

Robert E. Larson, P.E.
Senior Managing Engineer

Professional Profile

Mr. Robert E. Larson is a Senior Managing Engineer based in Exponent's Test and Engineering Center in Phoenix, Arizona. Mr. Larson addresses issues related to vehicle dynamics and accident reconstruction, including testing and analysis of vehicle handling, vehicle stability, occupant vibration exposure and ride quality, and vehicle crash testing. His range of experience includes working with automobiles, light trucks/SUVs, heavy trucks, construction/industrial equipment, ATVs, motorcycles, and locomotives.

Mr. Larson has extensive experience investigating rollover crashes and analyzing various aspects from the causes of loss of control through reconstructing the rollover sequence. During his time with Exponent Mr. Larson has conducted numerous vehicle roll-over tests, both to standardized test procedures and by developing unique ways of recreating accident specific characteristics. He has extensive experience working with and analyzing the use of computer applications in vehicle dynamics and accident reconstruction.

Mr. Larson has evaluated vehicle stability, crashworthiness, and occupant protection issues on a wide variety of vehicles. The evaluations involve mechanical design analysis, biomechanics, and understanding of the use of standardized testing for evaluating occupant protection. He has conducted numerous evaluations the of vibration and impact exposure on a variety of commercial vehicles. He approaches reconstruction using traditional accident investigation and calculation techniques, but also brings extensive crash testing and computer simulation experience. He is experienced in conducting vehicle handling/characterization analyses with both on-road and off-road vehicles.

Mr. Larson has developed unique test methodologies and has experience conducting and developing standardized tests, as well as evaluating vehicle safety issues through database analysis. This includes Mr. Larson's experience in developing the standards for heavy truck occupant protection and his involvement on SAE committees. He has experience with test fixture design, instrumentation, data analysis, signal processing, vibration measurement, sound level monitoring, and component testing.

Academic Credentials and Professional Honors

M.S., Mechanical Engineering, University of Michigan, 1989

B.S., Mechanical Engineering, University of Michigan (*summa cum laude*), 1987

Tau Beta Pi; Pi Tau Sigma

Licenses and Certifications

Registered Professional Mechanical Engineer, Arizona, #31181
Registered Professional Mechanical Engineer, Alabama, #28393
OSHA Certified Forklift Operator, #20082

Specialized Training

HVE Forum, February 2011
SAE 2009 Heavy Truck Handling, Dynamics & Control Symposium, May 2009
Traffic Accident Reconstruction, Northwestern University Traffic Institute, September 2007
Mechanics of Heavy-Duty Truck Systems, University of Michigan, June 2007
SAE Accident Reconstruction Symposium, November 2005
Enhancing Heavy Truck Safety, Security, and Efficiency Through Technology Symposium,
December 2004
PhotoModeler Pro 5 Training, November 2004
HVE Forum, April/May 2003
Heavy Truck Rollover and Collision Avoidance TOPTEC, April 2003
Passenger Vehicle Rollover TOPTEC: Causes, Prevention and Injury Prevalence, April 2002
Accident Reconstruction TOPTEC: Special Topics, May 2001
Commercial Vehicle Rollover Workshop, July 2000
Heavy Vehicle Rollover TOPTEC, July 2000
SAE Automotive Dynamics and Stability Conference May 2000
Passenger Car Rollover SAE TOPTEC: Cause and Prevention, 1999
Sport Utility / Light Truck Vehicle Safety SAE TOPTEC, 1997
Low Speed Collision TOPTEC, 1996
Automobile Vehicle Dynamics, SAE course, 1994
Vehicle Rollovers TOPTEC, September 1992

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. SAE Technical Paper Series, 2010-01-0515, 2010.

Larson RE, Fowler GF, Kuzel M, Stubbs A, Brown J, Donelson AC. Single-vehicle rollovers involving an initial off-roadway excursion followed by a return to roadway: A NASS study and vehicle response measurement. SAE 2008-01-0159, 2008.

Daws JW, Larson RE, Brown JC. The Impact of plus-sized wheel/tire fitment on vehicle stability. Proceedings, Meeting of the Tire Society, September 2005.

