



# STRUCTURES & CIVIL ENGINEERING LITIGATION SUPPORT



## **Engineering Systems Inc.**

Engineering Consulting and Forensic Investigation

American Bar Association  
Forum on Construction Law  
2023 Midwinter Meeting  
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# ABOUT ESi

## ESi PROFILE

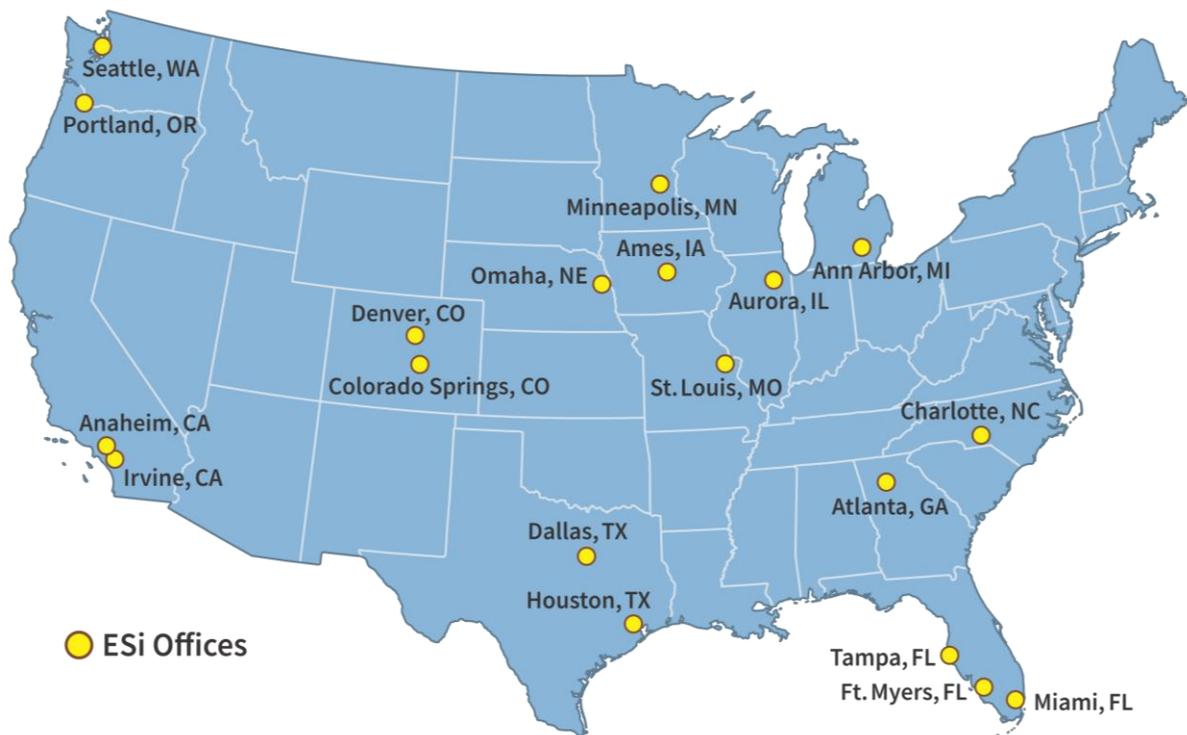
ESi (Engineering Systems Inc.) is an engineering consulting and forensic investigation firm providing clients with non-biased, science-based answers to complex questions. ESi applies a collaborative team approach that allows us to help with almost any type of construction project no matter the size. We have engineers, scientists, technologists, and Ph.D.'s pairing technical expertise with in-depth industry knowledge.

Our carefully assembled teams can assist with every aspect of construction and forensic investigation of construction defects. From structural and civil engineers, to materials and component testing, geophysical evaluations, and mechanical systems review, we can help you with your most difficult technical needs. ESi consultants are leaders in their fields who offer complete analysis, reporting, consulting, and expert testimony. Our expertise with projects ranges from site and code compliance consultation, construction defects and building envelope investigations, architectural forensics, and much, much, more.

