THE EXPERTS
Robson Forensic

MARCUS A. MAZZA, P.E.
Mechanical/Automotive Expert

Provide technical investigations, crashworthiness and engineering, and accident reconstruction analysis.

**Motor Vehicle Design, Development and Testing** – from requirements, concept through validation field-testing of complete vehicles, including manufacturing. Failure Mode Effects Analysis (FMEA) for products & process and DVP&R development. Testing pre-production and production vehicles in extreme environments at or above rated capabilities. Federal Motor Vehicle Safety Standard (FMVSS) and other regulatory requirement compliance.

**Motor Vehicle System Design, Development and Testing** – conventional and anti-lock brakes; electronic stability control; powertrain; suspension; steering; tires; electrical; frames; and structures.

**Motor Vehicle Failures** – air bag; structural; suspension; axle; spindle failure and separation; wheel and bearing failure; transmission failure; sudden acceleration; cruise control; steering; frame rail; wheel separation; steering; ABS; electronic stability control; transmission; fuel injection and electronic engine controls; car, light truck and medium truck brakes; trailer hitches.

**Motor Vehicle Repair** – diagnosis and repair of engine, transmission, transfer case, differential and final drive, suspension and steering systems, conventional and anti-lock brake systems, stability/traction control, fuel system, emissions systems, climate control, primary and supplemental restraint systems, lighting/electrical, interior/exterior components and systems, interaction of dealers and manufacturers, and Safety Recall repairs. Proper use of service repair tools and equipment, repair procedures and shop operations.

**Manufacturing Process and Equipment** – hand tools, torque verification means and methods, Statistical Process Control (SPC), stamping, welding (TIG/MIG), tube bending.

**Vehicle Accident Reconstruction –** inspection of damaged vehicle and components. Site inspection. Review of police report, witness statements, scene photos and other documents. Computational recreation of the accident using facts and scientifically accepted methodology to determine how the accident occurred, including elements within the accident. All to determine cause(s) of the accident, including the resulting severity.

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**PROFESSIONAL EXPERIENCE**

2014 to present **Robson Forensic, Inc**.
*Associate*

- Provide technical investigations, analysis, reports, and testimony toward the resolution of commercial and personal injury litigation involving vehicle collisions, vehicle crashworthiness and engineering issues, mechanical defects and malfunctions, and vehicle repair issues for passenger cars, light trucks, SUVs, medium and heavy trucks.

2011 to 2014 **Department of Defense – Army**, Aberdeen Proving Grounds, MD
*US Army Materiel Systems Analysis Activity (AMSAA)*

- Served as acting mobility team lead for six months, performing team workload planning, budgeting, management and mentoring, resulting in increased reports generation and renewed focus on methodology development and analysis tools refinement
- Vehicle dynamics and mobility specialist within the Mobility Power & Energy (MPE) Branch, providing modeling, simulation, and subject matter expertise (SME)
- Led numerous mobility analyses including: Mine Resistant Ambush Protected (MRAP), Stryker, Logistics Vehicle System Replacement (LVSR), and Joint Light Tactical Vehicle (JLTV) stability, handling and performance studies, the Stryker Analysis of Alternatives (AoA)/Business Cost Analysis (BCA) efforts, and the Rollover Detection Warning System (RDWS) studies
- Expanded modeling and simulation capabilities within the Mobility Team, which included leading a team of AMSAA mobility analysts and contractors to develop in-house Electronic Stability Control (ESC) modeling and simulation capabilities
- Developed relationships with outside organizations including the Joint Program Office (JPO) MRAP, Program Manager (PM) LVSR, PM Stryker Brigade Combat Team (SBCT), Army Research Laboratory (ARL), Army Evaluation Center (AEC), and Aberdeen Test Center (ATC), which has resulted in funding for numerous projects
- Influential in the development of the Program Executive Office (PEO) Ground Combat Systems (GCS) Campaign Plan Analysis Tool (CPAT) and Whole Systems Trade Analysis Tool (WSTAT), and involved in the WSTAT Verification, Validation and Accreditation (VV&A) effort

2010 to 2011 **ManTech International Corporation**, Aberdeen Proving Grounds, MD
*Operational Research Systems Analyst (ORSA)*

- Provided modeling, simulation, and SME support to the AMSAA MPE Branch
- Analyzed on-road performance of military tactical vehicles using software packages including: TruckSim, CarSim, SuspensionSim, Motion View, and Adams
- Analyzed off-road performance of military tactical vehicles and tracked vehicles using software packages including the NATO Reference Mobility Model (NRMM) and VehDyn 4

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2007 to 2009 **Roehrig Engineering Inc.**, Lexington, NC; Meuspath, Germany
*Director of International Sales and Service*

