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Curriculum Vitae

Daniel J. Melcher, P.E.



Professional Profile

Mr. Melcher is a Professional Engineer and consultant with experience, education, and training in the fields of mechanical engineering, transportation engineering, and forensic engineering. His practice currently focuses on providing transportation safety consulting services to legal, insurance, governmental, and corporate clients throughout North America.

Specific areas of expertise include vehicle collision reconstruction, commercial vehicle crash investigation and analysis, highway work zone traffic control safety, roadway design and traffic control devices, vehicle system components and dynamics, and driver factors and transportation safety statistics.

His ongoing transportation safety research and international safety policy consulting have resulted in many peer-reviewed publications and presentations at technical conferences and professional forums around the world. Mr. Melcher directs the national engineering activities of the Focus Forensics consulting engineering firm. He has provided expert witness testimony in criminal proceedings and civil litigation at deposition, mediation, and jury trial levels in 21 states.

Licensure

- Professional Engineer, State of Alabama, #28402-E
- Professional Engineer, State of Arkansas, #16551
- Professional Engineer, State of Colorado, #41896
- Professional Engineer, State of Florida, # 61950
- Professional Engineer, State of Georgia, #PE-039427
- Professional Engineer, State of Illinois, # 62-057169
- Professional Engineer, State of Kentucky, #27418
- Professional Engineer, State of Michigan, #6201058577
- Professional Engineer, State of Mississippi, #25810
- Professional Engineer, State of Texas, #103212

Contact Information

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Evanston, IL 60201

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133 E. 143rd Avenue
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Education

Georgia Institute of Technology
Atlanta, Georgia
Master of Science in Transportation Engineering

Virginia Tech
Blacksburg, Virginia
Bachelor of Science in Mechanical Engineering



Professional Certification

Board Certified Diplomate in Forensic Engineering
Council of Engineering and Scientific Specialty Boards through NAFE

Accredited Accident Reconstructionist
Accreditation Commission for Traffic Accident Reconstruction (ACTAR),
#1329

Certified Traffic Control Supervisor
American Traffic Safety Services Association (ATSSA)

Work Zone Traffic Control Supervisor
Florida Department of Transportation

Certified Crash Data Retrieval (CDR) Technician and Analyst
Vetronix

Factory-Certified Engine Control Module (ECM) Data Extractor
Detroit Diesel

U.S. DOT Qualified Motor Carrier Safety Inspector

Professional Affiliations

Institute of Transportation Engineers (ITE), Member (Transportation Safety
Council)

National Academy of Forensic Engineers (NAFE), Senior Member

Society of Automotive Engineers (SAE), Member

SAE Technical Publication Review Committee Member, Accident
Reconstruction Section and Commercial Vehicle Engineering Section

American Society of Mechanical Engineers (ASME), Member

American Society of Civil Engineers (ASCE), Member

National Society of Professional Engineers (NSPE), Member

International Association of Accident Reconstruction Specialist (IAARS),
Member

National Association of Professional Accident Reconstruction Specialists, Inc.
(NAPARS), Member

Work Experience

Focus Forensics, LLC
Director of Engineering:
2014-Present

Armstrong Forensic Engineers, Inc.
Vice President and Director of Engineering:
2006-2014

Graduate School of Purdue University
Graduate Faculty: *2011-2014*

Rimkus Consulting Group
Project Consultant: *2003-2006*

Kimley-Horn and Associates
Forensic Engineering Analyst: *2003*

Zook, Moore & Associates
Forensic Engineering Analyst: *2000-2003*

Georgia Institute of Technology
Research Assistant: *1999-2000*

Toyota Motor Manufacturing Kentucky
Engineering Co-op: *1996-1997*



Professional Development

Accident Dynamics Research Center

- Human Factors: Understanding Driver Response, 2006

American Traffic Safety Services Association (ATSSA)

- Florida Advanced Work Zone Traffic Control, 2004
- Florida Advanced Work Zone Traffic Control Refresher Course, 2008
- Florida Advanced Work Zone Traffic Control Refresher Course, 2012

Collision Safety Institute

- Vetronix Crash Data Retrieval (CDR) Certified Analyst Course, 2005
- Annual Crash Conference and Full Scale Crash Testing, 2006
- Annual Crash Conference and Full Scale Crash Testing, 2007
- Annual Crash Conference and Full Scale Crash Testing, 2009
- Annual Crash Conference and Full Scale Crash Testing, 2011

