Exponent®
Engineering & Scientific Consulting

Jeffrey Croteau

Practice Director and Principal | Vehicle Engineering
Natick
+1-508-652-8527 | jcroteau@exponent.com

Professional Profile

Mr. Croteau has decades of experience in conducting vehicle reconstructions and crashworthiness analysis of motor vehicle crashes. He specializes in the kinematic and dynamic analysis of on-road and off-road motor vehicles in all crash modes. He has specific expertise in the areas of accident reconstruction, structural crashworthiness, seat performance, vehicle crash and rollover testing with and without ATDs, and the design evaluation and testing of vehicle components and structures.

Mr. Croteau has conducted hundreds of full-scale vehicle and component tests at Exponent's Test and Engineering Center that have been used to validate reconstructions, understand vehicle and occupant kinematics and dynamics, assess restraint system performance, analyze seat structure performance, and research the performance of occupant protection systems in the context of the crashworthiness of vehicle structures.

Mr. Croteau has developed specialized expertise in designing and conducting vehicle crash and sled tests, handling tests, automotive component testing, and restraint system evaluations that relate to a specific accident mode or incident. He is acquainted with the different safety standards, the NHTSA star ratings, and consumer metrics associated with vehicle performance in static and dynamic testing. Mr. Croteau has conducted physical testing and evaluated the design and performance of Roll Over Protection Structures (ROPS) for off-highway recreational vehicles, as well as evaluated the kinematics and dynamics of these recreational vehicles. He is familiar with the Federal Motor Vehicle Safety Standards (FMVSSs) and the ANSI/ROHVA standards as well as the testing required in evaluating compliance with those standards.

Mr. Croteau has conducted numerous peer-reviewed research programs that have explored the validity of simulation-based tools for use in accident reconstruction, proposed novel methodologies for determining impact speed in vehicle crashes using Newtonian physics, and generated energy dissipation data for the body of literature associated with crashes into wooden utility poles and steel bollards. He has contributed to the rollover community by conducting several research studies utilizing different rollover methodologies, which has advanced the understanding of vehicle and occupant kinematics and dynamics in real-world rollover crashes. Specifically, he was involved in the early development and fabrication of Exponent’s Controlled Rollover Impact System (CRIS) and has conducted more than a dozen subsequent tests with the machine. He is knowledgeable about the different configurations and measurements obtained by the Anthropomorphic Test Devices (ATDs) used in crash and rollover testing as well as their association to the relevant Injury Assessment Reference Values.

Mr. Croteau’s extensive testing experience complements his overall technical expertise and enhances his consulting contributions to the reconstruction of motor vehicle accidents and analysis of the performance of structural components in different types of vehicles. He has demonstrated technical capabilities in computer-aided engineering and analysis of electromechanical, hydraulic, and pneumatic systems. He has first-hand experience in designing automatic control systems using closed-loop analog and digital

techniques. He also has experience in instrumentation system design, installation, and calibration, as well as computer-based data acquisition and processing.

Academic Credentials & Professional Honors

M.S., Mechanical Engineering, University of New Hampshire, 1993

B.S., Mechanical Engineering, University of New Hampshire, 1991

Recipient of 2012 SAE Arch T. Colwell Award for outstanding paper (2010-01-0515) presented at SAE

Professional Affiliations

American Society of Mechanical Engineers (member)

Society of Automotive Engineers (member)

Publications

Croteau J, Toney-Bolger M, Issacs J, Shurtz B. Seatback Strength and its Effect on In-Position and Out-of-Position ATD Loading in High-Speed Rear Impact Sled Tests. SAE Technical Paper 2022-01-0856, 2022.

Toney-Bolger M, Issacs J, Rapp van Roden E, Croteau J, et al. Seat Belt Latch Plate Design and Pretensioner Deployment Strategies Have Limited Effect on In- and Out-of-Position Occupants in High-Severity Rear-End Collisions. SAE Technical Paper 2022-01-0849, 2022.

Toney-Bolger M, Croteau J, Dibb A, Weber P, et al. The Role of Seat Belt Restraint System Components in Rear-End Collisions. SAE Technical Paper, 2021-01-0912, doi:10.4271/2021-01-0912.

Parenteau C, Croteau J, Zolock J, The Effect of Crash Severity and Structural Intrusion on ATD Responses in Rear-End Crashes. SAE Technical Paper 2020-01-1224, 2020, doi:10.4271/2020-01-1224.

Croteau J, Crosby C, Marine M, Kwasniak A. Bollard energy dissipation in moving barrier and passenger vehicle impacts. SAE Technical Paper 2015-01-1424, 2015, doi:10.4271/2015-01-1424.

Larson R, Croteau J, Bare C, Zolock J, et al. Steering maneuver with furrow-tripped rollovers of a pickup and passenger car. SAE Technical Paper 2015-01-1477, 2015, doi:10.4271/2015-01-1477.

Heller M, Sharpe S, Newberry W, Dibb A, et al. Occupant kinematics and injury response in steer maneuver-induced furrow tripped rollover testing. SAE Int. J. Trans. Safety 3(2):2015, doi:10.4271/2015-01-1478.

Newberry W, Imler S, Carhart M, Dibb A, Balavich K, Croteau J, Cooper E. Belted occupant kinematics and head excursion during the airborne phase of vehicle rollover: Evaluation of the effects of rollover-deployed curtain airbags. SAE Technical Paper 2014-01-0527, 2014. doi:10.4271/2014-01-0527.

