



THOMAS F. CONRY, Ph.D., P.E.

Mechanical Engineer

CURRENT EMPLOYMENT

Ruhl Forensic, Inc., since 1979.

Consultant on mechanical systems design and analysis, vibration, tribology (friction, lubrication and wear), machine dynamics, component failure, etc.

PREVIOUS EMPLOYMENT

<u>University of Illinois</u> , Urbana- Champaign, Illinois	1971 – 2006
Professor Emeritus of Industrial and Enterprise Systems Engineering	2006 - Present
Professor Dept. of Industrial and Enterprise Systems Engineering (formerly known as the Dept. of General Engineering)	1981 – 2006
Department Head Dept. of General Engineering	1987 – 1998
Sabbatical – Caterpillar Research Labs	1998 – 1999
Co-Director Program in Technology and Management	1995 – 1998
Co-Director Manufacturing Engineering Program	1986 – 1989
Associate Professor	1975 – 1981
Sabbatical – University of Cambridge, England	1978
Assistant Professor	1971 – 1975
<u>Caterpillar, Inc.</u> , Peoria, Illinois Staff Consultant	Summer, 1999
<u>Sargent & Lundy, Engineers</u> , Chicago, Illinois Staff Consultant	Summer, 1979 Summer, 1977
<u>NASA/Lewis Research Center</u> , Cleveland, Ohio Summer Faculty Fellow	Summer, 1975 Summer, 1974

General Motors Corporation, Detroit Diesel Allison Division, Indianapolis, IN, 1969 – 1971

Research Engineer. Conducted research on turborotor dynamics for small, very high-speed gas turbine engines. Designed and built a rig to test the feasibility of using fluid film bearings in small, high-speed turborotor systems, using transmission fluid as the lubricant. Issues of power loss and stability had to be addressed. Investigated the feasibility of bearing systems for automotive applications and methods for designing rotors to operate in the supercritical range.

General Motors Corporation, Delco Electronics Division, Milwaukee, WI, 1963 –1966

Mechanical Design Engineer. Worked on the mechanical design of inertial-navigation missile guidance equipment for the Titan II and Titan III missile systems. Planned and directed vibration-testing programs to obtain confirmation of models that I had developed to support product modification of the gimbal system in the inertial measurement unit. Involved in the mechanical design of a prototype gyro-stabilized optical sight-head for a prototype main battle tank for the European Theater.

Developed the specifications and coordinated with the bearing manufacturer to obtain a very high-precision instrument bearing to support an optical sight tube (similar to a periscope). Developed the assembly procedure to install the bearings on the sight tube.

EDUCATION

Ph.D., 1970	University of Wisconsin - Madison
Major field:	Mechanical Engineering
Ph.D. Thesis	The Use of Mathematical Programming in Design for Uniform Load Distribution in Nonlinear Elastic Systems
M.S., 1967	University of Wisconsin - Madison
Major field:	Mechanical Engineering
M.S. Thesis	Optimization of Gear System Design for Surface Durability
1964-1965	Marquette University
Graduate School Course Work	4 courses in Mechanical Engineering
B.S., 1963	Pennsylvania State University
Major field:	Engineering Mechanics

PROFESSIONAL CERTIFICATIONS

- Registered Professional Engineer in the State of Illinois (No. 062-030299)
- Registered Professional Engineer in the State of Wisconsin (No. E-11429-6)
- Registered Professional Engineer / Mechanical in the State of Arizona (No. 47584)
- Registered Professional Engineer in the State of Texas (No. 100749)

PROFESSIONAL AND ACADEMIC ACTIVITIES (PARTIAL LIST)