Detroit Diesel Training Center

- Engine Control Module (ECM) Data Extraction Certification Course, 2005

Engineering Dynamics Corporation

- Accident Reconstruction Training Course, 2002

European Association for Accident Research and Analysis

- 22nd Annual Congress, 2013
- 24th Annual Congress, 2015

Georgia Institute of Technology Continuing Education Program

- Traffic Signal Operations at Local Intersections, 1999
- Traffic Signal Operations in Coordinated Systems, 1999

Institute of Traffic Accident Investigators (ITAI)

- Motorcycle Collision Reconstruction Seminar, 2011
- Pedestrian Collision Reconstruction Seminar, 2011
- International Conference on Collision Investigation, Interpretation, and Reconstruction, 2011

Institute of Transportation Engineers (ITE)

- ITE Technical Conference: Making a Difference in Transportation Safety, 2007
- ITE/FHWA Safety Evaluation and Crash Modification Seminar, 2007

National Academy of Forensic Engineers (NAFE)

- General Topics in Forensic Engineering, 2007
- General Topics in Forensic Engineering, 2008
- General Topics in Forensic Engineering, 2009
- General Topics in Forensic Engineering, 2009
- Advanced Topics in Accident Reconstruction, 2009
- General Topics in Forensic Engineering, 2010
- Advanced Topics in Accident Reconstruction, 2010
- General Topics in Forensic Engineering, 2011
- General Topics in Forensic Engineering, 2012
- Advanced Topics in Accident Reconstruction, 2012
- General Topics in Forensic Engineering, 2013
- Advanced Topics in Accident Reconstruction, 2013
- General Topics in Forensic Engineering, 2015
- Advanced Topics in Accident Reconstruction, 2015
- General Topics in Forensic Engineering, 2016
- Advanced Topics in Accident Reconstruction, 2016

National Lift Truck

- OSHA Industrial Powered Lift Truck Operator Course, 2013
- OSHA Industrial Powered Lift Truck Train-the-Trainer Course, 2013

Northwestern University Center for Public Safety

- Traffic Accident Reconstruction I, 2001
- Traffic Accident Reconstruction 2, 2001
- Heavy Vehicle Crash Reconstruction, 2004
- Advanced Crash Reconstruction Utilizing Human Factors, 2014

Red Vector

- Florida Professional Engineering Laws and Rules, 2005
- Florida Professional Engineering Laws and Rules, 2007
- Bicycle and Pedestrian Design, 2007
- Better Roadway Design – Intersections, 2007
- Florida Professional Engineering Laws and Rules, 2009
- Florida Professional Engineering Laws and Rules, 2011
- Florida Professional Engineering Laws and Rules, 2013



Professional Development Continued

Society of Automotive Engineers (SAE)

- Motor Vehicle Accident Reconstruction, 1999
- Passenger Vehicle Rollover TOPTEC: Causes, Prevention, and Injury, 2002
- Commercial Vehicle Braking Systems, 2008
- Event Data Recorder Symposium, 2011
- Applied Vehicle Dynamics, 2012
- Applying Automotive EDR Data to Traffic Crash Reconstruction, 2013
- Society of Automotive Engineers World Congress, 2016
- Reconstruction and Analysis of Motorcycle Crashes, 2016
- Reconstruction and Analysis of Rollover Crashes of Light Vehicles, 2016

Society of Forensic Engineers and Scientists

- Technical Seminar, 2015

Transportation Research Board Human Factors Workshop

- Human Factors in the Courtroom: Accident Analysis in the Real World, 2000
- What Causes Accidents and How to Prevent Them, 2001
- Fatalities Arising from Driving in Rural America: What Can Be Done, 2002

U.S. DOT Transportation Safety Institute

- U.S. DOT Motor Carrier Safety Inspector Qualification (396.19), 2008

Visual Statement

- Advanced Animation & Engineering Analysis Using FX3, 2008

World Reconstruction Exposition (WREX)

- Crash Conference and Full Scale Crash Testing, 2016
- Driver Response
- Rollover Crash Reconstruction
- Speedometers and Collision Reconstruction
- Motorcycle Collision Reconstruction
- Motorcycle Speed from Deformation
- Electronic Data Recorder Update
- Pedestrian Collision Reconstruction
- Commercial Vehicle Air Brakes
- Video Collision Analysis

Seminar and Course Presentations

“Assessment of Intersection Visibility of Various Temporary Traffic Control Device Setups”, Midwestern/ Great Lakes ITE Conference, 2016

