

Mr. Roark is a Senior Staff Consultant with Engineering Systems Inc. (ESi). He has more than four years of experience investigating complex engineering failures. His practice focuses on engineering failures involving mechanical equipment, vehicle collisions, fire protection systems, fires and explosions, building systems, product safety, and premises liability across residential, commercial, industrial, and transportation-related systems.

Mr. Roark's experience includes mechanical failure analysis, accident reconstruction, code compliance evaluations, destructive examinations, and the investigation of equipment failures, building system failures, and product-related incidents. His technical capabilities include LiDAR laser scanning, drone aerial imagery, and three-dimensional engineering visualization to support forensic investigations and clearly communicate complex technical findings.

Prior to forensics, Mr. Roark worked in the oil and gas industry, where he supported the design, inspection, testing, and maintenance of subsea equipment. His responsibilities included developing assembly, testing, and maintenance procedures, preparing manufacturing and assembly documentation, performing engineering analyses, and collaborating with multidisciplinary teams throughout the product lifecycle to support equipment reliability and performance.

Education

BS, Mechanical Engineering. Oklahoma State University. 2013

Licenses & Certifications

- State of Texas P.E. License 135133
- State of Louisiana P.E. License 46183
- State of Oklahoma P.E. License 33270
- State of Minnesota P.E. License 62262
- State of Florida P.E. License 95243
- OSHA, Confined Space 8 Hours (General Industry)
- MEWP Type 3A (Scissor Lift) & 3B (Boom Lift)

Contact Information

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ESi Houston

18500 Trails End Rd.
Conroe, TX 77385

Areas of Specialization

- Automotive Accident Reconstruction
- Vehicle Event Data Imaging
- Product Safety and Design
- Mechanical, Electrical, and Plumbing Systems
- Heating, Ventilating, and Air Conditioning (HVAC)
- Refrigeration
- Fire Protection Systems
- Fire and Explosion Investigations
- Cranes and Aerial Devices
- Premises Liability
- Code Compliance Assessment
- Hail, Wind, Moisture Intrusion
- Roofing Systems
- LiDAR Scanning (FARO & Leica)
- Drone Aerial Photography and Videography

- Fall Protection Authorized User
 - Federal Aviation Administration (FAA), Remote Pilot (Part 107)
 - Haag Certified Inspector (Residential, Commercial, & Wind)
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Languages

- English
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Positions Held

Engineering Systems Inc., Conroe, Tx

- Senior Staff Consultant, 2026 – Present

Great Harvest Bread Company, Friendswood, Tx

- Owner/Operator, 2024 – 2026

Haag Engineering, Sugar Land, Tx

- Associate Engineer Consultant, 2021 – 2024

TechnipFMC, Houston, Tx

- Design Engineer, 2018 – 2021
 - Project Engineer, 2016 – 2018
 - Graduate Engineering Program, Mechanical Engineer, 2014 – 2016
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Continuing Education

- **Haag Certified Inspector, Wind Damage** – Haag Engineering, 2024
 - **Haag Certified Reviewer - Residential Level I, Weather & Residential Construction Basics** – Haag Engineering, 2023
 - **OSHA Confined Space 8 Hours (General Industry)** – 360Training, 2023
 - **MEWP Scissor/Boom Lift Type 3 Group A&B** – CertifyMeOnline.net, 2022
 - **Haag Certified Inspector, Commercial** – Haag Engineering, 2022
 - **Haag Certified Inspector, Residential** – Haag Engineering, 2021
 - **ACRABAT Level 1, Association for Certified Rope Access Building Assessment Technicians** – Reality Rope Access, LLC, 2021
 - **PEC SafeLand Orientation** – Veriforce, 2014
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Professional Affiliations/Honors

Pi Tau Sigma, Mechanical Engineering Honor Society

- Member

Project Experience

Investigations

Automotive Accident Reconstruction and Vehicle Imaging

- Conducted a forensic investigation to evaluate whether prior vehicle repairs contributed to an alleged airbag non-deployment during a motor vehicle collision. Participated in a joint-party vehicle inspection, performed 3D laser scanning of the involved vehicle, documented crush profiles and impact damage, and analyzed police crash reports and Airbag Control Module (ACM) event data. Determined that prior repairs did not contribute to the reported airbag non-deployment and that impact severity was below deployment thresholds.
- Conducted a forensic reconstruction of a 10-vehicle chain-reaction collision to evaluate the involvement of a subject vehicle in the fatal outcomes. Analyzed dash camera footage, police crash documentation, and electronic crash data from multiple vehicles to reconstruct the sequence of impacts, identify vehicle-to-vehicle interactions, and assess the timing and progression of the collision.

Heavy Equipment, Cranes, and Aerial Devices

- Conducted a forensic evaluation of an automotive transport trailer lift system to determine the cause of a lift platform failure. Performed a visual inspection of an exemplar trailer, documented the lift mechanism, hydraulic system, and controls, observed lift operation, and developed visual diagrams of the lifting mechanism to support failure analysis. Participated as a fact witness during deposition proceedings.
- Conducted a forensic investigation of an oilfield service rig tip-over to determine the cause of the incident. Assisted with field inspection of the service rig, documented structural conditions, measured guyline assemblies, analyzed historical weather data, and reviewed incident documentation. Determined that the available evidence was inconsistent with wind, structural deficiencies, or maintenance-related conditions, with the incident most likely resulting from overloading and/or the guying configuration.

Fire Sprinkler Systems, Fire, and Explosions

- Performed a comprehensive forensic failure analysis of a diesel fire pump engine. Reviewed controller pressure and temperature data logs, developed and executed a destructive examination protocol, evaluated the engine cooling system and associated components, coordinated laboratory analysis of engine oil samples, and disassembled critical engine components to determine the failure mechanism. Determined that overheating caused by coolant loss led to engine failure.
- Conducted a forensic investigation of fire sprinkler pipe failures within a multi-building apartment complex to determine the cause of leak and evaluate whether the damage resulted from freezing conditions.

