4215 Campus Drive
Aurora, IL 60504

MARK A. HINEMAN, P.E., C.W.I.
SENIOR CONSULTANT

mahineman@engsys.com

Mr. Hineman has over 47 years' experience performing metallurgical testing and failure analyses. He has used a large variety of testing and inspection techniques to analyze and evaluate a broad range of materials, processes, and failed components. His use of material testing has primarily involved metals such as steels, stainless, copper, aluminum, cobalt, titanium, and nickel alloy systems.

As a metallurgical engineer, Mr. Hineman helped develop testing methods for mechanical, microscopic, and chemical evaluation of a variety of materials, fabrication processes, and engineering components. SEM and EDS techniques were evaluated and optimized for interpretation of fracture appearances and chemical identification of corrosion products, plating layers, contamination, and electronic fault analysis. In addition to metallurgical failure analysis, Mr. Hineman has been involved in development and support of a nuclear quality assurance program.

With ESI, some of the specific products that have been analyzed include aircraft systems, bicycle components, fire sprinkler systems, railroad, and ship components. Failure analysis included many materials in the form of castings, forgings, powdered metal, plate, pipe, and extrusions. Assemblies with welded, brazed, bolted, or adhesive joints have been evaluated. Materials and failures from many industries have been analyzed including nuclear, aerospace, petrochemical, medical, pharmaceutical, automotive, and electronics.

Mr. Hineman is a Registered Professional Engineer (P.E.) in the states of Illinois and Wisconsin. He is a Certified Welding Inspector (C.W.I.) and member of ASM International, American Welding Society, American Society of Mechanical Engineers, and National Association of Corrosion Engineers. The results of his testing and analyses have been issued as oral, written, and audio/visual presentations.

Areas of Specialization

Metallurgical failure analysis
Testing to optimize materials, fabrication, or processing
Corrosion analysis
Fracture characterization/evaluation
Certified welding inspector
Aviation licensed SEL, IFR rated

Education

Bachelor of Science, Metallurgical Engineering, University of Illinois at Chicago, Chicago, Illinois, 1976

January 2024

Licensed Professional Engineer (P.E.)

State of Illinois ..... License No. 062-039657
State of Wisconsin ..... License No. E-40247

Professional Affiliations/Honors

ASM International

Member
Failure Analysis Committee, 2002 - Present
Treasurer, Chicago Region Chapter, 2005 - 2008

American Welding Society

Member, Certified Welding Inspector

American Society of Mechanical Engineers

Member

NACE International – The Corrosion Society

Member

Continuing Education

X-14: Imaging and Analysis with Variable Pressure or Environmental SEM

Completed coursework in conjunction with the Microscopy & Microanalysis Meeting, Microscopy of America, August 2012

Positions Held

Engineering Systems Inc., Aurora, Illinois

Senior Consultant, 1999 - present

Bodycote Taussig, Inc., Skokie, Illinois

Engineering Manager, 1998 – 1999

Taussig Associates, Inc., Skokie, Illinois

Senior Metallurgical Engineer, 1984 - 1998
Manager of Welding Technology, 1979 - 1984
Staff Engineer, 1976 - 1979

Presentations

“Tribological Performances, Issues & Utilization of Testing to Improve Functionality”
(M.A. Hineman, F.E. Schmidt, Jr.,) Presented at Materials Science & Technology (MS&T) 2017 Conference and Exhibition, Pittsburgh, PA, October 11, 2017

“Steel & Aluminum Fabrication & Design: Motorcycle Applications”
(F.E. Schmidt, Jr., M.A. Hineman, B.F. Schmidt) Presented at Failure Analysis Symposium, Materials Science & Technology (MS&T) 2014 Conference and Exhibition, Pittsburgh, PA, October 22, 2014

"Improper Materials Selection in Motorcycle Stud Bolt"
(F. E. Schmidt, Jr., M. A. Hineman, B. F. Schmidt) Presented at Microscopy & Microanalysis (M&M) 2014 Conference, Hartford, CT, August 6, 2014.

“Weldability of Historic 1920’s Chicago Steel Structural Column”
Presented at ASM Materials Science & Technology (MS&T) Conference, Montreal, QC, October 31, 2013.

“Failure Analysis and Prevention: Tools and Techniques for Failure Analysis”
Session Chair, ASM Materials Science & Technology, Montreal, QC, October 31, 2013.