Fowler GF, Larson RE, Wojcik L. Driver crash avoidance behavior: Analysis of experimental data collected in NHTSA's Vehicle Antilock Brake System (ABS) Research Program. SAE 2005-01-0423, 2005.

Yamaguchi GT, Richards D, Larson R, Carhart M, Cargill RS, Lai W, Corrigan CF. Development of a computational method to predict occupant motions during steering-induced rollovers. SAE 2005-01-0300, 2005.

Yamaguchi GT, Carhart MR, Larson R, Richards D, Pierce J, Raasch CC, Scher I, Corrigan CF. Electromyographic activity and posturing of the human neck during rollover tests. SAE 2005-01-0302, 2005.

Larson RE, Fries RH, Cooperrider NK. A comparison of impact and vibration loading on locomotive crew members with exposures in activities of daily living. Proceedings, ASME Rail Transportation Division Ride Quality Conference, RTD-Vol. 20, 2001.

Larson RE, Smith JW, Werner SM, Fowler GF. Vehicle rollover testing, methodologies in recreating rollover collisions. SAE Technical Paper Series, 2000-01-1641, SAE Automotive Dynamics & Stability Conference, Troy, MI, May 15-17, 2000.

Werner SM, Larson RE. Heavy truck rollover crashworthiness: Testing methods and development of recommended practices. SAE Technical Paper Series, 2000-01-0467, SAE 2000 World Congress, Detroit, MI, March 6–9, 2000.

Werner S, Larson RE, Marine M, Behrens T. Heavy truck crashworthiness Phase III—Testing and analysis for recommended practice development. SAE CRP-13, April 1997.

Fowler GF, Fries RH, McDarthy RL, Forouhar FA, Larson RE. Steady-state and transient response of selected All-Terrain Vehicles (ATVs). SAE 940277, Society of Automotive Engineers International Congress and Exposition, February 1994.

Cooperrider NK, Fries RH, Larson RE. Locomotive and road vehicle ride quality assessments. Proceedings, ASME Rail Transportation Division Ride Quality Conference, RTD-Vol. 6, 1993.

Cooperrider NK, Fries RH, Larson RE. Ride quality assessments for a 6-axle locomotive and a heavy truck. Rail Transportation, American Society of Mechanical Engineers, RTD-Vol. 4, 1991.

Published Abstracts

Larson RE, Raasch C, Pierce J. Measurement and evaluation of vibration exposure for locomotive crew members. Proceedings, 1st American Conference on Human Vibration, Morgantown, WV, June 2006.

Richards D, Scher I, Vijayakumar V, Carhart M, Larson R, Taylor S, Ford Corrigan C. Repetitive head loading: accelerations during cyclic, everyday activities. Proceedings, Congress of the International Society of Biomechanics, Cleveland, OH, 2005.

Other Presentations

Larson RE, Bosch K. Accident investigation approach to UTV incidents. Southwest Association of Traffic Accident Investigators (SATAI), Fall 2011 Conference, September 24, 2011.

Larson RE. On and off-road rollovers; a dynamic analysis of roof crush energy and deformation. ABA Emerging Issues in Motor Vehicle Product Liability Litigation, April 2008.

Larson RE. Simulation of off-road excursion. HVE Forum, February 2006.

Larson RE. Electronic stability control. Southwest Association of Traffic Accident Investigators (SATAI), Spring 2006 Conference, March 4, 2006.

Larson RE. Heavy truck testing and standardization. SAE Heavy Truck Safety, Security and Efficiency Through Technology Symposium, December 2004.

Larson RE. Proposal for a dynamic rollover test in response to the TREAD Act. Presented to NHTSA, August 2001.

Larson RE. Photogrammetry in accident reconstruction. In the Driver's Seat: Trucking, Trials and Triumph, ALFA International, May 1998.

Professional Affiliations

- Society of Automotive Engineers (member)
 - Impact and Rollover Test Procedure Standards Committee
 - Vehicle Dynamics Standards Committee
 - ISO TC22/SC9 Vehicle Dynamics & Road Holding Committee
- American Society of Mechanical Engineers (member)
- The Acoustical Society of America (member)