ESi has state-of-the-art laboratories to perform a full range of metallurgical, chemical and specialty testing. We can scan, record, and survey scenes and equipment, develop demonstratives and visualizations, and offer secure long-term storage of artifacts.

## ESi LOCATIONS

ESi expertise spans dozens of industries and specializations organized across several practice groups with offices located throughout the nation.



# ESi FEATURED CONSULTANTS



William R. Broz, P.E., MBA, LEED AP  
ESi Principal  
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Mr. William Broz has over 40 years of strong, diverse engineering and business experience including mechanical building system and industrial piping design, mechanical system failure analysis, construction claims, patent litigation, and economic analysis.

He has spearheaded claims analyses for a wide variety of projects, with issues ranging from schedule delay and loss of productivity to evaluation and pricing of direct-cost change orders. Mr. Broz is especially well versed in the analysis of complex design and construction contracts, on such varied issues as obligations of parties, delay and disruption, and sustainable building.

Mr. Broz has experience testifying in both state and federal cases, including design standard-of-care, construction defect, patent disputes, and property/casualty matters. An early adopter of the Leadership in Energy and Environmental Design (LEED) rating system, he has designed LEED projects up to the Gold award level.

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Kristina Cydzik, P.E., LEED AP  
ESi Senior Managing Consultant  
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Ms. Kristina Cydzik specializes in investigating a broad range of problems related to water. She has significant experience identifying ways to mitigate natural hazards, assessing the root causes of water-related incidents, and developing strategic plans for water and land management. She conducts studies of water diversion, land use change, flooding, alluvial fan flooding, erosion, water availability, post-fire watershed impacts, debris flows, water allocation, and water consumption.

She also investigates the failure of infrastructure, including dams, debris basins, and flood control channels. In international and domestic contexts. Ms. Cydzik works with stakeholder groups and facilitates and mediates discussions to identify strategies for managing water resources problems. She has particular experience evaluating the hydrology of arid and semi-arid regions all over the world.

# STRUCTURES & CIVIL ENGINEERING

The ESi structures and civil engineering team consults with clients on projects related to architecture, construction, infrastructure, and water resources and hydrology. Our experts work with all kinds of clients, from private entities to governments to help design and implement structures and procedures, as well as to provide solutions connected to construction, transportation, and water management.



## RESIDENTIAL STRUCTURES

Building-related failures tend to occur most often in residential structures. These can include structural failures with a variety of causes (design, installation, fire, storm, deterioration, and overloading) or building envelope issues. ESi has worked on thousands of

projects related to residential structures and as a result, the group is very well versed in typical problems, applicable code requirements, efficient repair details, and overall damage assessment. Our services include assessment of existing structures, emergency stabilization of distressed structures, initial damage assessment, setting scope of repairs, and repair drawings, including structural, architectural, and mechanical, electrical, and plumbing (MEP) repairs.



## ARCHITECTURAL INVESTIGATIONS

The ESi architectural investigation team is made up of architects, civil, structural, mechanical, electrical, plumbing, fire and explosion, and materials engineers who have expertise and extensive hands-on experience in every aspect of the building process, from design to construction. We investigate a variety of structures and products, including residential, commercial, mixed-use, institutional, high-rise, industrial, hospitality, parking facilities, and bridges.



## CONSTRUCTION DEFECTS

The ESi structural engineering team have specialized expertise in defects related to design, construction and materials, gaps in routine maintenance, and onsite safety violations. The scope of their services includes analysis of cause and origin, structural assessments (including building envelopes), environmental analysis, premises liability, repair recommendations, and direct oversight of restoration or repair activities.



## INFRASTRUCTURE

ESi assists with new construction design and evaluation, and implementation of repairs to existing structures to mitigate safety concerns, restore structural integrity, and prolong a structure's lifespan. Our projects often involve design, testing, and repairs to buildings, bridges, tunnels, and towers. These projects often include evaluation, preliminary and final design, program management, quality control, plan development and implementation, construction engineering and inspection.



