

THE EXPERTS
Robson Forensic

STEVEN J. BECKER
Mechanical Engineer

Provide technical investigations, analysis, reports, and testimony towards the resolution of litigation involving product liability, accident reconstruction, mechanical engineering, and photogrammetric/video 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; DVP&R development; as well as writing trouble shooting and service procedures. Testing pre-production and production vehicles in extreme environments at or above rated capabilities.

Motor Vehicle System Design, Development and Testing – conventional and anti-lock brakes; restraints; powertrain; throttle-by-wire; seat; gear shift; transmission; 4WD and drivetrain systems (axle, shafts, PTUs); vehicle control modules testing; suspension; steering; tires; electrical; climate control; frames; bumpers; and structures.

Motor Vehicle Failures – seat belt; seat retention, air bag; structural; suspension; axle, spindle failure and separation; wheel and bearing failure; transmission or transfer-case failure; sudden acceleration; steering; frame and unibody; steering; ABS; off-road utility vehicles (ATV and UTV), golf cart, car, light truck and medium truck brakes; trailer hitches; throttle by wire; electronic throttle and vehicle systems control.

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, video, network, multiplexing, 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 – Gear processing and heat treatment, pneumatic and DC powered tools, hand tools, torque verification means and methods, Six-Sigma and Statistical Process Control (SPC), Mistake and Error proofing, operator protection means and methods, operator ergonomics, operator lift assists, end-of-line verification machines and testing.

Vehicle Accident Reconstruction – inspection of damaged vehicle and components; CDR/EDR “black box” data retrieval and analysis; Site inspection; Review of police report, witness statements, scene photos and other documents. Computational simulation of the accident using facts and scientifically accepted methodology to determine how the crash occurred, including the resulting severity. Pedestrian knockdowns and their kinematics and interaction with vehicles, roadways, and surfaces.

Digital Forensics – Photogrammetry, Video, and Data Analysis making measurements from images used to identify people, vehicle models, speeds, and geometry changes. Evaluation of video surveillance systems, Dash-cam data analysis, photographs, computer aided drawings (CAD), animations, and simulations related to vehicles, pedestrians, and other scalable objects.

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PROFESSIONAL EXPERIENCE

2009 to present **Robson Forensic, Inc.**
Associate

- Provide technical investigations, analysis, reports, and testimony towards the resolution of commercial and personal injury litigation involving vehicle collisions, pedestrians, vehicle design issues, acoustics, mechanical defects and malfunctions, and vehicle repair issues for: ATVs, UTVs (side by side ATVs), golf carts, bicycles, motorcycles, passenger cars, SUVs, light trucks, and tractor trailers.
- Experienced case work on over 600 investigations and testimony involving: scene diagramming, evidence collection, gunshot acoustics, environmental acoustics, sirens and backup alarms, manufacturing and test machine design, pedestrian knockdown, bicycle collisions, low speed collisions, occupant dynamics and restraint, black box (CDR, EDR, ACM, PCM) download and data analysis, automotive design/engineering and defective repair for: oil changes, lighting systems, engines, transmissions, brake systems, steering and suspension systems, axle systems, driveshafts and universal joints, throttle systems, vehicle structure, bumpers, vehicle dynamics and collision simulations.
- 3D scanning, digital imagery, and video analysis in determining distances and imagery content. Imagery enhancement and photogrammetric measurement.

2009 to present **Fournier, Robson & Associates, LLC**
Associate

- Provide acoustic and vibration monitoring and problem diagnosis involving building acoustics, environmental noise, and machine vibrations.
- Test, data analysis, and instrumentation including: accelerometers, microphones, strain gauges, torque cell, speedometers, thermocouples, position sensors, etc.
- Vehicle engineering and test development consulting.
- Computer aided design (CAD), Animation and Simulation.

1997 to **Magna Powertrain – New Process Gear Division**

2009 *Engineering Test Services Manager*

1999-2009

- An active project engineer and manager for three worldwide manufacturing and two engineering sites' noise and vibration activities; project approval, purchasing, timing, and methodology.
- Managed and trained engineers and mechanics in product development, vehicle and component testing, data analysis, control module testing and data analysis.
- Product design and development engineering for gears, sprockets, chains, shift actuators, control modules, transmissions, 4WD and AWD transercases, PTUs, and axles.
- Negotiation of customer product specifications relating to noise and durability with Audi, BMW, Chrysler, Ford, GM, Honda, Land Rover, Nissan, Porsche, Toyota, and Volkswagen.
- Test vehicle fleet management of use, repair, and inspection.
- Design of the machine, driveshafts and joints, test enclosure, quality, and test plan for product end of line test.
- Developed the capability for electrodynamic shaker durability testing, HALT.

