



Failure Analysis Associates®

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John D. Zolock, Ph.D., P.E.
Managing Engineer

Professional Profile

Dr. John Zolock is a Managing Engineer in Exponent's Vehicle Engineering practice. Dr. Zolock's expertise in the field of engineering includes analytical and experimental evaluation of vehicle crashworthiness and occupant protection, vehicle dynamics, and mechanics. He specializes in automobile, bus, pedestrian, heavy truck, and rail vehicle accident investigation and reconstruction. His experience in photogrammetry, event data recorder (EDR) analysis, full scale rail vehicle testing, and automobile crash, dolly rollover, and handling testing enhances his consulting contributions to the reconstruction of accidents. His work has emphasized study in the areas of materials, applied mechanics, dynamics, vibrations, finite element analysis, biomechanics and occupant injury modeling, and component and full-scale field-testing.

Prior to joining Exponent, Dr. Zolock held the position of Mechanical Engineer at the Department of Transportation/Research and Innovative Technology Administration/Volpe National Transportation Systems Center in Cambridge, MA, for 9 years. His core work specialized in research and development projects related to railroad vehicle/track interaction, train derailment cause finding and prevention, train make-up and performance, rail vehicle suspension design and performance, rail vehicle crashworthiness, accident injury causation, and rail vehicle occupant safety and protection. Dr. Zolock is familiar with test and/or analysis protocol used to demonstrate compliance with numerous National Highway Traffic Safety Administration (NHTSA) FMVSS Regulations, Federal Railroad Administration Regulations (FRA), and American Public Transportation Association (APTA) recommended practices.

While working at the Volpe Center, Dr. Zolock wrote a Ph.D. dissertation at Tufts University titled, "A Methodology for the Modeling of Forced Dynamical Systems from Time Series Measurements using Time-Delay Neural Networks." The dissertation studies the use of neural networks to predict the wheel/rail force response of rail vehicles to track geometry variation. While at Penn State University, Dr. Zolock wrote a thesis titled, "Experimental Observation and Characterization of Tire Standing Waves." At Penn State, Dr. Zolock focused classroom studies on experimental and analytical dynamics, vibrations, modal analysis, signal analysis, mechanics of materials, and composite materials. Previous work experience at Micro Motion included experimental and analytical modal analysis of coriolis based mass flow meters, high pressure feedthru testing and design, and coriolis mass flow meter design.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, Tufts University, 2005
M.S., Engineering Science and Mechanics, The Pennsylvania State University, 1997
B.S., Mechanical Engineering, Grove City College, 1994

Licenses and Certifications

Registered Professional Mechanical Engineer, Connecticut, #28194
Registered Professional Mechanical Engineer, Massachusetts, #48127
Registered Professional Mechanical Engineer, New York, #088006
Registered Professional Mechanical Engineer, Pennsylvania, #079651
Registered Professional Mechanical Engineer, Rhode Island, #9625

Additional Education

Engineering Dynamics Corporation HVE Forum Workshop, 2012
Bosch Crash Data Retrieval Data Analyst Course, 2011
Bosch Crash Data Retrieval Technician Level 1 Course, 2011
Vehicle Dynamics for Passenger Cars and Light Trucks e-Seminar, 2011
Hazardous Waste Operations and Emergency Response Training, 29 CFR 1910.120
Highway-Rail Grade Crossing Safety Course, University of Wisconsin, 2008
Engineering Fundamentals of Rail Transit Passenger Systems: Light Rail, Commuter Rail, and Rapid transit, University of Wisconsin, 2008
Northwestern University Center for Public Safety Traffic Accident Reconstruction Course, 2007
Society of Automotive Engineers: Occupant and Vehicle Kinematics in Rollovers, 2007
Society of Automotive Engineers: Injuries, Anatomy, Biomechanics, and Federal Regulations Seminar, 2001
Railroad Derailment Cause Finding and Prevention Seminar, by Rail Sciences Inc., 1999
Dale Carnegie Leadership Training Course Graduate and Course Assistant, 1993–1994

Publications

Croteau J, Zolock J, Larson R, Bare C, Peterson D, Parker D. Dynamic response of vehicle roof structure and ATD neck loading during dolly rollover tests. Society of Automotive Engineers, 2010-01-0515, April 2010.

