Larry D. Hanke, P.E.

Metallurgical Engineer

Materials Evaluation and Engineering, Inc.
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SUMMARY

Metallurgical engineer with over 35 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 and Materials Engineer (Licensed in California, Minnesota, South Dakota, and Wisconsin)

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.

- Assist high-technology industrial clients with materials selection and processing optimization.

- 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.

AWARDS AND RECOGNITION

- Fellow of ASM International 2010

COMMUNITY ACTIVITIES

- YMCA of the Greater Twin Cities - Ridgedale Community Board Member 2017 - present
- University of Minnesota, Materials Science Industrial Advisor 2014 - present
- Minnesota ASM Materials Camp Mentor 2007 - present
- Iowa State University, MSE Industrial Advisory Council 1999 - 2005

PROFESSIONAL AFFILIATIONS

- ASM International Member 1975 - present
  - Golden Gate Chapter Chairman 1990 - 91
  - Minnesota ASM Chapter Chairman 2000 - 01

- ASM International Board of Trustees 2016 - present

- ASM International Failure Analysis Society Member 2016 - present
  - Awards Committee Chair - 2016 - 2017
  - Liaison to Society Board - 2016 - present

- ASM International Handbook Committee Member 1996 - 2013
  - Vice Chairman 2004 - 2006
  - Chairman 2006 - 2008

- ASM International Failure Analysis Committee Member 1998 - 2013
  - Secretary 2009 - 2010
  - Vice Chairman 2010 - 2011
  - Chairman 2011 - 2012

- ASM International Technical Books Committee Member 2009 - present

- Minnesota Microscopy Society Member 1996 - present
  - Vice Chairman 2012 - 2013
  - Chairman 2013 - 2014

- International Organization on Shape Memory and Superelastic Technologies Member

- International Metallographic Society Member

- ASTM International Member
  - Member ASTM Committees on Forensic Sciences and Forensic Engineering

- American Welding Society Member

- National Association of Corrosion Engineers Member

- Society of Plastics Engineers Member

PUBLICATIONS

BOOKS

- Hanke, Larry D., "Wear Failures - Fatigue," *Understanding How Components Fail,* Third Edition, Edited by Brett Miller, ASM International, pp 189 - 209, 2013 (Chapter reviewed and revised from *Understanding How Components Fail,*" Second Edition by Donald Wulpi, 1999)

- Hanke, Larry D., "Surface Characterization for Medical Devices", *ASM Handbook Volume23 - Materials for Medical Devices*, pp 331-342, 2012

- Chumbley, L. S., Hanke, L. D., "Scanning Electron Microscopy", *ASM Handbook Volume11 - Failure Analysis and Prevention*, 516-526, 2002

PROCEEDINGS AND JOURNALS

- 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

- 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

- Hanke, L and Schenk, K., Characterization of Secondary Phases in Nitinol," *Proceedings of the International Conference on Shape Memory and Superelastic Technologies,* 164-165, 2010

- Haase, Ryan J. and Hanke, Larry D., "Boiler Stack Economizer Tube Failure," *Journal of Failure Analysis and Prevention,* Volume 13, Issue 5 (2013), pp 513-520

- Hanke, L. D., Schenk, K. H., and Scholz, D. R., "Broad Beam Ion Milling for Microstructure Characterization," *Materials Performance and Characterization*, Online: October 2016, https://doi.org/10.1520/MPC20160049, ISSN 2165-3992.

- Haase, Ryan J. and Hanke, Larry D., "Alkaline Carbonate SCC Failures at a Refinery," *Journal of Failure Analysis and Prevention,* 2018, https://doi.org/10.1007/s11668-018-0391-y