

Curriculum Vitae

David V. Niebuhr, Ph.D., P.E.

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Academic Preparation

- Ph.D. Materials Science and Engineering, 1997
Oregon Graduate Institute of Science and Technology, Portland, Oregon
Concentrations: Tribology (Wear) and Materials Characterization
Dissertation: Self-Lubricating Composite Plasma Sprayed Coatings
Advisor: Dr. Paul Clayton (deceased)
- B.S. Materials Engineering, 1993
California Polytechnic State University, San Luis Obispo, California
Senior Project: Hydride Kinetics in Zirconium lined, Zircaloy™ (UO₂) Fuel Rods

Licensed Professional Engineer (Metallurgical), State of California. License # 1957

Professional Experience

- President, Niebuhr Metallurgical Consulting, 2005 – Present
San Luis Obispo, California
- Industrial consultant for metallurgy, materials degradation and failure analysis
 - Projects range from simple mechanical property evaluation to complex multi-component failures
 - Expert Witness Testimony in both civil and criminal court
- Lecturer, Physics & Chemistry Department, 2007 – Present
California Polytechnic State University, San Luis Obispo, California
- Responsible for teaching 120 and 130 series lecture and laboratory in Physics
 - Responsible for teaching 100 level chemistry laboratories
- Professor of Materials Engineering, 1999- 2006
Materials Engineering Department
California Polytechnic State University, San Luis Obispo, California
- Developed and taught >12 courses at undergraduate and graduate level, including numerous laboratories
 - Research focus in Tribology, Failure Analysis and Metallurgy

Visiting Scholar, (ASEE Summer Faculty Fellowship Program), Summer 2003

Jet Propulsion Laboratory (California Institute of Technology), Pasadena, California

- Research project to characterize CdSe Quantum Dots (QD) utilizing Atomic Force Microscopy (AFM)
 - Analysis of shape and morphology as a function of QD synthesis parameters
 - Measurement of photoluminescence
- Analysis and characterization of TiC coating with AFM

Visiting Scholar, (ASEE Summer Faculty Fellowship Program), Summer 2002

Jet Propulsion Laboratory (California Institute of Technology), Pasadena, California

- Research project to evaluate wear and friction in low pressure CO₂ environments
- Atomic Force Microscopy project investigating friction in several inert atmospheres as compared to ambient conditions.

Tribologist / Materials Engineer, HDB (fluid bearing) Team, 1997-1999

Quantum Corporation, Milpitas, CA,

- Materials / wear consultant responsible for testing, reporting, and recommending new materials for a wide variety of cross-departmental projects
- Wear consultant to vendors, managers, and drive engineers for new materials / coatings for disk drive hydrodynamic bearing (HDB) spindle motors on three drive programs
- Purchased \$100k materials analysis lab which streamlined HDB wear evaluation
- Trained technicians which increased productivity by 400%
- Assignment in Japan to solve critical solder failures which directly affected multi-million dollar mass production program

Ph.D. Candidate, 1993-1997

Oregon Graduate Institute of Science and Technology, Portland, Oregon,

Association of American Railroads (Sponsor), Portland, Oregon

Metallic Coating development for Rails

- Designed repeatability experiments to be performed by technicians
- Researched wear and tribological behavior of metal and polymer coatings
- Developed and tested self-lubricating surface coatings for extreme wear applications
- Implemented new coating analysis procedure using SEM, EDX, and optical image analysis

Undergraduate Research Student, Summer 1992

General Electric Nuclear Energy, Pleasanton, California

Project: The Effect of Zirconium Hydride on the Corrosion of Zircaloy™ Fuel Rods

- Performed corrosion experiment of Zircaloy™ fuel rods utilizing input from team
- Conceived and executed minor element diffusion experiment

Technical Publications

Niebuhr, D., "Friction and wear behavior of engineering alloys in a simulated martian (CO₂) environment, a preliminary study," 16th International Conference on Wear of Materials, Volume 263, Issues 1-6, 10 September 2007, pp. 88-92.