American Society of Mechanical Engineers (ASME), *Life Fellow*
National Nominating Committee (1985-1987) (2015-2017)
Member, ASME Board on Safety Codes and Standards (2012-2021)
Member, ASME Rail Transit Vehicles Standards Committee (2010-2020)
Member, Tribology Division Honors and Awards Committee (2000-2005), Chair (2004-2005)
Member, ASME Committee on Finance and Investment (1999-2004)
Chair, Council on Engineering Special Task Force on Actions to Insure Responsiveness of Conferences and Publications (1998-1999)
Member, Board on Public Information of the Council on Public Affairs (1997-2000)
Chair, Budget Committee of the Council on Engineering (1996-1999)
Member, Board of Governors Task Force on Electronic Networking (1993-1996)
Member, ASMENET Committee (1996-2000)
Member, Publications Committee (1989-1993); *Chair, (1990-1993)*
Member-At-Large of the Board on Communications (1989-1993), (1996-2000)
Member of the Conferences Committee of the Board on Communications (1984-1990)
Member, Committee on the Technology Executives Conference (1981-1983)
Executive Committee, Design Engineering Division (1975-1980)
Chairman of the Executive Committee (1979-1980)

Journal of Mechanical Engineering Science, Editorial Board Member (1999-2009)

ASME Journal of Vibration, Acoustics, Stress and Reliability in Design, Technical Editor (1984-1989)

University Of Illinois Senates Conference (1997-2003)
Executive Committee Member (1999-2001), Secretary (2000-2001), Chair (2001-2002)
(The Senates Conference acts as the Advisory Committee to the President of the University of Illinois)

Phi Kappa Phi, UIUC Chapter President (1990-1991)

Sigma Xi

American Society for Engineering Education (ASEE)

ABET, Inc. (fka Accreditation Board for Engineering Technology)
Program Evaluator sponsored by ASEE (2009-Present)
Member, Engineering Accreditation Commission (2014-present)

National Safety Council (firm membership)

AWARDS AND HONORS

Edmond E. Bisson Award, Society of Tribologists and Lubrication Engineers (STLE), 2007
Dedicated Service Award, American Society of Mechanical Engineers (ASME), 1994

PROFESSIONAL LISTINGS

American Men and Women of Science (1993 – present)
Who's Who in America (1986-1987 – present)
Who's Who in Engineering (1982 – present)
Who's Who in Finance and Business (1996-present)

ADDITIONAL TRAINING AND EDUCATION

- 2015 University of Wisconsin-Milwaukee, Plastic Part Failure: Analysis, Design & Prevention, Milwaukee, WI
- 2015 American Society of Civil Engineers, Wind Loads for Buildings and Other Structures, Chicago, IL
- 2013 American Society of Civil Engineers, Design of Foundations for Dynamic Loads, New York, NY
- 2010 American Society of Mechanical Engineers, Practical Welding Technology, Atlanta, GA
- 2008 Design and Operation of Work Zone Traffic Control Seminar, presented by a National Highway Institute certified instructor, Champaign, IL
- 2007 American Society of Mechanical Engineers, The Bolted Joint, Las Vegas, NV
- 2007 American Society of Mechanical Engineers, Design of Bolted Flanged Joints, Las Vegas, NV
- 2007 TOPCON, Use of robotic, pulsed laser total station and data recorder for forensic mapping, Champaign, IL

PUBLICATIONS

“Analyzing Truck Component “Failures”: An Engineer’s Perspective”, Truck Accident Litigation, Third Edition, American Bar Association, 2012

“Scuffing of Cast Iron and Al-390-T6 Materials Used In Compressor Applications”, Wear, Volume 260, 2006, pp. 735-744. (A.Y. Suh, J.J. Patel, A. A. Polycarpou, T.F. Conry)

“Tribological Studies on Scuffing Due to the Influence of Carbon Dioxide Used as a Refrigerant in Compressors,” STLE Tribology Transactions, Volume 48, No. 3, 2005, pp 336-342. (N.G. Demas, A. A. Polycarpou, T.F. Conry)

“Reconciliation of Nanoscratch Hardness with Nanoindentation Hardness Including the Effects of Interface Shear Stress,” Journal of Materials Research, Volume 19, No. 11, 2004, pp. 3316-3323. (N. Tayebi, T. F. Conry, A. A. Polycarpou)

“Nanomechanical Properties of Aluminum 390-T6 Rough Surfaces Undergoing Tribological Testing,” ASME Journal of Tribology, Volume 126, No. 3, 2004, pp. 573-582. (S. R. Pergande, A. A. Polycarpou, T. F. Conry)