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- Performed vehicle dynamics testing and durability development for traction control systems.
- Developed and taught a course on Design for Test Engineering for powertrain products.
- Used problem solving techniques; Six Sigma, Shainin, Taguchi, Root Cause.

Quality Engineer

1997-1999

- Implemented the quality process for assembly line First Time Capability improvement, and defect repair.
- Provided for the safety of the end of line operators on powertrain test machines.
- Designed methods of noise and imagery analysis for production inspection and repair of manual transaxles, gears sets, power take-off units, and transfer cases.
- Performed process audits and verification of all design changes throughout production that affect noise (FMEA, APQP).
- Designed test apparatus including; motors, controls, shafting, and fixtures.

1994 to
1997

Chrysler Corporation

Sci Lab Engineer from Modern Engineering

- Product instrumentation, testing, and data analysis for Chrysler vehicles including; sound package design, design and development of engine mount systems, induction resonators, control modules, vibration dampers, and various structural components.
- Design, performance, and crash testing for the stiffness of structural components and joints of the vehicle body, including bumpers and the unibody.
- Powertrain and drivetrain noise and vibration specialist.
- Design and testing for Viper, Sebring, Neon, PT cruiser, Grand Cherokee, and Minivan.
- Coordinated shift assignments for engineers, mechanics, and technicians.

1993 to
1994

New Venture Gear

Product Engineer from CDI Corporation

- Designed geared systems for automotive transmissions.
- Established a method of experimentation with accelerometers and microphones and computer simulation.
- Performed acoustic and vibration instrumentation, testing, and analysis of gears, bearings, and shift actuators.

1989 to
1991

Alliant Computer

Computer Network Engineer

- Local Area Network design
- Performed trouble shooting between mini-super computers, terminals, workstations and various PCs with Ethernet and RS232 communications. Re-routing of physical cabling and development of a digital graphics network.
- Back-ups and shell scripts for a Mini-Super computer manufacturer.

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PROFESSIONAL CREDENTIALS

Certified Inspection Mechanic, Class 1 (passenger car / light truck): Commonwealth of Pennsylvania
Amusement Ride Safety - General Qualified Inspector, Pennsylvania State Department of Agriculture

EDUCATION

M.B.A. Syracuse University, Syracuse, NY, 2007
B. S., Mechanical Engineering (with Aerospace), Worcester Polytechnic Institute, Worcester, MA, 1992

Continuing Education:

World Reconstruction Exposition WREX, with testing for pedestrian impacts, human factors, crash reconstruction, video analysis, vehicle sensors, and heavy trucks. 2023
Advanced Human Factors in Traffic Crashes, Crash Safety Solutions, LLC, 2022
iNPUT-ACE Video Evidence Symposium Webinar, (Camera match, reverse projection, comparison analysis, speed analysis), 2021
Acoustical Engineering Society Pro Audio Conference, 2019
Interactive Driver Response Research Program (I.DRR) Instruction, Crash Safety Solutions, 2019
ARC-CSI Crash Conference and the Pedestrian Crash Research Team, Collision Safety Institute, 2017
Pennsylvania Amusement Ride Safety Seminar, Pennsylvania Department of Agriculture Bureaus of Ride and Measurement Standards, 2016, 2017, 2018, 2021, 2023
Traffic Crash Reconstruction 3, Northwestern University Center for Public Safety, 2016
FARO Laser Scanning, 2016, 2018
Traffic Crash Reconstruction - 2, Northwestern University Center for Public Safety, 2015
Timken Tech Series on Bearings - Certificate 2015
Siemens: Durability and Fatigue, Fundamentals of Sound, Driving Dynamics, 2014
Photodeler Photogrammetry, 2014
CDR Data Analyst Certification, 2013
PC-Crash Software Crash Simulation and Animation Skills, 2011, 2013, 2014, 2019
Traffic Crash Reconstruction 1 & 2, Northwestern University Center for Public Safety, 2010
Leika Total Station, Digital Laser Survey Techniques, 2010, 2012
Certified Inspection Mechanic Class, Lancaster County Career and Technology Center, 2009, 2018
Polytec Non-contact Laser Doppler Vibrometry, 2008
Bruel & Kjaer Operational Deflection Shapes Analysis, 2006
Six Sigma Yellow Belt training, 2006
OSHA Compliance, 2003
LMS Modal Testing, 2003
Labview Systems Engineering, 2002
Shainin Red X Apprentice training, 2001
New Venture Gear Off-Road Driving Techniques, 1999

