

Larry D. Hanke, P.E.

Metallurgical Engineer

Materials Evaluation and Engineering, Inc.
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SUMMARY

Metallurgical engineer with over 25 years of experience in failure analysis, materials characterization, product evaluation, and research and development. Expert in engineering evaluation of failures in metallic and nonmetallic materials by deformation, fracture, corrosion, and wear. Skilled with a wide variety of materials evaluation laboratory methods and instruments. Experienced as an expert witness for product-liability litigation.

EDUCATION AND PROFESSIONAL CERTIFICATIONS

Bachelor of Science, Metallurgical Engineering, 1978
Iowa State University, Ames, Iowa

Registered Professional Metallurgical Engineer (Licensed in Minnesota and California)

EXPERIENCE

December 1994 to Present

Materials Evaluation and Engineering, Inc.
Plymouth, MN
Principal Engineer

- Perform product failure analyses for a diverse industrial clientele and to support insurance investigations and product-liability litigation. Areas of expertise include fracture, deformation, wear, corrosion, and environmental degradation in metals and polymers.
- Perform materials engineering evaluations and materials characterization for new product development and product improvement projects for high-technology industrial clients.
- Design and perform specialized testing to evaluate product performance and simulate failure mechanisms.
- Provide expert witness testimony in the areas of materials science and failure analysis.

June 1991 to December 1994

Engel Metallurgical
St. Cloud, MN
Metallurgical Engineer

- Performed failure analysis for a wide variety of industrial and private clientele, including support for product-liability litigation.
- Consulted with industrial clients on materials selection and applications.
- Provided technical services to industry to solve materials-related manufacturing problems.
- Performed and directed materials evaluation testing, including microstructure evaluations, fractographic examinations, and physical and mechanical properties testing.

May 1986 to May 1991

Anamet Laboratories, Inc.
Hayward, CA
Senior Metallurgist

- Performed failure analyses for a wide range of engineering systems and consumer products, encompassing structural, corrosion, and tribological failures.
- Served as an expert witness in metallurgy and failure analysis for product-liability litigation.
- Principal investigator for a research project to design a new, computerized system for quantitative evaluation of surface defects in rolling-element bearings.
- Assisted in research projects investigating the use of fractals to predict soil properties and evaluating fracture propagation in engineered structural polymers.
- Developed equipment and techniques for specialized mechanical and corrosion testing for material and product evaluations.
- Directed and performed routine material tests based on ASTM, ASME, Federal, Military, and other industry standards and specifications.

August 1978 to May 1986

Anamet Laboratories, Inc.
Berkeley, CA
Metallurgist

- Conducted failure analyses for industrial clients and to support product-liability litigation.
- Performed routine materials testing, materials characterization analyses, and specialized product evaluations.
- Provided metallurgical consulting on materials and process selections for a wide variety of industrial clients.
- Participated in research projects related to the development of new, improved tool steel alloys.

August 1992 to May 1993

St. Cloud State University
St. Cloud, MN
Adjunct Professor

- Taught introductory materials engineering course to undergraduate students in Manufacturing Engineering. Materials covered included: metals, polymers, and ceramics.
- Developed and taught laboratory course accompanying undergraduate materials engineering course.

PROFESSIONAL AFFILIATIONS

- ASM International Member
 - Golden Gate Chapter Chairman 1991 - 91
 - Minnesota ASM Chapter Chairman 2000 - 01
- ASM International Handbook Committee Member
 - Vice Chairman 2004 - 2006
- ASM International Failure Analysis Committee Member
- National Society of Professional Engineers Member
- National Association of Corrosion Engineers Member
- Society of Plastics Engineers Member
- Minnesota Microscopy Society Member
- Iowa State University Materials Engineering Industrial Advisory Committee 1999-2005