“Effects of the substrate on the determination of hardness of thin films by the nanoscratch and nanoindentation techniques,” Journal of Materials Research, Vol. 19, No. 6, 2004, pp. 1791-1802. (N. Tayebi, A. A. Polycarpou, T. F. Conry)

“A Dynamic Stiffness and Damping Model for Rail Car Center Plate Polymer Liners,” Proceedings of the 2004 ASME/IEEE Joint Rail Conference, RTD-Vol.27, ASME, New York, pp. 63-74. (R. R. Katta and T.F. Conry)

Effects of the substrate on the determination of hardness of thin films by the nanoscratch and nanoindentation techniques: A comparative study for the cases of soft film on hard substrate and hard film on soft substrate. Symposium U, Thin Films-Stresses and Mechanical Properties X, (Editors: S.G. Corcoran, Y-C. Joo, N.R. Moody, Z. Suo), *2003 MRS Fall Meeting Proceedings*, Volume 795, 2004, Paper U7.5. (N. Tayebi, A. A. Polycarpou, T. F. Conry)

“Tip-Radius Effect in Finite Element Modeling of sub-50 nm Shallow Nanoindentation,” Thin Solid Films, Vol. 450, No. 2, 2004, pp. 295-303. (N. Yu, A. A. Polycarpou, T. F. Conry)

“The determination of hardness from nanoscratch experiments: Corrections for interfacial shear stress and elastic recovery,” Journal of Materials Research, Vol. 18, No. 9, 2003, pp. 2150-2162. (N. Tayebi, T. F. Conry, A. A. Polycarpou)

“Detailed surface roughness characterization of engineering surfaces undergoing tribological testing leading to scuffing,” Wear, Vol. 255, 2003, pp. 556-568. (A. Y. Suh, A. A. Polycarpou, T. F. Conry)

“The Effect of Adapter Crown Wear on Rated Fatigue Life of a Railroad Tapered Roller Bearing,” STLE Tribology Transactions, Vol. 42, No. 4, 1999, pp. 874-880. (R. A. Post, T. F. Conry, C. Cusano)

“Thermally-Induced Failures in Railroad Tapered Roller Bearings”, STLE Tribology Transactions, Vol. 42, No. 4, 1999, pp. 824-832. (D. B. Kletzli, C. Cusano, T. F. Conry)

“Stack-up Forces for Normal and Abnormal Operating Conditions in a Railroad Roller Bearing Assembly,” ASME Journal of Mechanical Design, Volume 120, No. 4, 1998, pp. 707-713. (H. Wang, T. F. Conry, C. Cusano)

“Squeezing Flow of an Eyring Fluid,” ASME Journal of Tribology, Volume 119, No. 3, 1997, pp. 593-596. (F. Yang, T. F. Conry, J. C. M. Li)

“Effects of Cone/Axle Rubbing Due to Roller Bearing Seizure on the Thermomechanical Behavior of a Railroad Axle,” ASME Journal of Tribology, Volume 118, No. 2, 1996, pp. 311-319. (H. Wang, T. F. Conry, C. Cusano)

“Effects of Cone/Axle Rubbing on the Thermomechanical Behavior of a Railroad Axle,” Rail Transportation—1994, ASME RTD-Vol. 8, pp. 181-190. Presented at the 1994 ASME International Mechanical Engineering Congress and Exposition in November 1994 in Chicago, Illinois. (H. Wang, C. Cusano, T. F. Conry)

“A Dynamic Model of the Torque and Heat Generation Rate in Tapered Roller Bearings under Excessive Sliding Conditions,” STLE Tribology Transactions, Volume 36, No. 4, 1993, pp. 513-524. (S. Wang, C. Cusano, T. F. Conry)

“Steady-State Temperature and Stack-Up Force Distributions in a Railroad Roller Bearing Assembly,” Rail Transportation—1992, ASME Book Number G00767, 1992, pp. 89-96, presented at the 1992 ASME Winter Annual Meeting in November 1992 in Anaheim, California. (D. L. Dunnuck, T. F. Conry, C. Cusano)