## WATER RESOURCES & HYDROLOGY

ESi has focused expertise in water resources and hydrology. These consultants specialize in performing water availability studies, conducting cause and origin investigations, assessing and managing water risks, and designing plans to mitigate against natural hazards with flood control infrastructure. They work with private sector companies and government entities on matters related to national security and business continuity.



## COMMERCIAL STRUCTURES

ESi experts work to assess the condition of structural, civil, architectural, mechanical, and fire protection systems and components, and to investigate when a failure occurs. Our expertise is used to give building owners, property managers, engineers, architects, and contractors access to the technology and expertise necessary to make their buildings safe for the people who use them.



## STORM DAMAGE INVESTIGATION

ESi engineers and scientists investigate damages arising from rain, snow, hail, wind, tornadoes, hurricanes, storm surge, and other natural disasters. We can rapidly deploy our team members to collect perishable evidence, and support our clients in preparing emergency stabilization measures, evaluating hazardous materials, performing habitability assessment, and designing permanent repair measures.



## DAMS & EMBANKMENTS

Our team of civil, geotechnical, and water resource engineers and geologists are well-versed in the many facets of analysis and investigation of the design, construction, operations and maintenance, and failure mechanisms of dam and embankment structures. ESi has extensive experience performing hazard assessments of these structures to proactively evaluate their stability, functionality, and behavior under extreme conditions.



## WILDFIRE DAMAGE ASSESSMENT

Our wildfire experts are well versed in post-fire hydrology and post-fire watershed recovery. We excel at thorough investigations of wildfires, working with property owners and communities to prepare measures to mitigate post-fire hazards. We have extensive experience tailoring plans to address the specific hazards that property owners face, including those in suburban, rural, and agricultural settings.



## EARTH MOVEMENT INVESTIGATION

The ESi Earth Movement Team includes experts in geology, geomorphology, architecture, and earthquakes, along with civil, structural, geotechnical, and water resources engineers. Our consultants possess a thorough understanding of the substrate properties, environmental conditions, and human influences needed to evaluate existing or future damage.



## CRANES & AERIAL DEVICES

Our crane and aerial device experts help our clients with the planning required to keep cranes and similar devices safe and prevent avoidable accidents, for both the people operating them and the people around them when they are in use. ESi consultants can assist with lifting equipment specifications, complex rigging design and specification, wind loads and ground bearing pressures, and reliability testing.

# MECHANICAL SYSTEMS ANALYSIS

ESi mechanical investigations often include engineers with backgrounds in stress analysis, heat transfer, thermodynamics, vibration and modal analysis, fluid mechanics, fracture mechanics, aerodynamics, acoustics, instrumentation, control systems, risk analysis, process control, materials analysis, fire and explosions, and chemical analysis.

## CONSTRUCTION ADMINISTRATION

When these contentious and often costly issues occur, ESi's team of multidisciplinary experts will work with you to identify where breakdowns may have occurred, quantify the damages, identify liability, and assist in dispute resolution. Our experience in construction and project management spans all phases of construction, and virtually every type of construction project, including Design-Bid-Build projects, Design-Build projects, Fast Track projects and publicly funded or governmental construction projects.



## DESIGN ANALYSIS

ESi design analysis experts support product development efforts through testing products currently in development and analyzing failures in their products to help them improve the structures, mechanical systems, and components that make them up. ESi capabilities include solid modeling, stress analysis, finite element analysis (solid mechanics, heat transfer, and fluid dynamics), fatigue analysis, and fracture mechanics.



## HVAC, PLUMBING & REFRIGERATION

Failures in HVAC, plumbing, and refrigeration systems can occur for a variety of reasons, including defects introduced during design, manufacturing, or installation, as well as poor or improper maintenance. These failures often have a cascading effect. ESi experience with these systems enables us to analyze the problem at hand, uncover how and why the failure may have occurred, and identify what or who might be responsible.



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