PUBLICATIONS

- Hanke, Larry D., "Variable Pressure Scanning Electron Microscopy for Nonconductive and Volatile Samples," *Microscopy Today*, Issue 95-9, November 1995, Pages 20-21
- Hanke, Larry D. and Smith, Gary, "Electron Microscopy of Ni-Ti Alloys for Medical Devices," *Microscopy and Microanalysis* 96, 1996
- Hanke, Larry D. and Schenk, Kurt, "Sputter Etching for Microstructure Evaluation of Small Diameter Corrosion Resistant MP35N Wire," *Microscopy and Microanalysis* 96, 1996
- Hanke, Larry D. and Smith, Gary, "Electron Microscopy Ni-Ti Alloys for Medical Devices," *American Laboratories*, June 1997
- Rodnyansky, A., Warburton, Y. J., Hanke, L. D., "Segregation in Hot-dipped Galvanized Steel", *Surface and Interface Analysis*, 29, 215-220, March 2000
- Chumbly, L. S., Hanke, L. D., "Scanning Electron Microscopy", *ASM Handbook Volume 11 Failure Analysis and Prevention*, 516-526, 2002
- Hanke, L and Bayha, E., "Surface Characterization for Optimizing Electropolishing for Medical Devices," *Medical Device Materials - Proceedings of the Materials and Processes for Medical Devices Conference*, 81-86, 2004

TECHNICAL PRESENTATIONS AND CONFERENCE ORGANIZATION

NACE Western Regional Conference, 1985, Corrosion Failure Analysis

Golden Gate Materials Technology Conference, 1987, Corrosion Failure Analysis

San Francisco Chapter of STLE, 1988, Analysis Techniques for Wear and Lubrication Failures

San Francisco Chapter of STLE, 1990, Metallurgical Expert for Expert Roundtable on Wear and Lubrication

Golden Gate Materials Technology Conference, 1991, Member of Organizing Committee

Central Minnesota Chapter of SME, 1991, Introduction to Microstructures and Metallographic Examination Methods

Central Iowa ASM Chapter, 1994, Failure Analysis and Engineering Ethics

Minneapolis Chapter of SME, 1995, Failure Analysis as a Quality Tool

Surfaces for Biomaterials, International Conference, 1995, Variable Pressure SEM for Nonconductive and Volatile Samples

MN ASM Annual Seminar, 1996, Failure Analysis - Failure Mechanisms and Analytical Methods

Microscopy and Microanalysis 96, 1996, Local Arrangements Committee Member

Duluth Adjusters Conference, 1996, Failure Analysis for Loss Subrogation

Katz Analytical Materials Analysis Seminar, 1996, Fundamentals of Scanning Electron Microscopy and Energy Dispersive X-ray Spectroscopy

MN ASM Annual Seminar, 1997, Failure Analysis of Machine Components

Minnesota Microscopy Society, 1997, Forensic Microscopy in Material Science

Golden Gate ASM Monterey Conference, 1998, A Primer in Failure Analysis Methodology

ASM Materials Solutions Conference, 2000, Variable Pressure Scanning Electron Microscopy

ASM Materials Solutions Conference, 2000, Technical Session Chair for Failure Analysis Symposium, Failure Analysis Tools Session

Inter/Micro 2001 Chicago Regional Conference, Variable Pressure SEM for Failure Analysis

MN ASM Annual Seminar, 2001, Electron Beam Analysis Methods for Failure Prevention

ASM Materials Solutions Conference, 2001, Bearing Failure Analysis

MN Chapter of AESF, 2002, Laboratory Characterization Methods for Coatings

AmCon Conference, 2002, Analytical Methods for Evaluation of Materials

Invited Lecture for Guidant Corporation Cardiac Division, 2003, A Primer in Fractography

ASM Materials and Processes for Medical Devices, 2003, Surface Characterization for Optimizing Electropolishing Processes for Medical Devices

ASM Materials Solutions Conference, 2003, Technical Session Chair in Failure Analysis Symposium, Corrosion Failures Session

Aspen Research Corporate Seminar, 2004, Failure Analysis of Structural Plastic Components

ASM Materials Solutions Conference, 2004, Environmental Stress Cracking of Structural Polymers

Central Michigan ASM Chapter, 2004, Plastic Failure Analysis

MN ASM Annual Seminar, 2005, Environmental Stress Cracking of Structural Polymers

Material Science and Technology Conference, 2005, Technical Session Chair in Failure Analysis Symposium, Historical Failures Session