NAFE Saturday Schedule (July 18, 2026)

Shawn Ray, PE (NAFE #970F)
Principal Mechanical Engineer
SEA, Ltd.

James Kasch
Mechanical Consultant
SEA, Ltd.

Time: 8 to 9 AM

Title: A Forensic Engineering Review & Testing of Bicycle Wheel Retention Strategies

Abstract: Each year, approximately 51 million Americans ride bicycles. Cycling offers numerous advantages, including a healthier lifestyle, reduced traffic and parking congestion, and more. In recent years, the popularity of e-bikes and e-scooters has surged — particularly in high-density urban areas — due to their small footprint and ability to extend pedestrian range through ease of mobility. However, bicycle-related fatalities are trending upward with the number of deaths since 2010 increasing by 87%. This rise likely correlates with the higher speeds that e-bikes and e-motos can attain. In most states, e-bikes are categorized as Class I, II, or III, with the latter reaching pedal-assisted speeds of 28 mph. Safety and reliability should align with a vehicle's intended use; for instance, a professional mountain bike must withstand far greater forces than a beach cruiser. This study will focus on one aspect of the forensic engineering evaluation: wheel retention capability. The presenters will evaluate various front-wheel retention designs and present their effectiveness in preventing unintended wheel separation. The following common attachment methods will be evaluated: (1) slotted dropouts equipped with quick-release levers and retention tabs referred to as "lawyer lips"; (2) slotted dropouts featuring retainer clips or retention plates; and (3) thru-axle bolts. Findings will compare and quantify the wheel retention capacity generated by each design and utilize ASTM load testing standards to demonstrate their relative viability for different applications.

Shawn Ray is a mechanical engineer who has been evaluating mechanical failures and performing accident reconstruction for more than 35 years. His scientific analysis of incidents has resulted in expert testimony in both state and federal courts. He was involved in racing (a test bed for new technology), vehicle development, and training for the understanding of vehicle control. Ray worked his way through school as a mechanic and maintained three ASE Master Certified Technician certificates for more than 25 years, he has full ACTAR accident reconstructionist accreditation, and is a certified fire and explosion investigator, a certified vehicle fire investigator, and a fire investigation instructor. Ray is a Board-Certified Diplomate in forensic engineering (DFE) by the National Academy of Forensic Engineers (NAFE) in accordance with the guidelines of the Council of Engineering Specialty Boards (CESB) and is serving on the Board of Directors as the Secretary for the Academy (NAFE). Ray is active in SAE's COMVEC, the Commercial Vehicle Exhibition & Technology Connection. His involvement includes being a session organizer, moderator, and past chair of the powertrain committee. Additionally, Ray is the Vice-Chair of SAE's Crash Data Collection and Analysis Standards Committee (CDCA) and a liaison to the SAE Event Data Recorder (EDR) Standards Committee. He also remains active in testing and evaluation of failure and product evaluations, including all types of incidents with equipment and machinery.

James Kasch received his bachelor of science degree and his master of science degree in mechanical engineering from Virginia Tech. He is a mechanical consultant who conducts investigations, analyses, and reconstruction of accidents involving automobiles, commercial trucks, heavy equipment, and pedestrians. He has experience retrieving and analyzing CDR and ECM data, inspecting and documenting accident sites and vehicles, and utilizing industry-standard software and methodologies to assist in accident reconstruction, including Faro Scene, Pix4D, HVE, and Virtual Crash simulation software. His previous experience includes mechanical failure analysis, vehicle dynamics evaluation, and inspection photography. During his graduate work at Virginia Tech, he gained exposure to LiDAR and photogrammetry technologies. Kasch is a member of the Society of Automotive Engineers (SAE), the American Society of Mechanical Engineers (ASME), and the National Association of Professional Accident Reconstruction Specialists (NAPARS).