Zolock J, Greif R. A methodology for the modeling of forced dynamical systems from time series measurements using time-delay neural networks. J Vibration Acoustics 2009; 131(1).

Zolock J, Greif R. A methodology for the modeling of rail vehicles from time series measurements using time-delay neural networks. American Society of Mechanical Engineers Rail Transportation Division Fall Technical Conference, RTDF2007-46022, November 2007.

Martinez E, Zolock J, Tyrell D. Crush analyses of multi-level equipment. American Society of Mechanical Engineers, IMECE2006-13214, November 2006.

Martinez E, Zolock J, Tyrell D. Review of severe deformation recommended practice through analysis-comparison of two cab car end frame designs. American Society of Mechanical Engineers, ASME2005-70043, March 2005.

Zolock J, Greif R. Application of time series analysis and neural networks to the modeling and analysis of forced vibrating mechanical systems. American Society of Mechanical Engineers, ASME2003-55519, November 2003.

Zolock JD, Tyrell D.C. Locomotive cab occupant protection. American Society of Mechanical Engineers, ASME2003-44121, November 2003.

Martinez E, Zolock J, Tyrell D. Rail-car impact tests with steel coil: Car crush. American Society of Mechanical Engineers, JRC2003-1656, April 2003.

Tyrell D, Zolock J, VanIngen-Dunn C. Train-to-train impact test: Occupant protection experiments. American Society of Mechanical Engineers, IMECE2002-39611, November 2002.

Tyrell D, Zolock J, VanIngen-Dunn, C. Rail passenger equipment collision tests: Analysis of occupant protection measurements. Rail Transportation, American Society of Mechanical Engineers, RTD-Vol. 19, November 2000.

Chatterjee A, Cusumano JP, Zolock JD. On contact-induced standing waves in rotating tires: Experiment and theory. Journal of Sound and Vibration 1999; 227(5):1049–1081.

Chatterjee A, Cusumano JP, Zolock JD. Standing waves in a simple model of a rotating balloon tire. ASME Winter Annual Meeting November 1997.

Cusumano JP, Zolock JD. An experimental study of tire standing waves on a small-scale test rig. SAE Aerospace Atlantic Conference, SAE961301, May 1996.

Technical Reports

Tyrell D, Severson K, Zolock J, Perlman A. Passenger rail two-car impact test Volume I: Overview and selected results. U.S. Department of Transportation/Federal Railroad Administration; DOT/FRA/ORD-01/22.1, January 2002.

Public Abstracts of Presentations

Zolock JD. Rail passenger equipment outermost end door removable panels. Federal Railroad Administration—Railroad Safety Advisory Committee Passenger Safety Working Group/Emergency Preparedness Task Force Meeting, Boston, MA, April 19 2005.

Zolock JD. Artificial neural network approach to modeling dynamic mechanical systems. University of Rhode Island Seminar Series in Mechanical Engineering, Kingston, RI, April 23, 2004.

Zolock JD, Tsai T. Equalized truck performance modeling and testing. Transportation Research Board 78th Meeting, Washington, D.C, January 10–14 2000.

Zolock JD, Carr G. A case study of commuter rail low speed derailments. ARM-Corporation Wheel/Rail Interface Seminar, Chicago, IL, May 12–13, 1999.

Zolock JD, Cusumano JP. An experimental study of tire standing waves. 133rd Meeting of the Acoustic Society of America, State College, PA, June 16–19, 1997.

Prior Experience

Senior Mechanical Engineer (Structures and Dynamics Division), U.S. Department of Transportation/Research and Innovative Technology Administration/Volpe National Transportation Systems Center, 1998–2006

Research Assistant, Department of Engineering Science and Mechanics, The Pennsylvania State University, 1995–1997

Teacher Assistant in the Department of Engineering Science and Mechanics, The Pennsylvania State University, 1995

Mechanical Engineering Intern, Micro Motion Incorporated, 1992–1993

Professional Affiliations

- Society of Automotive Engineers (member)
- American Society of Mechanical Engineers (member)
- National Society of Professional Engineers (PE Status and member)