“Maintenance of Traffic and Roadway Design Analysis”, World Reconstruction Exposition (WREX), 2016

“Testing Methodology to Evaluate Reliability of a “Frozen” Speedometer Reading in Motorcycle/ Scooter Impacts with Pre-Impact Braking”, Society of Automotive Engineers World Congress, 2016

“Forensic Engineering Technology Solution for Highway Work Zone Temporary Traffic Control Investigations”, National Academy of Forensic Engineers, 2016

“Photogrammetric Reconstruction Methodology and Engineering Validation for Video-Captured Pedestrian Collisions”, Proceedings of the 24th Annual Congress of the European Association for Accident Research and Analysis (EVU), 2015

“Handling Roadway Maintenance of Traffic Claims”, 21st Annual West Region Construction Litigation Conference, 2015

“Accident Reconstruction and Claims Management”, 12th Annual Service Rental Car Program Conference, 2015

“Forensic Photogrammetric Analysis and Engineering Validation of Video-Captured Pedestrians Collisions” *Society of Forensic Engineers and Scientists*, Technical Seminar, 2015

“Bicycle Tire Friction Coefficient Variance in Wet and Dry Conditions Across Multiple Surface Pavement Types” *European Association for Accident Research and Analysis*, 22nd Annual Congress, Florence, Italy, 2013

“Advanced Forensic Engineering Techniques in Accident Reconstruction” *Special Seminar*, National Academy of Forensic Engineers, 2012

“Applications of GPS Data in Collision Reconstruction” *10th ITAI International Conference on Collision Investigation, Interpretation, and Reconstruction*, Leeds, England, 2011

“Handling Large Loss Claims with Limited Information” *PLRB Large Loss Conference*, 2011

“Forensic Engineering Applications of GPS Data” *General Topics in Forensic Engineering Seminar*, National Academy of Forensic Engineers, 2011



Seminar and Course Presentations Continued

- “Applications of GPS Data for Collision Reconstruction” *Collision Safety Institute*, Annual Crash Conference, 2011
- “Forensic Engineering Analysis of Loading Dock Traffic Patterns” *General Topics in Forensic Engineering Seminar*, National Academy of Forensic Engineers, 2010
- “Forensic Engineering Applications in Commercial Vehicle Safety” *Advanced Topics in Accident Reconstruction*, National Academy of Forensic Engineers, 2010
- “Forensic Engineering Analysis of Night-Time Pedestrian Collisions” *General Topics in Forensic Engineering Seminar*, National Academy of Forensic Engineers, 2010
- “Vehicular and Driver Factors in Commercial Vehicle Safety” *1st International Road Safety Conference*, Cape Town, South Africa, 2009
- “Roadway Maintenance Factors in Collision Reconstruction” *1st International Road Safety Conference*, Cape Town, South Africa, 2009
- “Forensic Engineering Analysis of Commercial Vehicle Dynamics” *General Topics in Forensic Engineering Seminar*, National Academy of Forensic Engineers, 2009
- “Forensic Engineering Applications in Transportation Safety” *Guest Lecturer, Transportation Safety Graduate Course*, Department of Civil and Environmental Engineering, Fulton School of Engineering, Arizona State University, 2009
- “Commercial Vehicle Dynamics for Collision Reconstruction” *Collision Safety Institute*, Annual Crash Conference, 2009
- “Night-time Pedestrian Safety Factors in South Africa” *1st Annual Road Safety Conference*, Republic of South Africa Road Traffic Management Agency, 2007
- “Night-time Pedestrian Collision Reconstruction Factors” *Collision Safety Institute*, Annual Crash Conference, 2007
- “Vehicle Accident Analysis & Reconstruction”,
“Commercial Vehicle Accident Reconstruction”,
“Roadway Design, Safety, and Work Zone Evaluations”,
“Impact and Damage Analysis of Low-Speed Vehicle Collisions”,
“Airbag and Seatbelt Pre-tensioner Technology”, “Damage Analysis for Evaluating Consistency and Fraud” *Rimkus Consulting Group, Inc.*, taught at multiple locations on multiple dates, 2003 – 2006
- “Roadway Design and Construction Zone Safety Evaluations” *National Association of Subrogation Professionals*, 2004 Annual Conference, 2004
- “Forensic Engineering: Answering the Questions What, Why and How” *Florida Chapter of American Society of Civil Engineers (ASCE)*, 2003