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Small Engine Maintenance and Repair, 1999
Emergency Responder and Hazardous Substances, 1997
Chrysler Performance Driving Techniques, 1996
Dale Carnegie-Effective Communication & Human Relations, 1996
Gear Dynamics and Gear Noise, and LDP analysis, Ohio State University, 1994
Applications in Parallel Axis Gear Design, Drive Systems Technology, 1993

PROFESSIONAL MEMBERSHIPS

American Society for Photogrammetry and Remote Sensing (ASPRS)
AES Audio Forensics technical committee member
Society of Automotive Engineers (SAE)
Pedestrian and Bicycle Information Center
American Whitewater
Audio Engineering Society

PUBLICATIONS

P.J. Leiss, **S. Becker**, G. Derian, "Tire Friction Comparison of Three Tire Types in Warm and Near Freezing Temperatures," *Collision*, 12(1):24-40, 2017
Burns, James, U.S Patent 9,073,515 - System for Removing Snow from a Roof of a Vehicle; July 7, 2015
Parking Brake Use Study, SAE, 2013-01-0199
Tire Friction Comparison of Three Tire Types, SAE, 2013-01-0783
The NP244 Transference Chain Noise Reduction Using a Gemini HyVo Chain System, SAE, 2005-01-2298
1st Order Boom Noise Relationship to Driveline Imbalance, SAE, 2005-01-2299
Measurement of Transference Imbalance, SAE, 2005-01-2297
Gear Noise Rating Prediction Based on Objective Measurements, SAE, 1999-01-1721
Objective Rating of Gear Whine, SAE, 1999-01-1720

OTHER

Boy Scout and Cub Scout Den Leader, 2011-2021
Mountaineering and technical rock climber, 1990-present
Twisted Axles 4WD Club, Founding member, 1999-2004
WPI Computer lab monitor/instructor, 1988-1992
Cycling and Mountain biking, 1987-present
Soccer and Track coach – various
Whitewater Kayaking
Kayaker, 1993-present
Instructor - teaching river safety, Eskimo roll, self-rescue, and swift water rescue, 1998-present
River rafting guide, Whitewater Challengers, 2015-present

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WHITEWATER EXPERIENCE

River rafting, kayaking, and canoeing, on whitewater rivers and on flat, moving rivers. Outfitting and guiding river trips.

River Running Experience:

Have organized and supervised many recreational rivers trips in the United States and Canada, (New York, Massachusetts, Vermont, Pennsylvania, West Virginia, Maryland, Colorado, Ottawa, Ontario) using rafts, kayaks, canoes. 1990-present.

Rivers Paddled:

CO: Gunnison, Green, South Platte

MD: Gunpowder Falls, Potomac, Savage

NY: Moose, Black, Fish, Beaver, Salmon, Mill Creek, Cazenovia Creek, Limestone Creek, Independence, Raquette, Sacandaga, Schroon, West Canada Creek, Owasco Outlet, Nine Mile Creek, Hudson, Taughannock, Woodhull

PA: Tohicken, Susquehanna, Codorus, Conestoga, Muddy Creek, Mill Creek, Pequea Creek, Pine Creek, Stoney Creek, Lehigh, Schuylkill, Youghiogheny

VT: Deerfield

WV: New River, Cheat Canyon, Gauley, Savage

Canada: Ottawa

Atlantic Ocean

River Education and Teaching:

River running from Syracuse University Outing Club, whitewater kayaking, 1993-1998

Rafting experience with outfitters on the Black River, NY, New River, WV, Deerfield, VT, Youghiogheny, PA, Lehigh, PA

Syracuse University Outing Club, kayaking instructor, 1998-2002

Syracuse Whitewater Kayaking Club, kayaking instructor and founding member, 2004-2009

American Whitewater, member

River Guide Training - Whitewater Challengers, Weatherly PA, 2015-present

Part-Time River Guide - Raft and Kayak guide on the class 2-3 Lehigh River. Provide river rafting instruction to guests for small groups up to 120 people per trip. Pretrip river and rafting safety and instruction. Kayak alongside guests to ensure their safety; provide instruction on paddle technique, directing rafts along the various river lines in rapids; river lore, provide swift water rescue, first aid, and unpinning of stuck rafts as needed.