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

Time: 9 to 10 AM

Title: Forensic Engineering Evaluation of a Defective and Deteriorating Concrete Parking Garage

Abstract: The owners of a 22-story, twin-tower condominium renovated and waterproofed the exposed top floor of a two-story parking structure. This structure is attached and partially supports the towers. They became concerned when water started infiltrating the garage. The forensic engineering investigation evaluated the scope of renovation work that was supposed to be performed and the quality of the work. The forensic engineering evaluation determined that there are significant material defects in the renovation work that allow water to infiltrate the garage, which causes deterioration of the columns and floors. This paper will identify the design requirements and provide extensive photographic evidence of the construction defects that were caused by the contractor. It will also evaluate the ongoing deterioration, how it affects the structure, and why it could cause future structural failures and a possible collapse. The paper will also provide an analysis of repairs that are required to restore and preserve the parking garage's structural elements. As the collapse of the Champlain Towers in Florida demonstrated, collapses of deteriorated concrete structures can occur, increasing the need for forensic engineering evaluation of deteriorating structures to prevent future catastrophes.

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 over 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.

Brian C. Eubanks, PE (NAFE #962S)
Founder and Principal Structural Engineer,
Paragon Structural Engineering

Derek T. Patoskie, PE (NAFE #1312A)
Senior Staff Structural Engineer, Paragon
Cameron Labunski, PE (NAFE #1365M)
Principal Engineer, Tom Green & Company Engineers, Inc.

Time: 10:15 to 11:15 AM

Title: As-Built Performance of Building Moisture Management Resulting from Prescriptive Code Requirements: Forensic Evaluation of Thermal, Ventilation, and Moisture Conditions

Abstract: Thermal envelope performance, attic ventilation, HVAC operation, and moisture control are inherently interdependent building systems, and conditions attributed to one are frequently associated with interactions among the others. This paper examines these issues through a series of forensic engineering case studies addressing allegations of building-damaging air infiltration, inadequate ventilation, HVAC performance concerns, and mold infestation. The investigations include review of construction documents, applicable building codes and standards, environmental and performance testing data, and both destructive and non-destructive field observations. Analytical emphasis is placed on evaluating as constructed system behavior, distinguishing prescriptive requirements from performance based criteria, and assessing whether alleged conditions are present and whether they are causally related to physical distress, functional failure, or occupant lifestyle, and whether or not verifiable health concerns exist. The case studies demonstrate how differing professional interpretations may arise when visual indicators, infrared thermography, modeling, and measured performance data are weighted differently. The paper concludes that defensible forensic conclusions require careful consideration of code intent, system level performance, occupant lifestyle, and causation, and it presents a performance based framework for objectively evaluating thermal, ventilation, HVAC, and moisture-related conditions in buildings.

Brian C. Eubanks, MSCE, PE, SE, MAC, D-IBFES, DFE, is Senior Principal Engineer and founder of Paragon Structural Engineering, LTD. With over two decades of experience, he leads a multidisciplinary team in the structural design and forensic investigation of residential, commercial, and institutional projects. He is a Board-Certified Diplomate in forensic engineering by the National Academy of Forensic Engineers (NAFE) and the International Board of Forensic Engineering Sciences (IBFES) and holds professional engineering licenses in 15 states. Eubanks has been engineer-of-record on a diverse design portfolio and possesses significant proficiency in forensic investigations. He is recognized for expertise in structural systems, building envelopes, components and cladding, and construction defect evaluation. He is also a certified Mold Assessment Consultant (MAC), further supporting his forensic investigations involving moisture intrusion, indoor air quality, microbial growth, and building envelope failures. He is an active member of national and regional engineering committees, has authored numerous industry standards and technical publications, is a frequent expert witness in mediation, arbitration, and court proceedings, and served as an arbitrator. He regularly presents at engineering conferences and professional seminars, demonstrating his commitment to advancing best practices in engineering and forensic analysis.

Derek T. Patoskie, MECE, PE, is a Senior Staff Structural Engineer at Paragon Structural Engineering, LTD. He specializes in the structural design and forensic investigation of planned and existing structures, with expertise in building envelopes, soil-structure interaction, structural system performance, and the evaluation of peril-related damage. Patoskie is Building Envelope Certified by the Building Envelope Science Institute (BESI) and the Exterior Design Institute (EDI), Haag Certified, a Model Law Engineer with the National Council of Examiners for Engineering and Surveying (NCEES), an Associate Member of the National Academy of Forensic Engineers (NAFE) and holds professional engineering licenses in two states. Patoskie is an active member of several national engineering committees, has presented at engineering conferences and professional seminars and has contributed to multiple technical publications. With over seven years of experience, he has designed structural foundation systems, conducted a broad range of forensic investigations, prepared expert reports for mediation, arbitration, and court cases, and provided mentorship to developing engineers.

