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CLIFFORD C. BIGELOW, P.E.
SENIOR CONSULTANT
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Mr. Bigelow is a Senior Consultant with Engineering Systems Inc. (ESI), a professional, national engineering consulting firm and laboratory. He has over 22 years of engineering experience in the fields of failure analysis, metallurgy, materials and mechanical engineering, accident investigation, product development, testing, and design. He has gained broad experience conducting comprehensive in-field and laboratory investigations of damage and failures involving transportation equipment, industrial machinery and consumer products. His experience includes engineering investigations of automobile and truck accidents, industrial accidents, and failure analysis of a wide range of manufacturing and process equipment such as pressure vessels, weldments, rotating equipment, valves, piping, and castings. His expertise has been applied in the failure analysis of automobile, truck, railroad and aircraft systems including aircraft turbine and reciprocating engines. Mr. Bigelow is active in the investigation of residential and industrial fire and explosions, and specializes in laboratory analysis of materials in fire cause determinations.

Mr. Bigelow is proficient in materials laboratory procedures including optical microscopy, metallography, scanning electron microscopy (SEM/EDS), and mechanical testing. He has technical training and teaching experience in mechanics, machining and welding.

His specialties include metallurgy and materials analysis; welding; product testing and development; engineering investigations of material, equipment and machinery failures; aircraft, automobile and heavy truck accident and component failure analysis; residential and industrial fire and explosion investigation with emphasis on fire cause analysis of fuel gas and electrical systems involved in fires.

Areas of Specialization

Failure Analysis
Metallurgy and Materials Analysis
Automobile and Heavy Truck Accident Investigation
Industrial Machinery Failure and Accident Analysis
Fire and Explosion Investigation
Aircraft Accident and Failure Investigation
Welding, Piping, Boilers and Pressure Vessels

Education

Masters, Metallurgical and Materials Engineering
Illinois Institute of Technology, Chicago

B.S., Metallurgical Engineering
University of Illinois, Urbana

B.S., Industrial Education, Machine Tool and Automotive Technology
Illinois State University, Normal

*Providing Clear Answers
Through Insights and Multidisciplinary Excellence*

	COLORADO	FLORIDA	ILLINOIS	LOUISIANA	MISSOURI	TEXAS

Licenses and Certifications

Registered Professional Engineer (P.E.):

MO (2005013553) **IL** (062-048130)

TX (87110) **KS** (20292)

Certificate, Level II Ultrasonic Inspection

Certificate, Traffic Accident Reconstruction, Northwestern University Traffic Institute

Certified Fire & Explosion Investigator (CFEI)

Professional Affiliations

ASM International

Member

Past Chairman/Executive Committee, Chicago Western Chapter 1989-1994

American Society of Mechanical Engineers ASME)

Pressure Vessel and Piping; M& F Subcommittee, Past Vice Chairman, 1995

American Society of Testing and Materials (ASTM)

ASTM F.08– Trampolines Committee Member/Task Force Subcommittee, 1999

Society of Automotive Engineers (SAE),

Member

National Association of Corrosion Engineers (NACE)

Member

International Association of Arson Investigators (IAAI)

Member

National Association of Fire Investigators (NAFI)

Member

Technical Teaching and Presentations

“Metallurgy and Material Processes”,

Instructor of undergraduate course, Northern Illinois University, DeKalb, IL, 1988-95

“Metallurgy and Materials”

Training module for the Electric Power Research Institute, Charlotte, NC, 1992

“Metallurgy for the Non-Metallurgist”

ASM/MEI Continuing Education Course, Naperville, IL 1991-1994

“Failure Analysis”

ASM/MEI Continuing Education Course, Naperville, 1992

“Electron Microscopy in Failure Analysis”

Teacher Training Seminar, Argonne National Laboratory, Argonne, IL, 1993

“Failure Analysis”

Savannah River Chapter of ASM, Savannah, SC, 1991

“Case Studies in Failure Analysis”

St. Louis Chapter of ASM International, St. Louis, MO 1994

“Failure Analysis Techniques,”

ASM Materials Solutions Conference, St. Louis, MO, 2000

“Damage Analysis of Plain Bearings in Aircraft Engines”

MS&T Materials Conference, Cincinnati, OH, 2006

Continuing Education

Fatigue Analysis Seminar, University of Illinois, Urbana, IL 1990
Corrosion Control, Nickel Development Inst., Naperville, IL, 1991
Ultrasonic Inspection Level II Training, MQS Corporation, Elmhurst, IL, 1994
Truck Air Brake Systems Training, Allied Signal Co., Dallas, TX 1998
Traffic Accident Reconstruction, Northwestern University Traffic Institute, 1998
Vehicle Accident Reconstruction Methods, SEA International, Ft. Myers, FL, 2006
Forensic Fire Scene Reconstruction, IAAI, Orlando, FL, 2008
Fire, Arson & Explosion Investigation Training, NAFI, Denver, CO, 2009

Publications

“Short Term Failure of Carbon Steel Boiler Tube”, Handbook of Case Histories in Failure Analysis, ASM International, Edited by Khlefa Esaklul, 1994

Patents

U.S. Patent No. 5,476,429. Co-inventor of the Wheelchair Aerobic Fitness Trainer, an ergometer and diagnostic machine for wheelchair users developed under contract with the Veterans Administration.

Positions Held

Engineering Systems Inc., O'Fallon, Missouri
Senior Consultant, October 2003 to present

Materials Analysis, Inc., Dallas, Texas
Staff Engineer, 1995 to 2003

Packer Engineering, Inc., Naperville, Illinois
Staff Engineer/Senior Staff Engineer, 1988 – 1995

Northern Illinois University, DeKalb, Illinois
Guest Lecturer, 1988 – 1995

Jersey Community School District, Jerseyville, Illinois
Teacher, Industrial Education, Machine Tool and Welding Tech. 1980 – 1984

Lewis and Clark Community College, Godfrey, Illinois
Part Time Instructor, Welding Technology, 1980 – 1984