“An Experimental Study of the Effects of Surface Lay Orientations on Initial Surface Damage in Point Contacts,” STLE Tribology Transactions, Volume 35, No. 4, 1992, pp. 583-594. (J. Wang, B. W. Whitley, C. Cusano, T. F. Conry)

“Thermal Non-Newtonian Elastohydrodynamic Lubrication of Line Contacts under Simple Sliding Conditions,” ASME Journal of Tribology, Volume 114, No. 2, 1992, pp. 317-327. (S. Wang, T.F. Conry, C. Cusano)

“Temperature Distribution Associated With Failures of Railroad Bearings, Part II: A Model for the Torque and Heat Generation for Jammed Rollers”, Technical Report submitted to the Association of American Railroads for research conducted under Grant AAR ALRR Task 3-26, March, 1991, Report UIIU ENG 91-3001. (S. Wang, C. Cusano, T. F. Conry)

“Thermal Analysis of Elastohydrodynamic Lubrication of Line Contacts Using the Ree-Eyring Fluid Model,” ASME Journal of Tribology, Volume 113, No. 2, 1991, pp. 232-244. (S. Wang, C. Cusano, T. F. Conry)

“Analysis of High Speed Cylindrical Roller Bearings Using a Full Elastohydrodynamic Lubrication Model, Part I, Formulation,” STLE Tribology Transactions, Volume 33, No. 2, April 1990, pp. 274-284. (L. Chang, C. Cusano, T. F. Conry)

“Analysis of High Speed Cylindrical Roller Bearings Using a Full Elastohydrodynamic Lubrication Model, Part II, Results,” STLE Tribology Transactions, Volume 33, No. 2, April 1990, pp. 285-291. (L. Chang, T. F. Conry, C. Cusano)

“Temperature Distribution Associated With Failures of Railroad Bearings, Part I: A Model for the Frictional Heat Generated Between Cone and Axle”, Technical Report submitted to the Association of American Railroads for research conducted under Grant AAR ALRR Task 3-26, March, 1990. (S. Wang, E. D. Bramson, C. Cusano, T. F. Conry)

“Effects of Lubricant Rheology and Kinematic Condition on Micro-Elastohydrodynamic Lubrication,” ASME Journal of Tribology, Volume 111, No. 2, 1989, pp. 344-351. (L. Chang, C. Cusano, T. F. Conry)

“An Efficient, Robust, Multi-Level Computational Algorithm for Elastohydrodynamic Lubrication,” ASME Journal of Tribology, Volume 111, No. 2, 1989, pp. 193-199. (L. Chang, T. F. Conry, and C. Cusano.)

“Fault-Tree Analysis and Scale-Down Modeling of Railroad Roller Bearing Assemblies,” final Report to AAR for research conducted under Grant AAR ALRR Task 3-11, University of Illinois at Urbana-Champaign, June 1, 1988 (T. F. Conry, C. Cusano, L. Chang).

“A Reynolds-Eyring Equation for Elastohydrodynamic Lubrication in Line Contacts,” ASME Journal of Tribology, Volume 109, 1987, pp. 648-658. (T. F. Conry, S. Wang and C. Cusano)

“Thermal Effects on Traction in Elastohydrodynamic Lubrication.” Final report to the National Science Foundation, Grant No. MEA-8205464, UIUC-ENG-86-3026, 71 pp. September 1986. (T. F. Conry)

“Putting Parallelism to Work,” CIME, Computers in Mechanical Engineering, Springer-Verlag, New York, Inc., Volume 5, No. 1, July 1986, pp. 37-41. An invited paper to report on recent developments in supercomputing and associated research activity at the University of Illinois (T. F. Conry)

“The Use of Supercomputers in Mechanical Systems Research: Tribology and Machine Dynamics,” Final Report on a Study of Supercomputers in Mechanical Systems Research, NSF Mechanical Systems Program via NSF Grant MEA-8412134. Compiled by A. H. Soni, August 1985. (T. F. Conry)

