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DANIEL E. TOOMEY, Ph.D., P.E.

Professional Specialization

Passenger vehicle, heavy truck and off-road recreational vehicle accident analysis and reconstruction, including vehicle crash mechanics, occupant kinematics, biomechanical reconstruction and computer simulation. Biomechanics of occupant injury including mechanisms of injury and human injury tolerance. Performance and design analysis of on and off-road passenger vehicle systems, subsystems and components, including occupant protection systems, active and passive restraint systems, and chassis systems. Modeling, analysis, simulation and control of dynamic systems. Vehicle, system and component testing, including test fixture design, instrumentation, signal processing and data analysis.

Professional Background

Ph.D. (Biomedical Engineering), Wayne State University
M.S.E. (Mechanical Engineering) University of Michigan-Dearborn
B.S.E. (Mechanical Engineering), University of Michigan-Ann Arbor
Traffic Accident Reconstruction, Northwestern University Traffic Institute
Engineering Dynamics Corporation - HVE Simulations Forums

Principal Engineer,

Design Research Engineering

Senior Engineering Consultant,

Design Research Engineering

Senior Project Engineer,

Design Research Engineering

Project Engineer,

Design Research Engineering

Engineering Co-op,

TRW Automotive Chassis Systems

Registered Professional Mechanical Engineer, Michigan #6201056035

Cum Laude, University of Michigan

Pi Tau Sigma, National Mechanical Engineering Honor Society - Pi Rho Chapter (University of Michigan)

Member, Society of Automotive Engineers (SAE)

Member, Association for the Advancement of Automotive Medicine

Technical Paper Reviewer – SAE Occupant Restraints and Biomechanics, Traffic Injury Prevention

Publications

“Performance Evaluation of Seat-Integrated Restraint Systems (SIRS) in Controlled Crashes”, IRC-24-124, Proceedings 2024 International Conference on the Biomechanics of Impact, International Research Council on Biomechanics of Injury (IRCOBI), Stockholm Sweden. (with C. Parenteau, R. Burnett, E. Lau).

“Side Impact Characteristics in Modern Light Vehicles”, SAE Paper 2024-01-2646, 2024 (with C. Parenteau, B.N. Ault, R. Krishnaswami, and R. Burnett).

“Analysis of Fluid Evidence on Various Vehicle Components”, SAE Paper 2024-01-2467, 2024 (with K. Boysen, C. Parenteau, and R. Gregg).

“Evaluation of Large Pickup Truck Occupants: Size, Seated Height and Biomechanical Responses in Drop Tests”, SAE Paper No. 2023-01-0649, 2023 (with R. Burnett, C. Parenteau, M. Vogler, K. Orłowski, and R. Krishnaswami).

"Application of Lateral Pole Impact Force-Displacement Data to the Reconstruction of Side Impacts with Narrow Objects," *SAE Int. J. Trans. Safety* 5(1):2017 (with B.N. Ault).

“Evaluation of Air Bag Electronic Sensing System Collision Performance through Laboratory Simulation”, SAE Paper No. 2015-01-1484, 2015 (with E. Winkel and R. Krishnaswami).