- Setup and managed European office at the Nuerburgring in Germany
- Solely responsible for all sales, training, service, and repair functions throughout Europe
- Setup and attended various testing and motorsports expos to help increase exposure and sales in Europe
- Assisted in software debugging and updating of machine/software manuals to meet CE standards
- Performed independent projects such as characterizing and testing the acceleration and frequency dependency of shocks
- Gained in depth knowledge of servo controlled linear/rotary drive systems and variable frequency drive (VFD) controlled rotary systems

2006 to 2007 **R2R Inc.,** Lexington, NC
*Plant Engineer*

- Designed, installed and tested complete 25,000 cfm dust collection system including; blower and baghouse, airlock and auger, ducting, fire suppression system and motor control center
- Responsible for daily operations, equipment maintenance and new equipment installation

2004 to 2011 **MIWorks Corporation**, Troy, MI
*President*

- Co-founded MIWorks, an engineering design, prototyping, and consulting company
- Designed, constructed, and tested a motorcycle powered sports racer homologated for Sports Car Club of America (SCCA) D-Sports Racer (DSR) and C-Sports Racer (CSR)
- Modified design and sourced components for 2nd generation prototypes and production series
- Founded MITechnik in 2010, a small automotive repair shop and inspection station located in Manheim, Pennsylvania, which specialized in German cars, as part of the MIWorks family

2000 to 2006 **DaimlerChrysler Corporation**, Auburn Hills, MI
*Core Vehicle Dynamics*

- Oversaw the Body on Frame (BOF) Truck Platform dynamics group, insuring that their products complied with the guidelines set forth by the core group, along with all safety guidelines set forth by the government
- Supported the BOF group through simulation and testing, both on the component and full vehicle level
- Developed and evolved the guidelines which the core group upheld
- Researched and conducted independent projects which further increased the knowledge base and capabilities of the core group

*ATG (Austauschgruppe)*

- Selected to participate in German exchange program consisting of two six month rotations with the Mercedes car group in Stuttgart, Germany
- Completed three projects which were chosen and outlined by the core dynamics group
- Ride Comfort Tool: Built a duplicate objective ride measurement tool as used by Mercedes. Learned and translated all associated software, and developed a user manual for aid in the training of Chrysler personnel in the use of this tool
- ABS/ESP Hardware in the Loop (HIL) Test Bench: Assisted in the development of an HIL test bench, giving the core group the capability of running ABS/ESP maneuvers in their full vehicle simulations
- Active Damping Vehicle: Assisted in retrofitting a Chrysler 300C with an internally developed Mercedes-Benz active damping system, and responsible for initial tuning of the system in order to showcase the technology to the Chrysler group

*CIE (Chrysler Institute of Engineering) program*

- Rotated through five diverse engineering positions in two year program for new college graduates
- Newark Assembly Plant: Resident engineer responsible for all aspects of front end alignment during the second generation Durango launch
- BOF Platform Vehicle Dynamics: Assisted in the tuning of all components which affect the ride and handling for body on frame platforms
- Front Wheel Drive (FWD) Automatic Transmission: Supported the re-design and testing of front wheel drive transmission components in an effort to reduce costs as part of the material cost management (MCM) initiative
- Motorsports Chassis: Provided factory support to all Chrysler backed race teams
- Advanced Vehicle Engineering (AVE): Acted as bridge between design office and engineering, in order to insured concept and packaging feasibility of new large car platforms

*Intern*

- Analyzed current test procedures used in evaluating the performance and aggressivity of airbags
- Developed a model using Madymo to simulate possible new test configurations for assessing low-risk deployment airbags

**PROFESSIONAL CREDENTIALS**

Professional Engineer: Florida, Georgia, Kansas, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Texas, Virginia
Certified Amusement Ride Inspector, General: Commonwealth of Pennsylvania
Certified Inspection Mechanic, Class 1: Commonwealth of Pennsylvania, 2010-2013
Certified Emissions Inspector: Commonwealth of Pennsylvania, 2010-2012
Defense Acquisition SPRDE-SE Level 2 Certified, 2013

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**EDUCATION**

Master of Science in Mechanical Engineering, University of Michigan, Dearborn, MI, May 2003
Bachelor of Science in Mechanical Engineering, Lehigh University, Bethlehem, PA, May 2001

