JAMES W. LAIRD, PE, IAAI-CFI, CFEI, CVFI

Principal Engineer, Clear Analysis Engineering, PLLC (CAE Forensic)
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Professional Summary

Forensic mechanical engineer and expert witness with 16+ years of experience and more than 2,000 investigations involving mechanical failures, fires, explosions, and vehicle crashes. Licensed Professional Engineer in nine jurisdictions, with certifications in fire, explosion, and vehicle fire investigation. Former Director and Lead Engineer overseeing FORCON International's Mid-Atlantic operations, including multidisciplinary teams, technical review, and engineer development. Founder of CAE Forensic, providing independent forensic engineering and expert witness services. Has provided deposition and trial testimony in state and federal courts.

Selected Accomplishments

- **Investigation experience.** Conducted or led more than 2,000 inspections and failure analyses across fire, explosion, mechanical failure, product liability, and automotive matters.
- **Regional leadership.** Oversaw FORCON International's Mid-Atlantic operations, including the Virginia and Maryland offices and multidisciplinary investigations.
- **Team development.** Managed multidisciplinary engineering resources, trained engineers, and peer-reviewed reports for technical accuracy and sound investigative methodology.
- **Independent practice.** Founded CAE Forensic in July 2025 to provide forensic engineering and expert witness services.
- **Expert testimony.** Provided six depositions and testified at four trials across eight matters, including two depositions in federal court.
- **Published technical guidance** for adjusters and attorneys on applying the scientific method in forensic engineering and on post-incident evidence preservation.

Professional Experience

Clear Analysis Engineering, PLLC (CAE Forensic) — Bellingham, Washington
Founder and Principal Engineer, July 2025 – Present

- Founded and operate a forensic mechanical engineering practice focused on failure analysis, fire and explosion investigation, and automotive forensics.
- Personally conduct every assignment from evidence review and scene inspection through analysis, written report and testimony.
- Conduct fire and explosion investigations under NFPA 921 and issue reports structured for Rule 702 and Daubert review.
- Determined cause and duration of loss in a multi-year concealed water intrusion matter, including a construction defect present since original construction.

FORCON International — Richmond, Virginia
Director and Lead Engineer, October 2010 – July 2025

- Conducted and led multidisciplinary teams on more than 2,000 inspections and failure analyses over 14 years.
- Oversaw all Mid-Atlantic operations and directed the Virginia and Maryland offices, including office operations, marketing, and multidisciplinary investigation oversight.
- Managed a multidisciplinary team of five full-time employees and 10 consultants across electrical, structural, mechanical, and materials engineering disciplines. Trained engineers in investigation methods and failure analysis and peer-reviewed reports for technical accuracy and sound investigative methodology.
- Coordinated joint scene and laboratory examinations with opposing experts, including optical and scanning electron microscopy of failed components.
- Established cause and supported subrogation in matters including a gas range explosion traced to an improperly made installer fitting and a tracked loader fire traced to a component improperly reinstalled during dealer service.
- Declared as an expert and testified in state and federal courts.

U.S. Army Aberdeen Test Center — Aberdeen, Maryland
Engineering Technician

- Tested and analyzed the combat performance of military vehicles.

Virginia Tech, Extreme Laboratories — Blacksburg, Virginia
Undergraduate Researcher

- Conducted heat flux gauge testing supporting fire propagation analysis as part of for-credit undergraduate research in high-temperature projects.
- Designed experimental setups and analyzed data to evaluate gauge accuracy.

Representative Investigations

Anonymized examples showing scope and method. Client and party names are withheld.

- **Commercial kitchen fire.** Measured exhaust hood clearances and compared them with NFPA 96 and the manufacturer's installation instructions; determined the hood was installed too close to combustibles and caused the fire.
- **Restaurant sprinkler discharge.** Reviewed building plans and the applicable Virginia Construction and Fire Codes, IFC, and NFPA 13; determined that construction deviated from the approved plans and caused the sprinkler discharge.
- **CSST gas piping fire.** Inspected gas piping, bonding, and wiring during a joint examination; directed optical and scanning electron microscopy of perforated tubing and evaluated installation instructions and applicable codes. Concluded that improper installation allowed electrical shorting that caused the fire.
- **Awning separation.** Evaluated failed mounting points against the Uniform Statewide Building Code; determined the mounting tab design was insufficient and non-compliant.