Niebuhr, D. "Cavitation erosion behavior of ceramics in aqueous solutions," 16th International Conference on Wear of Materials, Volume 263, Issues 1-6, 10 September 2007, pp. 295-300.

Niebuhr, D. "Metallurgical Failure Analysis of a Horse Trailer: A Criminal Investigation," *Journal of Failure Analysis and Prevention*, Volume 6(4), August 2006. pp. 25-30.

Niebuhr, D. and M. Scholl, "Performance of Steel / Polymer Plasma Sprayed Coatings," *Journal of Thermal Spray Technology*, ASM International. Vol. 14 (4), December 2005. pp. 1-7.

Niebuhr, D. "Teaching Failure Analysis as an Independent Design Experience," *Proceedings of the ASEE Annual Conference*, Portland, OR, 2005.

Niebuhr, D., "Abrasive Wear as a Function of Microstructure in Metals," *Proceedings of the 19th Annual National Educators Workshop*, October 2004.

Niebuhr, D., "Cavitation / Erosion Wear as a Function of Microstructure in Metals," *Proceedings of the 19th Annual National Educators Workshop*, October 2004.

Niebuhr, D. and W.D. Forgeng, "Age Hardening of Aluminum Alloys," *Proceedings of the 19th Annual National Educators Workshop*, October 2004.

Niebuhr, D., Smith H., "Integrated Laboratories vs. Traditional Laboratories, Is there a difference?" *Proceedings of the ASEE Annual Conference*, Salt Lake City, CA, 2004.

Niebuhr, D. "Discovering the Source of Properties in Alloys: Metallographic Examination," *17th Annual National Educators Workshop*. 2002.

Li, M., Niebuhr, D., Atteridge, D., and Mekeesho, L. "A Computational Model for the Prediction of Steel Hardenability," *Metallurgical and Materials Transactions*, Vol. 29B. No. 3, June 1998.

Niebuhr, D., Scholl, M., and Clayton P. "Self-Lubricating Composite Plasma Sprayed Coatings," *Proceedings from the 9th National Thermal Spray Conference*, ASM International, 1996.

Li, M., Niebuhr, D., Atteridge, D., and Mekeesho, L. "Computing Jominy Hardness Curves of Steels," *Proceedings of the International Symposium on Phase Transformations during the Thermal/Mechanical Processing of Steel*, CIM, Montreal, 1995

Technical Presentations

"Teaching Failure Analysis as an Independent Design Experience," American Society of Engineering Education Annual Conference, Portland, Oregon, 6/05.

“Materials Engineering Challenges of Research and Teaching in a Changing Field,” Mechanical Engineering Dept., *Invited Speaker*, Portland State University, Portland, Oregon, 2/05.

“Materials Engineering Challenges in Extraterrestrial Exploration Mars, Venus and Beyond,” Softec Monthly Meeting, *Invited Speaker*, Arroyo Grande, California, 1/05.

“Wear of Materials on Earth, Mars and other Hostile Environments,” ASM Student Chapter, *Invited Speaker*, California State Polytechnic University, Pomona, California, 11/04.

“Integrated Laboratories vs. Traditional Laboratories, Is there a difference?” American Society of Engineering Education Annual Conference, Salt Lake City, Utah, 6/04.

“Discovering the Source of Properties in Alloys: Metallographic Examination,” 17th Annual National Educators Workshop, San Jose, California, 10/02.

“I3-Increasing Industry Interaction,” American Society of Engineering Education Annual Conference, Albuquerque, New Mexico, 6/01.

“Tribology 101, Teaching Wear to Undergraduates,” American Society of Engineering Education Annual Conference, Albuquerque, New Mexico, 6/01.

“Disk Drive Manufacture in the International Market,” International Business Management Class, University of Phoenix, San Jose, California, 1998.

“Tribology of Wheel /Rail Contacts,” Tribology Seminar, Quantum Corporation, 1998.

“Lubrication and Wear in the Hydrodynamic Bearing,” Quarterly Technology Review, Quantum Corporation, Milpitas, California, 1998.

“Solderability and Characterization of FBC Connectors,” Quarterly Technology Review, Quantum Corporation, Milpitas, California, 1998.