Discussion of the paper “Non-Newtonian Fluid Model Incorporated into Elastohydrodynamic Lubrication of Rectangular Contacts” by B. Jacobson and B. J. Hamrock, ASME Journal of Tribology, Volume 106, 1984, pp. 275-284. (T. F. Conry)

“The Effects of Surface Irregularities on the Elastohydrodynamic Lubrication of Sliding Line Contacts, Part I - Single Irregularities,” ASME Journal of Tribology, Volume 106, 1984, pp. 104-112. (P. R. Goglia, T. F. Conry, C. Cusano)

“The Effects of Surface Irregularities on the Elastohydrodynamic Lubrication of Sliding Line Contacts, Part II - Wavy Surfaces,” ASME Journal of Tribology, Volume 106, 1984, pp. 113-119. (P. R. Goglia, C. Cusano, T. F. Conry)

“The Evolution of Undergraduate Engineering Education with the Assimilation of Engineering Computer Technology,” Paper commissioned by ASEE Panel on Advanced Technologies in

Engineering Education and summarized in A Response to Advancing Technologies, Donald D. Glower and Lindon E. Saline, Editors, American Society for Engineering Education, Washington, DC. (1982). (T. F. Conry and M. H. Pleck)

“A Minimum Strain Energy Approach for Obtaining Optimal Unbalance Distribution in Flexible Rotors,” Progress in Engineering Optimization-1981, R. W. Mayne and K. M. Ragsdell, Editors, ASME, 1981, also in ASME Journal of Mechanical Design, Volume 104, 1982, pp. 875-880. (T. F. Conry, P. R. Goglia, C. Cusano)

“Design Optimization of Hydraulic Networks Using Mixed-Integer Linear Programming,” Progress in Engineering Optimization - 1981, R. W. Mayne and K. M. Ragsdell, Editors, ASME, 1981, also appears in ASME Journal of Mechanical Design, Volume 104, 1982, pp. 837-843. (T. F. Conry and J. A. Werhane)

“An Analytical Solution for the Normal Load Carrying Capacity of Lightly-Loaded Cylinders in Combined Rolling, Sliding and Normal Motion,” ASME Journal of Lubrication Technology, Volume 103, 1981, pp. 467-468. (T. F. Conry)

“Transient Dynamic Analysis of High Speed Lightly-Loaded Cylindrical Roller Bearings: Part I, Analysis,” NASA CR-3334, 1981. (T. F. Conry)

“Transient Dynamic Analysis of High Speed Lightly-Loaded Cylindrical Roller Bearings: Part II, Computer Program and Results,” NASA CR-3335, 1981. (T. F. Conry and P. R. Goglia)

“Thermal Effects on Traction in EHD Lubrication,” Solid Contact and Lubrication, AMD-Vol. 39, H. S. Cheng and L. M. Keer, Editors, ASME, 1980, pp. 135-150, also appears in ASME Journal of Lubrication Technology, Volume 103, 1981, pp. 533-538. (T. F. Conry)

“Viscosity in the thermal regime of E.H.D. traction,” Thermal Effects in Tribology, D. Dowson, C. M. Taylor, M. Godet and D. Berthe, Editors, Mechanical Engineering Publications Limited, London, 1980, pp. 219-227. (T. F. Conry, K. L. Johnson, S. Owen)

“Optimization of Die Profiles for Deep Drawing,” ASME Journal of Mechanical Design, Volume 102, 1980, pp. 452-459. (T. F. Conry, E. I. Odell, W. J. Davis)

“Unbalanced Response of a Large-Rotor-Pedestal-Foundation System Using an Elastic Half-Space Soil Model,” ASME Journal of Mechanical Design, Volume 102, 1980, pp. 311-319. (R. L. Ruhl, T. F. Conry, R. L. Steger)

Discussion of the paper “A Method for Optimal Tolerance Selection” by P. Ostwald and J. Huang, ASME Journal of Engineering for Industry, Volume 100, Series B, 1978, pp. 390-391. (T. F. Conry)

“On the Transmissibility of Short Porous Journal Bearings,” ASME Journal of Lubrication Technology, Volume 100, 1978, pp. 296-303. (C. Cusano and T. F. Conry)

