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Engineering & Scientific Consulting

Lee Swanger, Ph.D., P.E.

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Professional Profile

Dr. Swanger is a Principal Engineer in Exponent's Miami, Florida, office. His consulting work centers on the application of the principles of mechanical engineering, metallurgical and materials engineering, thermodynamics, and design engineering to issues related to incidents involving performance of engineered products and systems, accident reconstruction, and failure or fracture of system components.

Dr. Swanger also consults on issues of patent infringement and patent validity in the mechanical and materials arts. More specifically, Dr. Swanger’s experience includes the analysis of machinery dynamics and kinetics as exemplified by internal combustion engines of both piston and turbine configuration, as well as related compressor designs. His materials and metallurgical experience includes alloy applications, heat treatment, electrochemistry and corrosion, welding and brazing, and materials testing. He applies his combined expertise in both mechanical engineering and materials/metallurgical engineering to issues of fatigue and fracture, and mechanical joining via threaded fasteners.

Applications of these disciplines include systems in nuclear and fossil power plants, components of transportation systems on land, sea, and air, industrial manufacturing processes, components of commercial and residential buildings, materials used in the petroleum and chemical industries, machinery and processes for vapor degreasing and dry cleaning, and consumer products including sports equipment and kitchen appliances.

Dr. Swanger has a particular interest in engine design and performance, with an emphasis on combustion, operational stresses, lubrication and bearing design and performance. He received a U.S. Patent for his engine bearing material and fabrication process.

Academic Credentials & Professional Honors

M.B.A., Marketing/Finance, Cleveland State University, 1982

Ph.D., Materials Science and Engineering, Stanford University, 1972

M.S., Materials Science and Engineering, Stanford University, 1969

B.S., Metallurgy, Case Institute of Technology, 1968

Hertz Foundation Graduate Fellowship, 1970-1972

Member, Board of Directors of the Fannie and John Hertz Foundation

Licenses and Certifications

Professional Engineer, Alabama, #29848

Professional Engineer Mechanical, California, #23275

Professional Engineer, Florida, #37207

Professional Engineer, Georgia, #PE036205

Professional Engineer Metallurgical, Louisiana, #PE.0034064

Professional Engineer, Mississippi, #25349

Professional Engineer, New York, #93691

Professional Engineer, Ohio, #PE.44024

Professional Engineer, Virginia, #402015492

Professional Engineer Mechanical, Wyoming, #PE 11899

Prior Experience

Adjunct Professor, Mechanical Engineering Department, University of Miami, 1999-2008

Director of Research and Development, Engine Parts Division, Imperial Clevite, 1979-1983

Lecturer, Mechanical Engineering Department, Cleveland State University, 1978-1982

Project Manager, Gould Labs for Materials Research, Gould Inc., 1975-1979

Associate Sr. Research Metallurgist, General Motors Research Labs, 1973-1975

Visiting Research Associate – Corrosion, The Ohio State University, 1972-1973

Patents

Patent 4,333,215: Bearing Material and Method of Making, issued June 8, 1982.

Publications

Rogers G, Swanger L, Wells C. The Role of testing programs in verifying structural integrity of medium speed diesel generator components. Institute for Electrical and Electronics Engineers Transaction on Nuclear Science 1985; NS-32(1), February.

Swanger L. Inhomogeneous thermodynamics and spinodal decomposition. Ph.D. Dissertation, Stanford University, August 1972.

Swanger L, Rhines W. On the necessary conditions for homogeneous nucleation of gas bubbles in liquids. Journal of Crystal Growth 1972; 12:323-326.

Barnett D, Swanger L. The elastic energy of a straight dislocation in an infinite anistropic elastic medium. Physica Status Solidi (B) 1971; 48:419-428, 1971.

Swanger L, Cooper A, Gupta P. Computer simulation of one-dimensional spinodal decomposition. Acta

Metallurgica 1970; 18:9-14.

Presentations

Russell, T., Brooke, P., Swanger, L. Identifying Facts from Failure in Forensic Bearing Investigations. 2025 STLE Annual Meeting, Atlanta ,GA May 20, 2025.

Swanger L. Expert witnesses in patent infringement litigation. Presented to Cleveland Ad-Hoc Patent Litigators Council, Cleveland, OH, December 2004.

Swanger L. Early assessment of product liability claims, the role of the engineering consultant. Presented to TriMas Litigation Conference, Detroit, MI, June 2002.

Swanger L. How to solve your bearings' problems. Presented at Joint Emergency Diesel Generator Owners Group Conference, Chicago, IL, June 1997.

Swanger L, Vogler M, Rau S. Investigation of the reliability of solid aluminum main bearings in emergency diesel generators. 9th International Conference on Structural Mechanics in Reactor Technology, Volume D, Lausanne, Switzerland, August 1987.

Johnston P, Shusto L, Swanger L. Analysis of diesel engine crankshaft torsional vibrations. 9th International Conference on Structural Mechanics in Reactor Technology, Volume D, Lausanne, Switzerland, August 1987.

Swanger L. Advanced techniques of accident investigation. Presented at Occupational Safety and Health Administration Training Institute, Des Plaines, IL, March, June, and September 1986.

Swanger L, Harris D, Johnston P, Derbalian G. Advanced methods for diesel component life prediction. Society for Automotive Engineers Paper 860885, Marine Propulsion Technology Conference, Washington, DC, May 1986.

McCarthy R, McCarthy G, Swanger L. Reliability and service life of steel truck wheels. Annual Reliability and Maintainability Symposium, Las Vegas, NV, January 1986.

Rogers G, Wells C, Swanger L. Design analysis of emergency diesel generator components to establish reliability under operating conditions. 8th International Conference on Structural Mechanics in Reactor Technology, Brussels, Belgium, August 1985.

Swanger L. Bearing materials update. Presented to Society of Automotive Engineers Off-Highway Conference, Milwaukee, WI, September 1981.

Swanger L. Developments in bearings and pistons. Presented at O Motor no Futuro (The Engine of the Future), Sao Paulo, Brazil, September 1980.

Swanger L. Selection of crankshaft materials for optimum bearing performance. Presented to Society of Manufacturing Engineers Conference, CM80-392, Los Angeles, CA, June 1980.

Swanger L. Heavy duty bearings: Materials and process. Presented at Carnegie-Mellon University, Pittsburgh, PA, March 1980.