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- “The Influence of Body Mounted Shoulder Seat Belt Anchor (D-ring) Displacement During Dynamic Vehicle-to-Ground Impacts”, SAE Paper No. 2015-01-1756, 2015 (with D. Marth, W. Ballard, J. Belwafa, R. Burnett, and R. McCoy).
- “Assessment of Compressive Thoracolumbar Injury Potential and Influence of Seat Cushions on Vertical Impact Loading of a Seated Occupant”, *SAE Int J Trans Safety* 3(1), 2015 (with E. Winkel and R. Taylor).
- “ATV Rollover, Rider Response, and Determinants of Injury: In-Depth Analysis of Video-Documented Rollover Incidents,” *Traffic Inj Prev* 15:S190-S196, 2014 (with C. VanEe, B. Moroski-Browne, M. Vander Roest and A. Wilson).
- “The Hybrid III Upper and Lower Neck Response in Compressive Loading Scenarios with Known Human Injury Outcomes,” *Traffic Inj Prev* 15:S223-S230, 2014 (with K. Yang and C. VanEe).
- “Towards a More Robust Lower Neck Compressive Injury Tolerance - An Approach Combining Multiple Test Methodologies,” *Traffic Inj Prev* 14(8): 845-52, 2013 (with K. Yang, N. Yoganandan, F. Pintar and C. VanEe).
- “Exploring the Role of Lateral Bending Postures and Asymmetric Loading on Cervical Spine Compression Responses,” 2009 ASME International Mechanical Engineering Congress & Exposition, IMECE2009-12911, (w. M. Mason, W. Hardy, K. Yang, J. Kopacz and C. VanEe).
- “Vehicle Chassis, Body, and Seat Belt Buckle Acceleration Responses in the Vehicle Crash Environment,” *SAE Int. J. Passeng. Cars – Mech.Syst.* 2(1): 1151-1170, 2009. Paper No. 2009-01-1246 (with E. Paddock, E. Winkel, and R. Burnett).
- “Evaluation of Seat Belt Assembly Physical Evidence in Properly Functioning and Intentionally Disabled Retractor Demonstrations,” SAE Paper No. 2009-01-1245, 2009 (with M. Klima and E. Cooper).
- “Vehicle Rollover Recovery Using Active Steering/Wheel Torque Control,” *International Journal of Vehicle Design* 46(1) : 51-71, 2008 (with T. Shim, C. Ghike, and H. Sardar).
- “Safety Restraint System Physical Evidence and Biomechanical Injury Potential Due to Belt Entanglement” SAE Paper No. 2006-01-1670, 2006 (with C. VanEe and M. Klima).
- “Seat Belt Retractor Performance Evaluation in Rollover Crashes,” *SAE 2005 Transactions - J. Passeng. Cars – Mech.Syst.* Section 6 – Vol 114: 2016-2023, 2005. Paper No. 2005-01-1702 (with M. Klima and M. Weber).
- “Seat Belt Buckle Performance in High Energy Wheel-to-Ground Impacts,” *SAE 2005 Transactions - J. Passeng. Cars – Mech.Syst.* Section 6 – Vol 114: 2034-2041, 2005. Paper No. 2005-01-1709 (with M. Klima and M. Weber).
- “Investigation of Active Steering/Wheel Torque Control at the Rollover Limit Maneuver,” *SAE 2004 Transactions. J. Passeng. Cars – Mech.Syst.* . Section 6 – Vol 113: 1133-1140, 2004. Paper No. 2004-01-2097 (with Taeyhun Shim).

Presentations

- “Evaluation of Air Bag Electronic Sensing System Collision Performance through Laboratory Simulation”, Society of Automotive Engineers, 2015 World Congress, Detroit, MI, April 2015.
- “The Influence of Body Mounted Shoulder Seat Belt Anchor (D-ring) Displacement During Dynamic Vehicle-to-Ground Impacts”, Society of Automotive Engineers, 2015 World Congress, Detroit, MI, April 2015.
- “The Hybrid III Upper and Lower Neck Response in Compressive Loading Scenarios with Known Human Injury Outcomes,” 58th Annual Scientific Conference of the Association for the Advancement of Automotive Medicine (AAAM), Munich, DEU, October 2014.
- “Occupant Protection Study”, US Consumer Product Safety Commission: Recreational Off-Highway Vehicles (ROVs) Meeting, Bethesda, MD, November 2011.
- “Exploring the Role of Lateral Bending Postures and Asymmetric Loading on Cervical Spine Compression Responses”, 2009 ASME International Mechanical Engineering Congress & Exposition, Lake Buena Vista, FL, November 2009.
- “Vehicle Chassis, Body, and Seat Belt Buckle Acceleration Responses in the Vehicle Crash Environment,” Society of Automotive Engineers, 2009 World Congress, Detroit, MI, April 2009.
- “Investigation of Active Steering/Wheel Torque Control at the Rollover Limit Maneuver,” Society of Automotive Engineers, 2004 Automotive Dynamics Stability Conference, Detroit, MI, May 2004.