Cameron Labunski is a Principal Engineer with over two decades of experience in the design, commissioning, and forensic evaluation of mechanical, electrical, plumbing, and fire protection systems for complex building projects. He has served as Principal, Project Manager, and MEP/FP Task Design Engineer on a diverse portfolio of commercial, institutional, and critical-facility projects, including healthcare, educational, municipal, cultural, data center, and central plant facilities. Labunski is recognized for his expertise in high-performance and MEP-intensive facilities, sustainable design, and renovation projects executed in fully occupied environments. His experience includes LEED® Certified projects, advanced humidity control, and energy recovery systems, building automation and controls, energy auditing, and computer-based energy modeling. He brings extensive commissioning experience, having supported commissioning efforts and served as Commissioning Agent on numerous projects. In addition to his design practice, Labunski has significant forensic engineering experience and routinely serves as an expert witness in matters involving construction defects, design errors and omissions, and dispute resolution. His Mold Assessment Consultant (MAC) certification further supports his work in investigating building failures relating to moisture, air quality, and microbial growth. He is a licensed Professional Engineer in multiple states, holds ASHRAE HBDP and HFDP certifications, and is an active member of several professional engineering organizations.

Susan M. Bowley, Ph.D. (NAFE #408A)
Mechanical and Biomedical Engineer,
Founder, President & CEO, Bowley Inc.

Time: 11:15 AM to 12:15 PM

Title: Forensic Biomechanics Analysis of a Traumatic Brain Injury (TBI) Claim

Abstract: As a forensic engineering expert, we are often tasked with evaluating the human biomechanics of an incident to focus on injury causation analysis. Addressing engineering issues in a case that seems to focus on medical diagnosis can be challenging. However, adhering to first principles, creating clear demonstrative evidence, and remaining objective will ultimately uncover the key underlying causes of a specific injury. From a biomechanical engineering viewpoint, this paper evaluates the claim of a Traumatic Brain Injury (TBI) in a 16-year-old male subject riding to school on a city bus. The biomechanics analysis performed and discussed in this paper reveals how the injuries sustained were not supported by the medical diagnosis or opposing experts' opinions. However, ultimately, the flaws in the opposing experts' analyses were never revealed to the jury, since the case settled prior to this expert's testimony. Revealing the underlying causes of the injuries to the subject in this case, via the methods and techniques discussed, may provide useful insights to other forensic engineering experts with similar cases.

Susan M. Bowley has been a practicing engineer since 1988. Dr. Bowley grew up in Ashford, Conn. and completed her B.S. in mechanical engineering at the University of Connecticut. She then started her professional engineering career at NASA Ames Research Center in Northern California where she worked in various capacities for over 13 years. While at NASA, Dr. Bowley earned her M.S. in mechanical engineering at Stanford University with a concentration in thermosciences, including completion of an independent research study on transpired epidermal water loss in premature infants. After competitive selection for a NASA full-time graduate study fellowship, Dr. Bowley earned her Ph.D. in biomedical engineering at the University of Virginia. Her doctoral dissertation, with the help of a grant awarded by the National Osteoporosis Foundation, consisted of two human research studies to investigate the effect of physical activity on bone density in humans. Dr. Bowley then completed a post-doctoral fellowship at the Food and Drug Administration where she studied blood hemolysis via mechanical fragility of red blood cells in various medical devices. After completing her post-doctoral research, Dr. Bowley served as a lead medical device reviewer at the FDA in the Cardiovascular Division for over three years, including serving on the ASTM F04.30.06 Task Group as Co-Chair. Dr. Bowley has also served as a faculty member at multiple universities where she has developed her own courses. Since leaving the FDA, Dr. Bowley has been working as a forensic expert witness and medical device consultant. In 2008, Dr. Bowley started her own engineering consulting firm. Corporate offices are located in Connecticut (HQ), Maryland, and Northern California. Dr. Bowley also worked at the Consumer Product Safety Commission (CPSC), U.S. Patent and Trademark Office (USPTO), and Transportation Security Administration (TSA).