Inspected attic sprinkler piping, measured pipe slope and drainage characteristics, compared as-built conditions with construction documents, and examined fractured pipe sections. Determined that improper pipe installation prevented drainage of dry-pipe sprinkler system, leading to freeze-related pipe failures.

- Supported residential fire origin and cause investigation by conducting scene documentation, evaluating the residential gas system, and performing pressure testing to assist in determining whether natural gas contributed to the fire event.

Premise and Product Liability (Safety & Design)

- Conducted a forensic engineering evaluation of a mobile wooden bookshelf following a tip-over incident involving a minor. Inspected the involved and exemplar units, performed dimensional measurements, developed an engineering model to evaluate static stability and tip-over resistance, reviewed surveillance video, manufacturing documentation, deposition testimony, and accident records, and prepared a rebuttal to the opposing expert's opinions. Determined that the shelving unit's original design was consistent with comparable products within the industry and that post-manufacture modifications significantly reduced tip-over resistance.
- Conducted a forensic engineering evaluation of a torque wrench and socket assembly following a construction-site incident involving a falling object. Performed dimensional inspection of the socket and wrench, verified component geometry against applicable industry design standards, and conducted force test in multiple installation orientations to evaluate socket retention. Confirmed the components met applicable design specifications while concluding that available evidence could not establish the socket orientation at the time of the incident.
- Performed a forensic engineering evaluation of a rooftop fall incident to assess compliance of rooftop guard systems with applicable building codes and industry standards. Reviewed construction drawings, incident documentation, deposition testimony, photographs, aerial imagery, and applicable codes and standards to evaluate the design and construction of the rooftop access and guard systems.

Mechanical, Electrical, and Plumbing Systems

- Investigated the cause of residential bathroom flooding event. Inspected toilet fill valve components, evaluated water supply pressure, assessed installation practices, and compared the subject assembly with intact toilet fill valves. Developed an engineering test protocol to evaluate the proposed failure mechanism and determined that the fill valve components separated due to a combination of elevated water pressure and improper installation.
- Conducted a forensic investigation of a water leak involving a Viega ProPress® 90-degree elbow fitting within a commercial plumbing system. Performed an on-site inspection, documented and extracted the involved components, conducted a laboratory examination of the fitting, and evaluated the installation against manufacturer specifications. Determined that the fitting had not been properly installed evidenced by incomplete pressing around the fitting outer diameter.
- Conducted a forensic investigation of a commercial domestic hot water system to determine the cause of a reported water loss within a hotel. Inspected the mechanical room comprised of multiple water heaters and

descaling units. Documented system conditions and collected failed flexible pipe connectors. Identified V-shaped tears and longitudinal cracking within the flexible connector assemblies.

- Performed a forensic evaluation of a dual-piston hydraulic elevator system to determine the extent of damage associated with a reported water intrusion event. Inspected the elevator equipment, telescoping jack system, hoistway, and elevator pit. Reviewed elevator repair estimates, maintenance records for both the elevator and sump pump systems. Distinguished long-term moisture exposure from damage attributable to a single flooding event.
- Investigated whether copper pipe leaks within a residential plumbing system were attributable to freezing conditions. Performed a comprehensive site inspection, analyzed historical weather data, reviewed gas, water, and electrical utility records, and conducted pressure testing of the domestic water system. Determined the pipe leaks resulted from age-related deterioration rather than a recent freeze event.

Heating, Ventilating, and Air Conditioning (HVAC) and Refrigeration

- Conducted a forensic HVAC performance evaluation to determine the source of elevated indoor humidity in a residential home. Utilized airflow, temperature, and relative humidity measurements to identify operational deficiencies while confirming the HVAC system design was adequate and ruling out building moisture intrusion.
- Investigated the failure of a commercial refrigeration compressor serving a grocery store. Evaluated the refrigeration system, reviewed maintenance records, researched compressor design and operating characteristics. Determined that the compressor failure resulted from loss of lubrication caused by refrigerant leak.

Storm Damage Assessments (Hail, Wind, & Moisture Intrusion)

- Performed forensic inspection of 31 residential structures with concrete tile roofing systems following Hurricane Ian to determine the extent of storm-related damage. Conducted detailed field inspections with a technician, documented damage conditions, and compiled building-by-building damage data into a comprehensive tabulation to support engineering conclusions regarding the overall impact of the hurricane.
- Performed a large-scale forensic assessment of 31 structures across a 60,000-acre ranch to evaluate the extent of hail-related damage to metal, asphalt shingle, and clay tile roofing systems. Led a three-day field investigation with a technician, documenting roof conditions, compiling a comprehensive damage inventory, and authoring the engineering report regarding the extent of hail damage across the property portfolio.
- Conducted a forensic investigation of moisture intrusion affecting a 22-story, 225-room hotel, identifying deficiencies in window flashing through a systematic evaluation of the building envelope while ruling out roofing, plumbing, and mechanical systems as potential leak sources.

LiDAR Scanning, Drone Aerial Photography/Photogrammetry, and Visualization

- Developed 3D reconstructions of motor vehicle collisions using LiDAR laser scanning and drone aerial imagery to create digital environments. Integrated police scene measurements, vehicle crash data, and

physical evidence to reconstruct collision sequences and produce visualizations supporting forensic analysis and litigation.

- Performed LiDAR laser scanning of commercial and residential interiors and exteriors to create digital models. Generated floor plans, mapped floor elevations, and documented structural geometry and physical characteristics to support engineering analyses and forensic investigations.