

NAFE Saturday Schedule (January 18, 2025)

Brian Eubanks, PE (NAFE #962S)

Founder and Principal Structural Engineer,
Paragon Structural Engineering

Garrett Ryan, PE (NAFE #1125M)

Associate Principal Structural Engineer, Paragon

Derek Patoskie, PE (NAFE #1312A), Staff Structural Engineer, Paragon

Time: 8 to 9 AM

Title: Forensic Analysis of Construction Variances Associated with Cement Plaster Veneer on Wood Framing

Abstract: The International Residential Code (IRC) provides prescriptive specifications for the installation of cement plaster (stucco) veneer on wood framing. Since 2006, the IRC has also referenced ASTM C 926 (Standard Specification for Application of Portland Cement-Based Plaster) and ASTM C 1063 (Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster) as applicable standards that provide additional specifications associated with the installation of cement plaster veneer. The IRC and the applicable code-referenced standards do not consider all available materials, designs, and/or methods of construction — nor do they consider possible alternatives or construction variances. This paper will explore common construction alternatives and variances associated with the installation of cement plaster veneer and discuss methodology for evaluating whether or not an alternative or variance can still achieve the intent and purpose of the specifications provided in the IRC and/or the applicable code-referenced standards.



Brian Eubanks is the founder and principal structural engineer of Paragon Structural Engineering, a structural design and forensic investigation firm based in Plano, Texas. Eubanks leads a technical staff comprising professional engineers, graduate engineers, project managers, and field technicians in the structural design and forensic investigation of planned and existing structures. His services include analysis and engineering of large, custom single-family residences, multi-family apartment/condominium complexes, low-rise commercial facilities, warehouses, and ancillary structures (retaining walls, screen walls, and swimming pools).



Garrett Ryan is an associate principal structural engineer for Paragon Structural Engineering. He holds a B.S. degree in architectural (structural) engineering from the University of Texas in Austin. Ryan is a licensed professional engineer in seven states and board-certified diplomate in forensic engineering by the National Academy of Forensic Engineers.



Derek Patoskie is a staff structural engineer for Paragon Structural Engineering. He holds both B.S. and M.E. degrees in civil engineering from Texas A&M University. Patoskie is a licensed professional engineer in two states, is Building Envelope Trained and Certified by the Building Envelope Science Institute, Exterior Design Institute, and is also a Model Law Engineer with NCEES.

Mark McFarland, PE (NAFE #1186M)
Founder & CEO, Discovery Engineering

Time: 9 to 10 AM

Title: Delayed Inspection: Determining the Cause of an Electrical Fault One Year After the Incident

Abstract: John Doe received an electrical shock from a circuit panel in a hotel room in 2021 when he leaned on the closed panel door. The electrical shock itself didn't harm Doe, but it caused him to lose his balance and fall. Doe hit his head on the floor and suffered severe injury. He retained a personal injury lawyer, who, in turn, retained an electrical engineer for the case. The engineer recommended a timely inspection of the circuit panel to determine the cause(s) of the electrical fault. Counsel did not schedule this inspection until late 2022 (one year after the incident). The engineer's challenge was to determine the cause of the fault given scant evidence and a delayed inspection. Evidence from the circuit panel could have been tainted by maintenance workers or subsequent guests staying in the hotel room over the year. Thus, it was difficult to know whether any changes to the panel were made. Nonetheless, the engineer inspected the circuit panel, and the exact cause of the electrical fault could not be determined. However, the inspection revealed some interesting evidence: It appeared that some circuit breakers in the panel were replaced recently. That raised many questions. A review of hotel maintenance records and emergency responder records raised even more questions. This report discusses how a long-delayed inspection, a review of maintenance and responder records, and a review of the national and county electric codes were synthesized to determine the likely cause of the electrical fault in the circuit panel.