“Self-Lubricating Composite Plasma Sprayed Coatings,” 9th National Thermal Spray Conference, Cincinnati, Ohio, 1996.

“Development of a Steel Coating Deposited by High Energy Plasma Spraying with Wire Feedstock,” 9th National Thermal Spray Conference, Cincinnati, Ohio, 1996.

“Fundamental Energy Dispersive Spectroscopy (EDS),” OGI Technical Seminar, Oregon Graduate Institute of Science & Technology, Portland, Oregon, 1996.

Selected Consulting Projects

Litigation / Expert Witness

Adamski, Moroski, Madden & Green LLP, San Luis Obispo, CA

- Evaluation and determination of root cause failure for above ground storage tank (AST). Emphasis on corrosion, metal failure and fluid flow through concrete /soil. Analysis included

metallography, corrosion kinetics and environmental evidence of gasoline, simulated testing was also done to repeat alleged failure conditions.

- Represented Defense. Ruling in favor of defense, case appealed by plaintiff

Martin Jacobson, Attorney at Law, Los Angeles, CA

- Determination of probable failure mode of small aircraft landing gear following crash during landing. Emphasis on heat treating/thermal history affect on mechanical properties
- Represented Plaintiff. Settled out of court

Robert Gundert, Attorney at Law, San Luis Obispo, CA

- Evaluation of corrosion of recreational vehicle (mechanical structure, drive train). Emphasis on corrosion rates and environment
- Represented Plaintiff. Settled out of court

Hogan, Holmes & Usoz, LLP, Attorneys at Law, San Jose, CA

- Evaluation of ATV handlebar corrosion failure resulting in injury. Emphasis on crevice corrosion, fracture mechanics and mechanical behavior
- Represented Plaintiff. Settled out of court

District Attorney, County of San Luis Obispo, CA

- Evaluation of hinge failure in horse trailer which resulted in 3 deaths (felony vehicular homicide). Emphasis on corrosion, fracture mechanics, vehicle dynamics and materials characterization (SEM / EDS)
- Represented District Attorney, Hung jury, 2nd trial avoided by plea agreement

Additional Metallurgical Expert, (partial listing of 100 + projects, company names omitted for confidentiality)

- Tribological analysis of Silver-Cadmium alloy brush contacts
- Corrosion testing / failure analysis of residential water pipe
- 52100 steel bearing failure analysis used in heavy machinery (several projects in this area)
- Fatigue cracking investigation of aluminum alloy for high performance off road vehicles
- Weld procedure development for ASTM Grade 70-40 steel valve used in a hydroelectric plant
- Failure Analysis of brazed copper and stainless steel cracking
- Failure analysis of a corroded stainless steel rod
- Failure analysis of aluminum bronze / carbon steel weld
- Mechanical testing and analysis of ceramic bearing materials
- Analysis of failed hydrodynamic bearing used in a natural gas engine
- Lubricant evaluation for hydrodynamic spiral groove bearings
- Wear evaluation of cauterizing device used in heart by-pass surgery
- Corrosion fatigue analysis of lawn edger blade support shaft
- High voltage copper wire failure analysis
- Failure analysis of bearing seizure due to lubrication starvation and rolling contact fatigue
- Failure analysis of corroded & leaking crude oil tank
- Analysis of corroded air conditioner to assess product liability between manufacturer and supplier

- Design of marketing display for large automotive manufacturer, display demonstrated strength of hollow steel tubes used in their truck
- Evaluation of validity of claims of an advertisement for rifle suppressors
- Corrosion assessment / materials design of medical device used for external muscle therapy
- Failure analysis of motorcycle brake caliper

Professional Affiliations

American Society of Metals (ASM)

National Association of Corrosion Engineers (NACE)

Professional Service

National Science Foundation Proposal Panel Reviewer

Metallurgical and Materials Transactions Reviewer

Materials Science A Reviewer

American Society of Engineering Education Proceedings Reviewer

Honors and Awards

ASEE Summer Faculty Fellowship Program 2003

ASEE Summer Faculty Fellowship Program 2002

National Eagle Scout Association Life Member