"Metallurgical Failures and Their Relationship to NDT Practices"
Presented to American Society for Non-Destructive Testing (ASNT), Chicago Chapter, November 12, 2012

"Metallographic Analysis: Thread Damage in Iron Alloy Components"
(F. E. Schmidt, Jr., M. A. Hineman) Presented at ASM Materials Science & Technology, Pittsburgh, PA, October 9, 2012

"Why Do Welds Fail?"
(G. T. Davis, M. A. Hineman) Presented at International Boat Builder Exposition and Conference (IBEX), Louisville, KY, October 3, 2012

"Challenges in Polishing an Aluminum Specimen"
(M. J. Danko, M. A. Hineman F. E. Schmidt, Jr.) Presented at Microscopy & Microanalysis (M&M) 2012 Conference, Phoenix, AZ, August 1, 2012

"Adhesive Wear and Micro-Structural Damage in Re-Sulfurized Steels"
(F. E. Schmidt, Jr., M. A. Hineman, M. J. Danko) Presented at Microscopy & Microanalysis (M&M) 2012 Conference, Phoenix, AZ, July 31, 2012

"An Unusual Corrosion Condition in Welded Stainless Steel Pipes"
(M. A. Hineman, M. J. Danko, F. E. Schmidt, Jr.) Presented at Microscopy & Microanalysis (M&M) 2012 Conference, Phoenix, AZ, July 31, 2012

"Best Practices for Scanning Electron Microscopy and Energy Dispersive Spectroscopy in Forensic Examinations"
(M. A. Hineman, D. M. Norfleet, J. L. McDougall) Presented at Failure Analysis Symposium, Materials Science & Technology (MS&T) 2009 Conference and Exhibition, Pittsburgh, PA, October 27, 2009

"Nails and Rivets: Pre-Nineteenth Century Iron"
(F. E. Schmidt, Jr., M. A. Hineman) IMS Proceedings: Microscopy & MicroAnalysis, CD, Richmond, VA, July 2009

"Macro and Micro Mechanical Fibering Strengthening of Historic Phoenix Structural Irons Circa 1863" (M. A. Hineman, F. E. Schmidt, Jr.), Presented at MS&T Annual Conference, Pittsburgh, PA, September 2008

"Metallurgical Examination of Gear Failures"
Presentation to Davis and Company, Hilton Hotel, Lisle, IL, April 7, 2008

"Corrosion Coupon Measurements – Myth vs. Reality"
(M. A. Hineman, M. J. Danko) Presented at Failure Analysis Symposium, Materials Science & Technology (MS&T) 2007 Conference and Exhibition, Detroit, MI, September 19, 2007

"Examples of Marine Material Failures"
Presentation to Davis and Company, Skokie, IL, March 12, 2006

"Determining Material Behavior for Performance Verifications"
Verification of Simulation Data Workshop, Kenosha, WI, May 5, 1997

"Metallurgical Testing and Facilities Tour"
Metals in Historic Buildings: Investigation and Rehabilitation, Skokie, IL, September 30, 1997

"Boiler Tube Waterside Corrosion Mechanisms"
Recovery Boiler Corrosion Seminar, American Forest & Paper Association, Atlanta, GA, April 3, 1996

"Mechanical Testing of Welds"
ASM Chapter Meeting, Rockford, IL, March 26, 1991

Publications

"Examples of Stress Corrosion Cracking in Copper Piping for Heating and Cooling Systems" by **M. A. Hineman**, F. E. Schmidt, Jr., M. J. Danko, IMS Proceedings: Microscopy & MicroAnalysis, CD, Nashville, TN, July 2011

"Phoenix Historic Wrought Iron Structural Column Circa 1863: Mechanical Fibering" by F. E. Schmidt, Jr., **M. A. Hineman**, M. J. Danko, D. M. Norfleet, ASM MS & T Conference, Pittsburgh, PA, October 8, 2008

"Historic Wrought Iron Structural Column: Phoenix Iron Works Circa 1863"by T. T. Stoner, **M. A. Hineman**, M. J. Danko, F. E. Schmidt, Jr., Microscopy and Microanalysis Expo, August 5-9, 2007, Ft. Lauderdale, FL

"Zinc-Iron Reactions: A Metallographic Analysis "by M. J. Danko, K. L. Johnson, **M. A. Hineman**, F. E. Schmidt, Jr., Microscopy and Microanalysis Expo, August 5-9, 2007, Ft. Lauderdale, FL

"An Unusual Microstructure for a Carbon Steel Low Alloy Tube" by F. E. Schmidt, Jr., **M. A. Hineman**, M. J. Danko, Microscopy and Microanalysis Expo 2005, Honolulu, HI, August 1, 2005

Chapter 11, "Welding of Iron Castings," Iron Castings Engineering Handbook, 2003

"Stress Corrosion Cracking (SCC) in Copper Piping for Domestic/HVAC Heating and Cooling Systems", by **M.A. Hineman**, F.E. Schmidt, Jr., Practical Metallography, Volume 50, No. 4, April 2013