Review of Machine Design, Theory and Practice by Deutschman, Michels, and Wilson in Mechanism and Machine Theory, Volume 11, No. 4, Pergamon Press, 1976, pp. 304-305. (T. F. Conry)

“Optimal Selection of Pumps in an Hydraulic Network,” ASME Journal of Fluids Engineering, Volume 98, Series I, 1976, pp. 2-9. (T. F. Conry and D. P. Schneider)

“The Use of Decelerative Metal Cutting in the Design of Energy Management Systems,” ASME Journal of Engineering for Industry, Volume 97, Series B, 1975, pp. 867-872. (M. H. Pleck, L. D. Metz, T. F. Conry)

“On the Stability of Porous Journal Bearings,” ASME Journal of Engineering for Industry, Volume 96, Series B, 1974, pp. 585-590. (T. F. Conry and C. Cusano)

“Design of Multi-Recess Hydrostatic Journal Bearings for Minimum Total Power Loss,” ASME Journal of Engineering for Industry, Volume 96, Series B, 1974, pp. 226-232. (C. Cusano and T. F. Conry)

“A Mathematical Programming Technique for the Evaluation of Load Distribution and Optimal Modifications for Gear Systems,” ASME Journal of Engineering for Industry, Volume 95, Series B, 1973, pp. 1115-1122. (T. F. Conry and A. Seireg)

“A Mathematical Programming Method for Design of Elastic Bodies in Contact,” ASME Journal of Applied Mechanics, Volume 93, Series E, 1971, pp. 387-392. (T. F. Conry and A. Seireg)

“Optimum Design of Gear Systems for Surface Durability,” ASLE Transactions, Volume 11, 1968, pp. 321-329. (A. Seireg and T. F. Conry)

RESEARCH GRANTS

Grants from Association of American Railroads (Technology Scanning Committee) on “Center Plate Friction,” July 2000 to December 2004.

Grant from the UIUC Air Conditioning and Refrigeration Center on “Tribological Studies on Scuffing due to the Influence of CO₂ Used as a Refrigerant in Compressors,” June 2001 to September 2003. (T. F. Conry and A. A. Polycarpou, Co-Principal Investigators)

Grant from the UIUC Air Conditioning and Refrigeration Center (A consortium of 25 companies) on “Fundamental Investigation on the Tribological Failure Mechanisms of Compressor Surfaces—Scuffing,” June 2000 to September 2002. (T. F. Conry and A. A. Polycarpou, Co-Principal Investigators)

Grant from Caterpillar Inc. in partial support of sabbatical leave for two semesters to study galling and scuffing processes, August 1998 to May 1999.

Grants from Association of American Railroads on “Analysis of Railroad Bearing Failure,” June 1986 to August 1986 and April 1987 to December 1995. (T. F. Conry and C. Cusano, Co-Principal Investigators)

Grant from S&C Electric Company to investigate mechanical dynamics of large high-voltage switchgear, August 1990 to December 1991.

Grant from General Motors Corporation, New Departure-Hyatt Division on “Effect of Surface Topography in Surface Damage and Fatigue Life of Wheel Bearings,” May 1986 to December 1990. (T. F. Conry and C. Cusano, Co-Principal Investigators)

NSF Grant MEA-8205464, “Thermal Effects in EHD Traction,” July 1982 to July 1986.

NASA Grant NSG-3098, “Transient Dynamic Analysis of High Speed Lightly-Loaded Cylindrical Roller Bearings,” June 1976 to October 1978.

EDUCATIONAL PROGRAM SUPPORT

Grants from corporate foundations (MCI, GTE, Deere & Co.) for programs in mechatronics and telecommunications in the Department of General Engineering or the College of Engineering /College of Commerce and Business Administration Program in Technology and Management during the years 1991-1998.

Grant from General Motors Foundation to the UIUC College of Engineering for an “Intelligent Manufacturing Systems Laboratory,” May 1986 to May 1991. (T. F. Conry and R. E. DeVor, Co-Directors to 1989)