Mark McFarland, PE, DFE, is a licensed and board certified electrical and telecommunications engineer. He provides expert consulting for plaintiff and defense counsel on civil and criminal cases nationwide. His practice covers a wide range of cases, typically involving electrical, electronic, cellular, GPS, telecommunications, and software evidence. He has worked with lawyers in several fields including wrongful death, personal injury, product liability, securities fraud, homicide, sex trafficking, medical malpractice, class action, insurance claims, patent litigation, contract disputes, and more. McFarland has testified in court for civil and criminal trials, although many cases have settled upon his expert report.

David Aberizk, PE (NAFE #208A)

President & CEO, Integrated Consultants

Time: 10:15 to 11:15 AM

Title: Automotive Patent Process Manipulation Compromises Available in Technology Safety Enforcement

Abstract: I have been attempting to defend a multiple-award patent that was first awarded in 2011 for Operator Initiated Slowing (OIS). OIS is a process that allows the operator of a hybrid or electric vehicle to increase vehicle range. The regenerator process is in its manufacturing infancy and could conservatively expand efficiency to increase range by 30% once adopted by the auto industry. I will expand on the U.S. patent process and how the auto industry financially manipulates the legal system. This OIS effort has also exposed how safe application of technology is now beyond federal and state regulators exasperated by the emergence of billionaire auto manufacturers whose willingness to litigate away safety has emboldened all U.S. automakers. Will organizations like ASTM establish regulations governing advanced technologies such as precision GPS in the future? When will NAFE members reconcile the ethical inequities both in the legal and scientific communities in which they operate? If it is not NAFE members who assist in the engagement and utilization of legal, ethical, and scientific concepts, then who, as the issue becomes more apparent as technology advances with the help of AI.



President and CEO of Integrated Consultants, Inc. (ICI), San Diego, David Aberizk has been a member of NAFE for 28 years. David's 54-year career includes forensic engineering consulting in the Greater Boston area. In 2010, he presented "Forensic Engineering Analysis of Warehouse Freezer Subfloor Heating System Failure and Repair." Since 2000, ICI has been an R&D contract-fabricator to NAVAIR (PMA 272) of specialty electronic hardware as part of a multi-year contract developing the next generation of Aircraft Survivability Countermeasure enhancements for rotary and fixed wing aircraft. Aberizk's background in electric propulsion and slowing regeneration in ground robotic designs, coupled with insight into electronic systems installed

in devices that are mass produced, formed the catalyst for the novel and non-obvious use of regeneration in electric and hybrid vehicles.

David J. Icove, PhD, PE (NAFE #899F)

Owner, Icove & Associates

Time: 11:15 AM to 12:15 PM

Title: Risk Factors When Predicting Mortality of Burn Injuries of Patients Smoking While Undergoing Home Oxygen Therapy

Abstract: Patients smoking tobacco products while undergoing home oxygen therapy are at risk of suffering from burns, particularly when their clothing is ignited. A patient's risk of death is approximately two-fold higher in women aged 30 to 59 years than in men of the same age. The authors demonstrate in a case study the application of a peer-reviewed and objective methodology for estimating mortality risk after burn trauma. Findings of this case study confirm that a patient's risk factors for mortality include their type of oxygen therapy, age, presence of inhalation injury, burn size, body mass (weight), preexisting medical conditions, nonburn injuries, and gender. Co-authors of this study include those with forensic backgrounds in engineering, medicine, and archaeology.



An internationally recognized forensic fire engineering expert with more than 45 years of experience, Dr. Icove is coauthor of *Kirk's Fire Investigation, Forensic Fire Scene Reconstruction, and Combating Arson-for-Profit*, the leading textbook on the crime of economic arson. From 1992 to 2018, he served and maintained an appointment as a principal member of the NFPA 921 Technical Committee on Fire Investigations. He is also chair of NFPA 901 - Committee on Fire Reporting. Dr. Icove holds BS and MS degrees in Electrical Engineering and a PhD in Engineering Science and Mechanics from the University of Tennessee. He also has a BS in Fire Protection Engineering from the University of Maryland — College Park. He is currently a Professor of Practice in the Department of Electrical Engineering and Computer Science at the University of Tennessee, Knoxville; on the faculty of the University of Maryland's Professional Master of Engineering in Fire Protection program; and serves as an Investigator in the Knox County Fire Investigation Unit and as a Reserve Deputy

Sheriff for the Knox County Sheriff's Office, Knoxville, Tenn.