- “Comprehensive Methodology for Evaluating Sight Distance for Major Road Left Turns” *Institute of Transportation Engineers*, Annual Meeting and Exhibit, 2003
- “Driver Oversteer and Directional Control Loss: Physical Fundamentals and Transportation Safety Applications” *Transportation Research Board*, 81st Annual Meeting, 2002
- “Sight Distance for Left Turns from the Major Road: Assessment of Gap Acceptance Methodology from a Vehicle/Driver Performance Perspective” *TRANSPO*, 2002 Conference "Safety under the Sun: Technology for Safe and Secure Transportation," 2002
- “Bayesian Analysis Development: Feasibility of “Subjective” Engineering Evaluations for Assessing Road Safety Improvements” *Transportation Research Board*, 80th Annual Meeting, 2001
- “Traffic Signal Operations in Coordinated Systems” *Georgia Institute of Technology*, Continuing Education Program, 2000

Technical Reports and Publications

- Melcher, D., Keller, R., “Forensic Engineering Technology Solutions for Highway Work Zone Temporary Traffic Control Investigations.” National Academy of Forensics Engineers, 2016
- Montalbano, P., Melcher, D., Keller, R., Rush, T., Przybyla, J., “Testing Methodology to Evaluate Reliability of a “Frozen” Speedometer Reading in Motorcycle/ Scooter Impacts with Pre-Impact Braking.” SAE Technical Paper 2016-01-1482, 2016
- Melcher, D., Rush, T., Przybyla, J., Keller, R., Montalbano, P., “Photogrammetric Reconstruction Methodology and Engineering Validation for Video-Captured Pedestrian Collisions”, Proceedings of the 24th Annual Congress of the European Association for Accident Research and Analysis (EVU), 2015
- Rush, T., Przybyla, J., Melcher, D., Sax, C., “Video Analysis and Analytical Modeling of Actual Vehicle/ Pedestrian Collisions.” SAE Technical Paper 2014-01-0483, 2014
- “Bicycle Tire Friction Coefficient Variance in Wet and Dry Conditions Across Multiple Surface Pavement Types” *European Association for Accident Research and Analysis*, 22nd Annual Congress, Florence, Italy, 2013
- Przybyla J., Rush T., Melcher D., Robinson S., “Light Bulb Filament Distortion Thresholds by Voltage and Delta-V.” SAE Technical Paper 2013-01-0752, 2013
- “Applications of GPS Data in Collision Reconstruction” *Collision Magazine*, 2011



Technical Reports and Publications Continued

“Applications of GPS Data in Collision Reconstruction” *Proceedings of the 10th ITAI International Conference on Collision Investigation, Interpretation and Reconstruction*, Leeds, England, 2011

“Commercial Vehicle Dynamics for Collision Reconstruction” *Collision Magazine*, 2009

“Vehicular and Driver Factors in Commercial Vehicle Safety” *Proceedings of the 1st International Road Safety Conference*, Cape Town, South Africa, 2009

“Roadway Maintenance Factors in Collision Reconstruction” *Proceedings of the 1st International Road Safety Conference*, Cape Town, South Africa, 2009

“Risk Evaluation for Highway Transportation of “Toxic Gas” Hazardous Materials” Co-authored with Liu Hao-Xue of the School of Automobile Engineering, Chang’an University, China. *Transportation & Development Institute 9th International Conference of Chinese Transportation Professionals*, 2009

“Commercial Vehicle Dynamics for Collision Reconstruction” *Proceedings of the Republic of South Africa Road Traffic Management Agency 2nd Annual Crash Conference*, 2008

“Statistical Cause Analysis and Potential Countermeasures for Commercial Motor Vehicle Collisions in China” Co-authored with Yiyi Wang of the Beijing University of Technology, Beijing China. *Transportation & Development Institute Symposium on Transportation and Development Innovative Best Practices*, 2008

“Understanding Heavy Truck Engine Data Recorders” Co-author of informational website, www.heavytruckedr.org, 2007

“Night-time Pedestrian Safety Factors in South Africa” *Proceedings of the Republic of South Africa Road Traffic Management Agency 1st Annual Crash Conference*, 2007

“Night-time Pedestrian Collision Reconstruction Factors” *Collision Magazine*, 2007

“Comprehensive Methodology for Evaluating Sight Distance for Major Road Left Turns.” *ITE Compendium of Technical Papers*, 2003