Yoandi Interian, PE (NAFE #1260M)
Senior Engineer,
LGI Forensic Engineering

Time: 1:15 to 2:15 PM

Title: When Visual Evidence Is Not Enough: Evaluation of Fire-Exposed Concrete

Abstract: Post-fire evaluation of reinforced concrete structures presents significant challenges, particularly when visible indicators of damage are ambiguous or do not clearly correlate with the actual extent of thermal degradation. Surface manifestations such as discoloration, cracking, and spalling are commonly used as preliminary indicators of fire exposure; however, these features alone do not provide a reliable basis for assessing structural integrity or the depth of damage. This paper presents a systematic framework for evaluating fire-exposed concrete through an integrated approach that combines visual inspection, non-destructive testing (NDT), and targeted destructive laboratory analysis. It discusses a recent case study in which initial field observations identified typical signs of fire exposure, yet these indicators proved insufficient to accurately determine the extent and severity of damage. It examines the limitations associated with reliance on visual assessments and near-surface testing methods, which may not capture subsurface conditions. By incorporating destructive testing and laboratory evaluation, this study demonstrates that observed damage can be limited to superficial effects and not indicative of structural compromise. The findings underscore the importance of a comprehensive assessment methodology and highlight the critical role of destructive testing in accurately characterizing fire-related damage and informing appropriate repair strategies.

Yoandi Interian has a bachelor of science in civil engineering and master of engineering in civil engineering with concentrations in structural engineering from Rensselaer Polytechnic Institute (RPI). Interian is a licensed professional engineer (P.E.) in the state of Connecticut, New York, and New Jersey. He has more than 10 years of industry experience in all phases of building engineering design, construction, and project management. He also has knowledge of local and national building codes as well as experience in the analysis and design of reinforced concrete, structural steel, masonry, and timber structures. He has forensic experience specializing in the investigation of structural and non-structural failures and deficiencies in structures. Interian is also a certified fire and explosion investigator (CFEI).

John Bauer, PE (NAFE #1393M)
Senior Forensic Engineer & Vehicle Crash Reconstructionist
Nederveld, Inc.

Jerry Ogden, Ph.D., PE (NAFE #561F)
Transportation Group Manager Emeritus
Nederveld, Inc.

Time: 2:15 to 3:15 PM

Title: Forensic Engineering Evaluation of an Airbag Nondeployment

Abstract: Following a crash, questions may arise about why the occupant restraint airbag(s) did not deploy. This paper describes a forensic engineering methodology for evaluating an airbag non-deployment event. The process relies on vehicle specifications, restraint system content, and detailed examinations of seatbelts, airbags, sensors, and wiring. The examination process also includes imaging and scanning of the restraints control module (RCM) for faults and event data. A search for related recalls, previous collisions, and repair work to the restraint system of the subject vehicle provides background information. Steps to determine seatbelt usage at each passenger position provide data that can affect the airbag deployment threshold. Queries of crash databases can also provide a comparative damage analysis. The process culminates in a collision analysis, or crash reconstruction, and simulation to determine the principal direction of force (PDOF), velocity change (delta-V), accelerations, and other parameters useful for assessing impact severity and predicting airbag deployment. The methodologies presented allow the forensic engineer to systematically evaluate potential reasons for an airbag system's failure to deploy during motor vehicle collision events.

Jerry S. Ogden, Ph.D., PE has more than 35 years of experience in engineering forensics, spanning from his active-duty military days in the 1980s and early 1990s to his entry into private practice in 1991. Aside from his expertise in mechanical engineering related to impact analysis and mechanical failures, Dr. Ogden has extensive education, training, and experience in civil engineering as it relates to highway design, traffic engineering, and work zone temporary traffic control. He has testified in state and federal courts across the country, bringing with him a unique perspective on the forensic applications related to transportation-related failures and loss events.

John Bauer is a forensic engineer and certified vehicle crash reconstructionist with experience investigating and analyzing vehicle collisions, component failures, and product liability since 2014. His work has included speed determination, mapping, crash/energy analysis, passenger vehicles, commercial vehicles, heavy trucks, motorcycles, mopeds, ATVs, pedestrians, site distance, and crash data recovery. He has an extensive background and expertise in vehicle occupant safety restraints, including seatbelts and airbags. Prior to becoming a forensic consultant, he held various engineering positions in the automotive industry for 25 years. Bauer spent over 23 years directly involved in automotive safety while focusing on design, simulation, and testing. He has provided expert witness testimony in his areas of practice at both trial and deposition.