*Continuing Education*
Point Clouds in Collision Reconstruction: Speed from Video and Crush from Photos, Lightpoint, August 2022
Pennsylvania Amusement Ride Safety Seminar, Pennsylvania Department of Agriculture Bureaus of Ride and Measurement Standards, November 2021
Video Evidence Training Symposium, iNPUT-ACE, June 2020
Photogrammetry and Analysis of Digital Media, SAE International, September 2019
Interactive Driver Response Research Program (I.DRR) Instruction, Crash Safety Solutions, August 2019
Accident Reconstruction, The Autonomous Vehicle and ADAS, SAE International, April 2019
Pennsylvania Amusement Ride Safety Seminar, Pennsylvania Department of Agriculture Bureaus of Ride and Measurement Standards, November 2017
Pennsylvania Amusement Ride Safety Seminar, Pennsylvania Department of Agriculture Bureaus of Ride and Measurement Standards, March 2017
Traffic Crash Reconstruction – 3, Northwestern University Center for Public Safety, 2016
Traffic Crash Reconstruction – 2, Northwestern University Center for Public Safety, 2015
Traffic Crash Reconstruction – 1, Northwestern University Center for Public Safety, 2014
Lessons in Leadership, Business Training Works, 2013
SPRDE-SE Level 2, Defense Acquisition University, 2012-2013
- ACQ 201A – Intermediate Systems Acquisition, Part A
- ACQ 201B – Intermediate Systems Acquisition, Part B
- SYS 202 – Intermediate Systems Planning, Research, Development, and Engineering, Part I
- SYS 203 – Intermediate Systems Planning, Research, Development, and Engineering, Part II
- CLE 003 – Technical Reviews

SPRDE-SE Level 1, Defense Acquisition University, 2011-2012
- ACQ 101 – Fundamentals of Systems Acquisition Management
- SYS 101 – Fundamentals of Systems Planning, Research, Development, and Engineering
- CLM 017 – Risk Management

Civilian Leader Advanced Course Phase 1, CES, 2012
NATO Reference Mobility Model Training Workshop, MTC, 2012
Introduction to Brake Control Systems: ABS, TSC, and ESC, SAE, 2011
Virtual.Lab – 3D Dynamic Simulation using Multibody Simulation, LMS, 2011
Michelin Driver Training Class: Laurens Proving Ground, Michelin Inc., 2004
Applied Vehicle Dynamics Seminar, OptimumG, 2004

Fundamentals of Multibody Dynamics Analysis with Adams, MSC, 2004
MotionView/MotionSolve Intro, Altair, 2004
GD&T Training Course, DaimlerChrysler, 2002
Chrysler Institute for Engineering: Dealer Tech Training, DaimlerChrysler, 2001

**PROFESSIONAL MEMBERSHIPS and AFFILIATIONS**

Society of Automotive Engineers (SAE), 1998-2006, 2014-present
National Auto Sport Association (NASA), 2005-2017
Sports Car Club of America (SCCA), 2003-present
BMW Car Club of America, 2009-2012
Pi Tau Sigma – Honorary Mechanical Engineering Society, 2000
Phi Eta Sigma – National Honor Society, 1998

**PATENTS**

Vehicle Fuel Tank for Improved Crashworthiness, U.S. Patent #10000328

**PUBLICATIONS**

Peter J. Leiss, Marcus A. Mazza, Erin M. Shipp, "Heavy Truck Fuel Storage System Design for Improved Impact Protection," ASME Technical Paper IMECE2019-11854, 2019

Ross Brown, Marcus Mazza, Dy Le, and Muthuvel Murugan, "Comparison of Generalized Predictive Control Algorithm Using a Full Vehicle Multi-Body Dynamics Model," SAE Technical Paper 2012-09-24, 2012

Marcus Mazza, Matthew Rhoads, et al, "Software-Based Electronic Stability Controller for Tactical Wheeled Vehicles," NDIA GVSETS Technical Paper, 2012

**TEACHING**

Forensic Crash Course Part 2 - National Highway Traffic and Safety Administration - Office of Defects Investigation, December 2021
ADAS and the Autonomous Vehicle - National Highway Traffic and Safety Administration - Office of Defects Investigation, May 2021
Forensic Crash Course Part 1 - National Highway Traffic and Safety Administration - Office of Defects Investigation, April 2021

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## RACING EXPERIENCE

### Competition Race Licenses

- Waterford Hills Road Racing, Inc. (WHRRI): 2004-2006
- NASA: 2006-2016
- SCCA: 2014-2018
- ChumpCar: 2012-2015

### ChumpCar

- Converted a Plymouth Neon into a ChumpCar legal racecar, 2012
- The car successfully competed in numerous endurance events, including several 24 hour enduros. 2012-2014

### Spec Miata

- Built a 1.6L Spec Miata from the ground up for competition in both SCCA and NASA sanctioned events, 2006-2014
- Built a 99 Spec Miata from the ground up for competition in both SCCA and NASA sanctioned events, 2013-2016

### Spec Neon

- Converted an SSC (Showroom Stock C) Neon into a Spec Neon for competition in both WHRRI and NASA sanctioned events, 2003-2006

### American Viper Racing (AVR)

- Served as a volunteer mechanic and crew member for the AVR American Le Mans team, 2001

### Lehigh Formula SAE Race Team

- Member of the Lehigh Formula SAE Race Team, assisting in the design and construction of Lehigh's '99 formula racecar, 1997-1999
- Served as Team Captain Junior and Senior years, leading the design and construction of Lehigh's '01 formula racecar, 1999-2001