Georgia ASCE Student Chapter, Athens, GA, November 2014. (Invited)

Presentation: "Material Science in Failure Analysis," Georgia Institute of Technology, Atlanta, GA, 2013. (Invited)

Presentation: "Fractography of Thermally Shocked Glass Cookware," Failure Analysis and Prevention, Material Science & Technology, October 2013.

Publication: "Thermomechanical Analysis of a Ceramic Cooker," Michael D. Hayes & David L. Ahearn, *Journal of Failure Analysis and Prevention*, Vol. 13, Issue 3, June 2013.

Publication: "Residual Failure Due to Incomplete Sintering of Vitreous China Plumbing Fixtures," D.L. Ahearn, F.E. Schmidt, *Fractography of Glasses and Ceramics VI*, J.R. Varner, Ceramics Transactions (2011).

Publications/Presentations (*continued*)

Presentation: "Material Science and Premises Liability," Joint Meeting: Chartered Property Casualty Underwriters Society and Atlanta Claims Association, Atlanta, GA, November 2011. (Invited)

Presentation: "An Engineering Perspective on Claims," Chartered Property Casualty Underwriters Society, Atlanta, GA, September 2011. (Invited) Presentation: "Multidisciplinary Engineering Failure Analysis," United Consulting, Norcross, GA, July 2011. (Invited)

Presentation: "Plumbing Fixtures Failures Analysis," Southern Loss Association, Atlanta, GA, January 2011.

Presentation: "Premises Liability: Slip/Trip/Fall," CEU Institute, November 2010.

Presentation: "Adjusting Property Loss – An Engineer's Prospective, Advanced," Sedgwick CMS - Atlanta, GA, July 2009. CPCU by Invitation, October 2010.

Presentation: "Adjusting Property Loss – An Engineer's Prospective," PMA - Richmond, VA, March 2009.

Presentation: "Roof Construction, Inspection, and Diagnosis," CNA – Nashville, TN, February 2009.

Presentation: "Stormwater Design and Time of Concentration," Presented to Malcolm Pirnie and Balch and Bingham, L.L.P. - Birmingham, AL 2007.

Presentation: "Fracture Patterns of Impact Resistant Glass Panel Laminates with Annealed and Heat Strengthened Glass Plates," Alfred Fractography Conference - Rochester, NY, July 2006.

Publication: "Fracture Patterns of Impact Resistant Glass Panel Laminates with Annealed and Heat Strengthened Glass Plates," D.L. Ahearn, J.L. Ladner, R.E. Wright, R.C. Bradt, *Fractography of Glasses and Ceramics V*, J.R. Varner, G.D. Quinn, and M. Wightman, Eds., Ceramic Transactions, Vol. 199, pp. 383-395 (2006).

Project Experience

Material Science

Investigated steam rupture of refractory lining for a gasifier vessel causing manufacturing delays. ESi recommended changes to the refractory curing process, which prevented rupture of the linings.

Investigated workplace fatality involving refractory lining failure. Refractory maintenance, demolition, and site safety were also reviewed.

Failure analysis of fractures in ceramic plumbing products.

Consumer injuries from products such as glass containers, candle accessories, and cookware.

Product manufacture and quality control as it relates to product integrity and accident prevention.

Glass laboratory analysis for manufacturing controls and service reliability.

Comparison of glass components and ceramic materials through strength testing, fractography, and composition analysis.

Safety glass installation and code requirements relevant to accidents and losses such as falling through windows, falling or fragmentation of windows and doors, and analysis of the requirements for safety glass and proper installations.

Foreign materials identification in pharmaceutical products, concretes, and glass products.

Root cause analysis for pharmaceutical manufacturing: delaminated tablets, tablet defects, foreign materials in liquid product, valve gasket wear and particulates, OOS/OOT physical testing results, packaging machine failures, etc.

Inspections of coatings applied for weatherproofing of stadiums, parking decks, and buildings. Paint applications to wood, metal, and concrete. Adhesion testing of coatings to substrates and of adhesive properties of tape and transdermal patches.

Materials analysis of concrete, shotcrete, and gunnite used in pools, precast concrete structural components, and cast-in-place applications.

Project Experience (*continued*)

Civil Engineering

Construction site fatality during concrete forming building elevator shaft included analysis of concrete curing time, construction tolerances, and construction methods.

Pool drowning involving pool barriers, construction, maintenance, and safety regulations.

Hurricane storm damage assessments on residential and commercial buildings to determine causes related to wind versus those related to water.

Property damage investigation caused by flooding, including the analysis of the stormwater system. Retention/detention pond design, construction, and maintenance.

Moisture intrusion through building envelopes due to improper materials or construction not to code and/or manufacturers' installation requirements (vinyl, EIFS, stucco, wood, brick, concrete, curtain walls, etc.).

Concrete structural damage and collapse. Analysis of constrained joints, moisture intrusion, corrosion, and material defects. Construction methods have contributed to stress concentrations fracturing connections and welds contributing to collapse.

Precast concrete beams were prematurely failing with and without loading. Concrete materials were analyzed for contributions from the production materials, or the forming and curing process. Designed and analyzed prestressed strand transfer and constraint of transverse bursting stresses.

Guardrails, handrails, stair safety and code compliance related to injuries.

Requirement of safety and accessibility upgrades.

Fire suppression system piping, sprinklers, and maintenance. Freezing fire suppression piping resulted in water loss.

Construction site safety and demolition safety. Perform audits of construction site safety plans. Review fall safety, lifting and hoisting safety, and investigate accidents related to construction site safety.

Slip, trip, and falls related to design, construction, maintenance and code compliance.