Peter Glismann, PE (NAFE #1392M)
Consultant, Forensic Engineering Expert Witness
GlisWorks Engineering & Consulting

Time: 3:30 to 4:30 PM

Title: An "Undiscovered Country": Optical Confusion in Public Transportation

Abstract: "Optical Confusion" is a camouflage technique assimilated with the surroundings through manipulating colors and patterns. It is a primary failure in data visualization, occurring when poor system elements distract or mislead the viewer, rather than informing them. It occurs, for example, when conditions in an area create the illusion of a flat surface, visually obscuring any changes in elevation in interior and or exterior floor levels, resulting in injury. Optical confusion is a common-law negligence principle that can be supported by expert testimony. This paper serves as an introduction to how this failure may be cited in legal cases. In addition to trips and falls, bicyclists unwittingly hitting a pothole in pavement, or misunderstanding safety information due to obscured lines of sight or poorly placed warnings and passengers attempting to exit trains when the platform is above or below an expected elevation are examples that may result in injury or fatality. Legal and technical documents were reviewed. Findings indicate a lack of available knowledge. In conclusion, optical confusion may be utilized in cases for passengers of public transportation in which lighting, surfaces, and signage interfered with their ability to see and appreciate inherent risks, thus affecting their ability to protect themselves.

Peter Glismann is delighted to present a paper as a member of NAFE for the first time. He got licensed 20 years ago in mechanical engineering and is now licensed in 10 states. Glismann has a BS in aeronautical & astronautical engineering from the Ohio State University and an MS in systems analysis & management from George Washington University. He is a 1099 consultant as a special inspector and a forensic engineer and expert witness at his own firm (GlisWorks Engineering & Consulting, PLLC). In his spare time, he performs as a corporate comedian in comedy clubs and festivals. He is also an avid biker, swimmer, and downhill skier. He lives on the Upper West Side of Manhattan.

Jahan Rasty, Ph.D., PE (NAFE #1152S)
Professor, Texas Tech University
Founder and CEO, Real-World Forensic Engineering

Luke Blackwell (NAFE #1275A)
Assistant Engineer,
Real-World Forensic Engineering

Matthew Mills, D.Eng., PE (NAFE #1199A)
Technical Director, Real-World Forensic Engineering

Time: 4:30 to 5:30 PM

Title: False-Latch Position in a Two-Post Automotive Lift: Investigating Design-Related Factors Contributing to Hazardous Maintenance Configurations

Abstract: During routine maintenance of a two-post automotive lift, involving replacement of a hydraulic hose connected to a hydraulic cylinder, the lift's arm-supporting carriage was elevated but did not reach the minimum height required for safety latch engagement intended to safeguard against uncontrolled descent. Instead, unstable geometric interference between a support plate within the carriage and the retracted cylinder created a temporary, but unstable, support condition that mimicked proper latch engagement. Dimensional analysis demonstrated that the diaphragm opening and cylinder geometry permitted off-axis interference prior to latch activation, allowing an unstable equilibrium state to exist below the designed latch position. Unexpected release of this interference resulted in the sudden and uncontrolled drop of the carriage. This investigation examines the role of design, maintainability, and hazard controls in contributing to the creation of a false-latch condition, and discusses the importance of verifiable safe-states during foreseeable maintenance activities. The findings emphasize that safety systems must physically prevent the creation of hidden, false-latch positions, rather than relying solely on operator interpretation of system cues.

Dr. Jahan Rasty holds BS, MS, and Ph.D. 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 founding director of the graduate-level Applied Forensic Engineering Certificate program. Dr. Rasty is also the founding president and CEO of Real-World Forensic Engineering, LLC (RWFE) where he has investigated 1,500+ cases resulting in 300+ deposition testimonies and dozens of court appearances as an expert witness in the areas of design, mechanical metallurgy, materials science, safety engineering, and warnings.

Matthew Mills, who holds a doctor of engineering in multidisciplinary engineering and 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 has 4+ years of experience assisting with analysis of hundreds of forensic engineering investigations and conducting site inspections.

Luke Blackwell holds a BS in mechanical engineering and is currently pursuing a master's degree in the same field. He has 3.5+ years of experience assisting with analysis of hundreds of forensic engineering investigations and conducting site inspections.