Joseph Ellington, PE
Consultant, FireLogix

Time: 1:15 to 2:15 PM

Title: Artificial Intelligence and Fire/Explosion Investigations

Abstract: This paper explores the integration of artificial intelligence (AI) in fire investigation, emphasizing its potential to enhance investigative processes and fire safety. AI can process large data sets, detect patterns, and assist in real-time monitoring, evidence analysis, fire pattern analysis, and predictive modeling. Despite its benefits, AI's adoption requires caution due to potential biases and ethical concerns. NFPA 921 and NFPA 1033, the standards for fire investigation, currently do not include AI but recognize its potential impact. Case studies illustrate AI's application in fire scenarios, highlighting both successes and limitations. The paper will stress the importance of human expertise alongside AI, advocating for transparency and ethical use. It concludes that while AI offers significant advancements, it must align with industry, legal, and ethical standards to be effective and credible.



Joseph Ellington is an internationally certified fire and explosion investigator with more than 40 years of experience. His specific areas of experience include residential, business, commercial, and industrial losses involving consulting in the disciplines of advanced fire and explosion dynamics and computer modeling. Ellington has investigated the origin, cause, and responsibility for injury and death cases from fires and explosion and testified as an expert both in state and federal courts.

Jerry Tindal, PE (NAFE #642S)

Mechanical Engineer, SAFE Laboratories and Engineering Corp.

Time: 2:15 to 3:15 PM

Title: FE Analysis of a Modular Fireplace Fire with an Improperly Constructed Hearth Extension

Abstract: A fire originated beneath a modular fireplace hearth in a newly constructed home which then spread into the adjacent chase and attic spaces resulting in the destruction of the residence. The fireplace was installed on a CMU block riser positioned on a wooden subfloor in violation of the manufacturer's installation instructions. Scene investigators concluded based on fire patterns and witness observations that the fire originated beneath the fireplace hearth and that the first fuel ignited was wood construction in proximity to the hearth. The author was contacted three and a half years after the fire during ongoing litigation to review and analyze the available information and determine the cause of the fire. This paper examines the cause of the fire based on forensic engineering analysis and testing. Incorporation of analysis of previous similar cases and testing data as well as new testing data are utilized to reinforce the author's cause determination.



Jerry Tindal is a licensed professional engineer in 25 states. He holds both a Bachelor of Science and Master of Science in Mechanical Engineering from the University of South Carolina. Tindal is a Certified Fire and Explosion Investigator by the National Association of Fire Investigators and was also a Certified State Fire Marshal while employed with the South Carolina State Fire Marshal's Office. He currently serves as a governor-appointed board member on the South Carolina Liquefied Petroleum Gas Board.

Michael Stall, PE (NAFE #955M)
President, Managed Response, Inc.

Time: 3:30 to 4:30 PM

Title: Forensic Engineering Evaluation of a Collapsed Factory Roof

Abstract: When high winds and heavy rain recently struck Houston, Texas, a 130,000-square-foot factory building (constructed in the 1940s of glue-laminated beams) suffered a partial roof collapse that interrupted the manufacturing work, which normally ran 24 hours a day 7 days a week. This paper will explore the disaster recovery forensic engineering evaluation activities required to understand the scope of damage and the scope of engineering design work required to restore the building to its pre-loss condition. Extensive termite damage in the glue-laminated beams that collapsed and others throughout the facility required that in-place beams be evaluated in detail to determine how much termite damage existed in the remaining structure. Forensic structural engineering evaluation and design were required to specify replacement beams and establish code compliance repairs for the remaining roof. This is a good example of disaster recovery forensic engineering work that is required on an immediate basis to help preserve the continuity of factory operations.