“Sight Distance for Left Turns from the Major Road: Assessment of Gap Acceptance Methodology from a Vehicle/Driver Performance Perspective” *Proceedings of the TRANSPORTO 2002 Conference - "Safety under the Sun: Technology for Safe and Secure Transportation"*, 2002

“Driver Oversteer and Directional Control Loss: Physical Fundamentals and Transportation Safety Applications” *Proceedings of the 81st Transportation Research Board Annual Meeting*, 2002

“Feasibility of ‘Subjective’ Engineering Assessments of Road Safety Improvements: Bayesian Analysis Development” *Transportation*

Research Record 1758, “Highway Safety Design, Features, and Evaluation,” 2001

“Bayesian Analysis Development: Feasibility of “Subjective” Engineering Evaluations for Assessing Road Safety Improvements” *Proceedings of the 80th Transportation Research Board Annual Meeting*, 2001

“Scientific Approaches for Transportation Research” Co-author. *National Cooperative Highway Research Program Project 20-45*, 2000

Academic Research Programs

“Investigation and Identification of Principal Factors Contributing to Fatal Crashes in the Southeastern United States” Georgia Tech and Federal Highway Administration, 1999-2000

“Investigation of Countermeasures for Reducing Fatal Crashes in Georgia: A Causal Chain Analysis” Georgia Tech and Georgia Department of Transportation, 1999-2000



Select Project Experience

Vehicular Accident Investigation and Reconstruction

Mr. Melcher began conducting accident reconstructions in 1999 as part of a safety research program conducted for the Federal Highway Administration and the Georgia Department of Transportation. To date Mr. Melcher has consulted on over 2000 cases in over 40 states and Canada, covering a wide variety of vehicle types and collision scenarios.

- Automobiles
- Tractor-Trailers / Commercial Vehicles
- Buses
- Motorcycles
- Pedestrians and Rollerbladers
- Bicycles
- Trains and Light Rail Transit
- ATV's, Golf Carts, and Unusual Vehicles
- Vehicle Components (Braking, Steering, Suspension, and Throttle Systems)
- Tire analysis
- Immediate Response Site and Vehicle Inspections
- Data Collection
- Scene Mapping
- Sequence Determination
- Speed, Delta-V, and Principal Direction of Force (PDOF) Calculations
- Vehicle Rollovers
- Occupant Restraint Systems
- Headlamp Analyses
- Avoidance Analysis
- Distance-Time Evaluations
- Airbag Module Downloads and Data Analysis
- Driver Perception, Response, and Visibility Studies
- Diagrams, Graphics, Demonstrative Evidence, and Written Reports
- Expert Testimony
- Electronic Data Recorder (EDR) and "black box" data downloads and analysis
- Global Positioning (GPS) data downloads and analysis

Commercial Vehicle Collision Investigation and Reconstruction

Mr. Melcher is an expert in the field of commercial vehicle collisions with hundreds of vehicle inspections, scene inspections, and analyses. He is qualified by the U.S. DOT as a Motor Carrier Safety Inspector and has been trained extensively in heavy vehicle air brake systems and engine control module data retrieval. He is considered an international expert on commercial vehicle safety issues, speaking at technical forums, providing policy consulting to government agencies, and authoring peer-reviewed journal articles from South Africa to China and on the worldwide web.

- Federal Motor Carrier Safety Regulations
- Mechanical System Inspections and Out-of-Service Determinations
- Driver Hours-of-Service Logs and Rules
- Air Brake System Design, Function, and Safety
- Tractor-Trailer Dynamics and Articulated Vehicles
- Engine Control Module (ECM) Data Retrieval and Analysis
- Reconstruction of Collisions Involving Single or Multiple Heavy Vehicles

Transportation Safety Engineering

Given his expertise in the fundamentals of transportation and traffic safety, Mr. Melcher has been retained by clients nationwide to evaluate the safety characteristics of transportation facilities, including roadways, intersections, parking lots, driveways, transit stations, and pedestrian paths.

- Highway Work Zone Safety and Temporary Traffic Control
- Intersection Sight Distance
- Traffic Signals and Pedestrian Signals
- Signs, Pavement Markings, and Traffic Control Devices
- Roadside Hazards and Barriers
- Geometric Design of Curves, Hills, Lanes, Medians, and Shoulders
- Advanced Warning and Positive Guidance for Motorists
- Federal, State, and Local Standards and Guidelines
- Parking Lot and Pedestrian Facility Design
- Highway-Rail Grade Crossings