- **Vehicle steering failure claim.** Over a three-year matter, analyzed crash data, police records, depositions, mechanical and electrical schematics, service and recall history, and the vehicle itself. Identified inconsistencies between the plaintiff's alleged steering-failure theory and the physical evidence.
- **Forestry machine injury.** Inspected a logging machine and evaluated its design against the operator's manual and applicable guarding standards.
- **U.S. government health and wellness facility water loss.** Reviewed project contracts, drawings and specifications, NFPA standards, manufacturer data, testing records, discovery responses, and the opposing expert report concerning a fire-service main connection that leaked when the system was pressurized. Concluded that the flange was suitable for the application and met applicable requirements, but the required final set-screw torquing after the interior sprinkler piping was connected was missed.

Expert Witness Experience

- Testified in deposition and at trial 10 times in 8 matters since 2014: 6 depositions, including 2 in the U.S. District Court for the Eastern District of Virginia, and 4 trials in Virginia circuit and general district courts.
- Prepares written reports consistent with Federal Rule of Evidence 702 and Daubert; reviews and rebuts opposing expert opinions.
- Completed IAAI Expert Witness Courtroom Testimony and programs on deposition format, questioning tactics, discovery in civil cases and effective testimony.
- Record of testimony available on request.

Licenses and Certifications

- **Registered Professional Engineer:** Washington, Oregon, Idaho, Virginia, Maryland, West Virginia, North Carolina, South Carolina, District of Columbia
- **Certified Fire Investigator (IAAI-CFI)**, International Association of Arson Investigators
- **Certified Fire and Explosion Investigator (CFEI)**, National Association of Fire Investigators
- **Certified Vehicle Fire Investigator (CVFI)**, National Association of Fire Investigators
- **Bosch CDR Technician and Data Analyst**, Northwestern University Center for Public Safety
- **Former AWS Certified Welding Inspector** (D1.1 Structural Steel), certified through July 2024; previously Certified Associate Welding Inspector

Education

- **Master of Engineering, Mechanical Engineering**, Old Dominion University, Norfolk, VA, 2022. Coursework included finite element analysis, engineering design with uncertainties, advanced manufacturing technology and engineering mathematics.
- **Bachelor of Science, Mechanical Engineering**, Virginia Tech, Blacksburg, VA, May 2010. Coursework included land vehicle dynamics, engines and power trains, materials engineering, mechanical design, vibrations, heat and mass transfer, fluid mechanics, metal fabrication, electrical engineering and fundamentals of professional engineering.

Specialized Training and Continuing Education

In-person training

- Expert Witness Courtroom Testimony, International Association of Arson Investigators, 2024
- Bosch CDR Technician I & II Certification Course, Northwestern University Center for Public Safety, 2016
- Vehicle Accident Reconstruction and Crash Investigation, Northwestern University Center for Public Safety, 2015
- Operator Safety Training – Forklifts, Eaheart Industrial Service, 2014
- Vehicle Fire Investigations, National Association of Fire Investigators, 2013
- Advanced Motorcycle Rider Training, California Superbike School, 2012
- Certified Welding Inspector Seminar and Examination (AWS D1.1 Code Clinic, Welding Inspection Technology, Visual Inspection Workshop), American Welding Society, 2012
- Fire & Explosion Investigation, National Association of Fire Investigators, 2012
- Fundamentals of Welding & Technology, Earlbeck Corporation, 2006

Selected continuing education: Maintains PE licenses and fire investigator certifications through ongoing coursework, including 144 hours of IAAI CFITrainer.Net fire investigation training, 86 PDH of American Welding Society welding, metallurgy, and testing courses, Automotive Lift Institute Lifting It Right, and courses in engineering ethics, fire protection, and accident investigation.

Selected Technical Articles

- Laird, J. "The Scientific Method in Forensic Engineering: Why Rigorous Investigation Matters." CAE Forensic, 2026.
- Laird, J. "Evidence Preservation After a Mechanical Failure or Fire: A Guide for Adjusters and Attorneys." CAE Forensic, 2026.

Professional Societies

National Society of Professional Engineers · National Academy of Forensic Engineers · International Association of Arson Investigators · National Association of Fire Investigators

Areas of Expertise

- **Fire and explosion:** origin and cause under NFPA 921; natural gas, propane and CSST systems; appliances, cooking and wood-fired equipment; vehicle, heavy equipment and marine fires
- **Mechanical failure analysis:** plumbing fixtures and supply lines, water heaters, HVAC and boilers, fire sprinkler systems, fatigue and weld failures
- **Automotive:** crash data (EDR/CDR) retrieval and interpretation, steering, brake and suspension systems, wheel separations, motorcycles
- **Industrial and product liability:** heavy and forestry equipment, forklifts and aerial work platforms, power tools, ladders, exercise equipment, guarding and workplace safety, industry standards