Exponent®
Engineering & Scientific Consulting

Joe Lemberg, Ph.D., P.E.

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Professional Profile

Dr. Lemberg is a licensed Metallurgical Engineer specializing in failure analysis, fracture mechanics, metallurgy, and materials science engineering with a particular emphasis on understanding the fracture behavior of materials.

Over the past 12 years at Exponent he has consulted on fractures, corrosion, and other metallurgical failures of a variety of large structures, including gas, water, and other chemical pipelines, storage tanks, heavy equipment, rail tank cars, building glazing systems, and on-road & off-road vehicles. On a smaller physical scale, Dr. Lemberg has consulted on brass systems for potable water, glass cookware and drinkware, fire sprinklers, medical devices, other consumer products, as well as various other materials issues.

Dr. Lemberg has experience diagnosing failures in both ferrous and non-ferrous metal systems, ceramics, glasses and polymeric materials. He has expertise in mechanical testing, especially in the area of crack-growth resistance testing, as well as optical and electron microscopy, metallography, and fractography.

Prior to joining Exponent, Dr. Lemberg was a graduate research assistant at the University of California, Berkeley, where he studied the fracture behavior of Mo-Si-B alloys at ambient and ultra-high (1300 °C) temperatures, the fracture behavior of carbon-nanotube-impregnated, Nb-toughened nanocrystalline alumina, and the fracture behavior of alumina/silicon nitride functionally-graded joints at elevated temperatures. Dr. Lemberg also has experience studying the fatigue properties of tree-resistant cross-linked polyethylene insulation of underground power distribution cables.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of California, Berkeley, 2011

M.S., Materials Science and Engineering, University of California, Berkeley, 2009

B.S., Materials Science and Engineering, Cornell University, 2005

National Defense Science and Engineering Graduate Fellow, 2006-2009

Licenses and Certifications

Professional Engineer, Alabama, #34215

Professional Engineer Metallurgical, California, #1974

Professional Engineer, Georgia, #PE039760

Professional Engineer, Louisiana, #47019

Professional Engineer, New York, #98605

Professional Engineer, North Carolina, #41149

Professional Engineer Metallurgical, Texas, #122823

Certified Corrosion and Materials Professional (API 571)

Transportation Safety Institute, Transit Rail Incident Investigation Certificate

Transportation Workers Identification Card (TWIC)

Professional Affiliations

ASM

Failure Analysis Society – Secretary (2023 – 2024)

Tau Beta Pi

Publications

Lemberg, J, Guyer, E, Seidel, S, Garry, M, Tsuji, J, Valenty, S. Utilizing a combination of TGA and GC-MS to estimate health-based risks from off-gassed volatile compounds. Journal of Failure Analysis and Prevention 2018; 18(2): 246-249.

Lemberg JA, Ellis BD, Guyer EP. Failure of a trunnion axle on a hard suspension multi-axle trailer. Journal of Failure Analysis and Prevention 2017; 17(2): 189-194.

Ames N, Lemberg J, Caligiuri R. Fatigue failure of a 2500-ton forge press. Journal of Failure Analysis and Prevention 2017; 17(1): 15-22.

Guyer E, Lemberg, J. Things break… the hard part is figuring out why! The NCADA Resource, 2015.

Lemberg JA, Ritchie RO. Mo-Si-B alloys for ultrahigh-temperature structural applications. Advanced Materials 2012; 24(26):3445-3480.

Wang Z, Marcolongo P, Lemberg JA, Panganiban B, Evans JW, Ritchie RO, Wright PK. Mechanical fatigue as a mechanism of water tree propagation in TR-XLPE. IEEE Transactions on Dielectrics and Electrical Insulation 2012; 19(1):321-330.

Lemberg JA, Middlemas MR, Weingärtner T, Gludovatz B, Cochran JK, Ritchie RO. On the fracture toughness of fine-grained Mo-3Si-1B (wt.%) alloys at ambient to elevated (1300 °C) temperatures. Intermetallics 2012; 20(1):141-154.

Lee CS, Lemberg JA, Cho DG, Roh JY, Ritchie, RO. Mechanical properties of Si3N4-Al2O3 FGM joints with 15 layers for high-temperature applications. Journal of the European Ceramic Society 2010; 30:1743-1749.

Thomson KE, Jiang D, Lemberg JA, Koester KJ, Ritchie, RO Mukherjee AK. In-situ bend testing of niobium-reinforced alumina nanocomposites with and without single-walled nanotubes. Materials Science

and Engineering A 2008; 493:256-260.

Presentations

Lemberg, J., Budiansky, N., Colella, F., Caligiuri, R., Corrosion of Newly Commissioned Stainless Steel Beer Fermentation and Aging Vessels. IMAT 2023, Detroit, MI, 2023

Stewart, J., Lemberg, J., Semenikhin, N., Failure Analysis and Fractography of a Failed Repair Weld on a Trailer Axle. IMAT 2023, Detroit, MI, 2023.

Porter, T., Lemberg, J., Guyer, E., Fall-Prevention Device Shoulder Bolt Failure. IMAT 2023, Detroit, MI, 2023.

Moyer, L., Flury, M., Keeble, M., Lemberg, J., Lucas, G., Akyuz, B., Dennies, D. (moderator). Panel Session: Metallographic Techniques in Failure Analysis, IMAT 2023, Detroit, MI, 2023.

Issahaq MN, Strayer AR, Brooke PD, Lemberg JA, Guyer EP. Muzzleloader Failure Analysis. 15th International Conference on Fracture, Atlanta, Georgia, 2023.

Brooke, P., Lemberg, J., Fecke, M., Guyer, E., Metallurgical Case Studies of Early-in-Life Failures in Three Watertube Boilers, IMAT 2022, New Orleans, LA, 2022

Lemberg, J., Schwartz, J., MacLean, S. Failure of Underground ABS Dry Compressed Air Piping, MS&T 2019, Portland, OR, 2019.

Lemberg, J, Guyer, E, Seidel, S, Garry, M, Tsuji, J, Valenty, S. Utilizing a combination of TGA and GC-MS to estimate health-based risks from off-gassed volatile compounds. MS&T 2018, Columbus, OH, 2018.

Lemberg, JA, Guyer, EP. Failure of a trunnion axle on a hard suspension multi-axle trailer. MS&T 2016. Salt Lake City, UT, 2016.

Lemberg JA, Ames N, Caligiuri R. Fatigue failure of a 2500-ton forge press. MS&T 2015, Columbus, OH, 2015.

Lemberg JA, Gibbs J, Birringer R, James B, Eiselstein L. Fire cracking of lead-free brasses for use in water, oil and gas applications. MS&T 2014, Pittsburgh, PA, 2014.

Lemberg JA, Guyer EP, Eiselstein LE. Possible microbiologically-induced corrosion (MIC) of stainless steel weld used in domestic water risers. MS&T 2014, Pittsburgh, PA, 2014.

Lemberg JA, Middlemas MR, Cochran JK, Ritchie RO. Fracture behavior of Mo-Si-B alloys at elevated temperatures in air and inert atmospheres. TMS 2011 140th Annual Meeting and Exposition, San Diego, CA, 2011.

Lemberg JA, Ritchie RO. Fracture toughness of Mo-Si-B alloys at ambient and elevated temperatures. 12th International Conference on Fracture, Ottawa, Canada, 2009.