Lange R, Iyer M, Pearce H, Jacuzzi E, Croteau J. Rollover injury science and rollover crash typology. 22nd Enhanced Safety Vehicles Conference, Washington DC, June 2011.

Croteau J, Frank B, Peterson D, Bare C, Kyanka G. Timber utility pole fracture mechanics due to non-deformable and deformable moving barrier impacts. SAE Technical Paper Series, 2011-01-0288, 2011.

Heller M, Newberry W, Smedley J, Eswaran S, Croteau J, Carthart M. Occupant kinematics and injury mechanisms during rollover in a high strength-to-weight ratio vehicle. SAE Technical Paper Series, 2010-

01-0516, 2010.

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.

Raddin J, Cormier J, Smyth B, Croteau J, Cooper E. Compressive neck injury and its relationship to head contact and torso motion during vehicle rollovers. SAE Technical Paper Series, 2009-01-0829, 2009.

Luepke P, Carhart M, Croteau J, Morrison R, Loibl J. An evaluation of laminated side window glass performance during a rollover. SAE Technical Paper Series, 2007-01-0367, 2007.

Gloeckner DC, Bove RT, Croteau J, Corrigan CF, Moore TLA. Timing of head-to-vehicle perimeter contacts in rollovers. SAE Technical Paper Series, 2007-01-0370, 2007.

Raphael E, Piziali R, Le H, Hinger J, Cooper E, Croteau J. Physical evidence associated with seatbelt entanglement during a collision. SAE Technical Paper Series, 2007-01-1501, 2007.

Newberry W, Carhart M, Lai W, Corrigan CF, Croteau J, Cooper E. A computational analysis of the airborne phase of vehicle rollover: occupant head excursion and head-neck posture. 2005-01-0943, SAE 2005 World Congress, Detroit, MI, April 11-14, 2005.

Moffatt EA, Cooper ER, Croteau JJ, Orlowski KF, Marth DR, Carter JW. Matched-pair rollover impacts of rollcaged and production roof cars using the Controlled Rollover Impact System (CRIS). 2003-01-0172, SAE 2003 World Congress, Detroit, MI, March 3-6, 2003.

Carter JW, Habberstad JL, Croteau J. A comparison of the Controlled Rollover Impact System (CRIS) with the J2114 Rollover Dolly. 2002-01-0694, SAE 2002 World Congress, Detroit, MI, March 4-7, 2002.

Johnson L, Croteau JJ, Golliher J. Accelerations and shock load characteristics of tail lamps from full-scale automotive rear impact collisions. 2002-01-0548, SAE 2002 World Congress, Detroit, MI, March 4-7, 2002.

Croteau JJ, Werner SM, Habberstad JL, Golliher J. Determining closing speed in rear impact collisions with offset and override. SAE Technical Papers Series, 2001-01-1170, SAE 2001 World Congress, Detroit, MI, March 5-8, 2001.

Leonard MM, Croteau JJ, Werner SM, Tuskan SM. HVE EDSMAC4 Trailer model simulation comparison with crash test data. SAE Technical Paper Series, 2000-01-0468, SAE 2000 World Congress, Detroit, MI, March 6-9, 2000.

Moffatt EA, Cooper ER, Croteau JJ, Parenteau C, Toglia A. Head excursion of seat belted cadaver, volunteers, and Hybrid III ATD in a dynamic/static rollover fixture. 41st Stapp Car Crash Conference, SAE Technical Paper Series, 1997.

Croteau JJ. Control of a four wheel drive-steer wheelchair. Master's Thesis, University of New Hampshire, 1993.

Presentations

Croteau JJ. The accuracy of photogrammetry in accident reconstruction applications. SAE Accident Reconstruction Symposium, Ventura, California, November 8-9, 2005.

Croteau JJ. Mock trial—Houseman v Wheeler Motors. Accident reconstruction expert for Wheeler Motors, American Bar Association (ABA), Phoenix, AZ, March 18-19, 2004

Croteau JJ. New tools in rollover testing and the Controlled Rollover Impact System (CRIS). Defense

Research Institute (DRI), Las Vegas, NV, February 12, 2003.

Croteau JJ. Controlled Rollover Impact System—New technology to analyze old issues—Roof strength and rollover. American Bar Association (ABA), Detroit, MI, October 24, 2002.

Croteau JJ. Controlled Rollover Impact System—New technology to analyze old issues—Roof strength and rollover. ABA Products Liability Issues in the Automotive Industry, Detroit, MI, October 24, 2002.

Croteau JJ. Vehicle rollover testing methodologies and simulations in action. SAE Passenger Vehicle Rollover TOPTEC: Causes, Prevention and Injury Prevalence, Scottsdale, AZ, April 22-23, 2002.

Croteau JJ. Determining closing speed in rear impact collisions with offset and override. SAE Accident Reconstruction TOPTEC: Special Topics, Tempe, AZ, May 22-23, 2001.

Additional Education & Training

SAE Seminars: Occupant and Vehicle Kinematics in Rollovers, Troy, MI, November 11-12, 2004

Passenger Car Rollover TOPTEC: Cause and Prevention, San Diego, CA, January 21-22, 1999