Michael Stall is a registered professional engineer (#65893) in Texas and is a National Academy of Forensic Engineers board-certified forensic engineer (DFE). Stall earned a master's of science in civil engineering from Stanford University and a bachelor's of science in architectural engineering from the University of Texas at Austin. He has worked as an expert witness in resolution of design, construction, and property insurance settlement disputes during the past 15 years. Stall is also a certified property appraiser and umpire. He has more than 45 years of construction experience as a carpenter, ironworker, foreman, supervisor, engineer, scheduler, and construction manager for construction of shopping centers, single-family homes, multi-family buildings, manufacturing plants, power plants, and medical facilities. He has evaluated hundreds of buildings during the past 30 years that have suffered damage from fires, explosions, hurricanes, earthquakes, tornados, hail storms, design defects, and construction defects. He has published peer-reviewed articles in the *Journal of the National Academy of Forensic Engineers* about

construction defects and resolution of schedule delay claims and has made numerous presentations to industry and university groups about construction management and disaster recovery. Stall is founder and president of Managed Response, Inc. (MRI), a Texas-registered professional engineering firm (#00546) and a general contracting company that specializes in evaluation and repair of distressed and damaged properties. MRI is a licensed general contractor in Florida and California and has been in business since 1998. MRI performs construction, renovation, disaster reconstruction, and forensic engineering.

Jahan Rasty, PhD, PE
Texas Tech University

Mathew Mills, PE
Real-World Forensic Engineering

Olin Parker
Texas Tech University

Time: 4:30 to 5:30 PM

Title: Lithium-Ion Energy Cell Explosions: Investigating the Contribution of Design, Marketing, and Warnings to Consumer Risks

Abstract: Lithium-ion energy cells are vital for modern energy storage demands due to their high energy density and compact size. However, they can be susceptible to catastrophic failures which result in high-intensity fires and explosions. The risk of this occurring is exacerbated when individual cells, originally intended for use in battery packs with safety mechanisms, are repackaged and sold as standalone rechargeable consumer batteries to individual consumers for applications such as e-cigarettes. Manufacturers have issued warnings against this improper use, but some distributors and sellers ignore these warnings, rewrapping and rebranding cells without appropriate safeguards. This often exaggerates the current or performance characteristics of the cell, posing additional hazards. This paper examines the engineering legal responsibilities of manufacturers, distributors, re-wrappers, and sellers regarding the marketing, sale, and failure of these individual lithium-ion energy cells. The effectiveness and suitability of the provided warnings, adherence to the Hierarchy of Controls, and the potential for design and marketing defects on the part of distributors, re-wrappers, and sellers shall be explored. Recent court cases shall also be reviewed, expanding upon these arguments and demonstrating that parties who disregard manufacturer warnings can be held liable for injuries.



Dr. Jahan Rasty holds BS, MS, and PhD degrees in mechanical engineering and an MBA. Since 1988, he has served as a tenured professor at Texas Tech University where he is currently the founding director of the Materials Performance and Failure Analysis Laboratory as well as the graduate-level Applied Forensic Engineering Certificate program. Rasty is the founding president and CEO of Real-World Forensic Engineering, LLC (RWFE) where he has investigated 1,300+ cases resulting in 300+ deposition testimonies and dozens of court appearances as an expert witness in the areas of design, metallurgy, materials science, safety engineering, and warnings.



Mills, who holds an MS in mechanical engineering, is a licensed professional engineer with a specialization in engineering design. He also holds a graduate certificate in applied forensic engineering from Texas Tech University. He is currently working toward his doctor of engineering in multidisciplinary engineering. He has 4+ years of experience assisting with analysis of hundreds of forensic engineering investigations and conducting site inspections.



Parker is a teaching assistant at Texas Tech University working on a doctor of philosophy in mechanical engineering. He has 2+ years of experience assisting with the analysis of a large number of forensic engineering investigations.