MOMENTUM
engineering corp.

CURRICULUM VITAE
JEFFREY S. BONSALL, BSME, EIT

SPECIALIZATION

- Crash Data Recorder
- Heavy Truck EDR
- Electronic Data Recorders
- Mechanical Failure Analysis

- Accident Reconstruction
- Vehicle Dynamics and Loss of Control
- Computer Simulation and Animation
- Traffic Signal Analysis

EDUCATION

- Master of Science in Mechanical Engineering (MSME)
  Dynamics, Controls, Vibrations & Robotics Concentration
  California State University, Long Beach (2021)
- Bachelor of Science in Mechanical Engineering (BSME)
  Automotive Technology Concentration
  California State University, Northridge (2015)

REGISTRATION

- Registered Engineer in Training, California Number 158335

CERTIFICATIONS

- SAE – Accident Reconstruction Certificate Program, 2018
- CDR – Certified Trainer-Mentor (Crash Data Group), 2018
- CDR – Technician (Crash Data Group)
- CDR – Data Analyst (Crash Data Group)
- Berla – iVe Certification (Berla)
- Certified Industrial Truck Operator (Toyota-Lift of Los Angeles)

ADDITIONAL TRAINING

- CA2RS 3rd Quarter Training, August 2019
- SAE, Fundamentals of Automotive All-Wheel Drive Sytems, August 2019
- SAE, Introduction to Highly Automated Vehicles, July 2019
- Bendix Advanced Technology Training, May 2019
- Bendix Air Brake Training 101, April 2019
- Crash Safety Solutions, Human Factors for Traffic Crash Reconstruction, January 2019
- SATAI Winter Conference, January 2019
- SAE, Applied Vehicle Dynamics, May 2018
- SAE, Vehicle Crash Reconstruction: Principles and Technology, April 2018
- EDR Users Summit, 2018
- EDC Accident Reconstruction Certificate, January 2018
- Berla, Vehicle Forensics & iVe Certification, September 2017
- SAE, Introduction to Brake Control Systems: ABS, TCS, and ESC, May 2017
- EDR Users Summit, March 2017
- SAE, Vehicle Dynamics for Passenger Cars and Light Trucks, January 2017
- SAE, Accessing and Interpreting Heavy Vehicle Event Data Recorders, October 2016

- ➢ CA2RS 2nd Quarter Training, June 2016
- ➢ SATAI Spring Conference, March 2016
- ➢ SAE, Applying Automotive EDR Data to Traffic Crash Reconstruction, October 2015
- ➢ SATAI Fall Conference, September 2015
- ➢ FARO 3D Scanning Training Course, September 2015

PROFESSIONAL EXPERIENCE

2015 to present   MOMENTUM ENGINEERING CORP.
Forensic Engineer
Accident reconstruction and investigation of heavy truck, automobiles, bicycles, and pedestrian collisions. Engineering services including vehicle and site inspections utilizing laser measurement, event data recorder access and interpretation, crash testing, re-enactments, visibility studies, traffic signal analysis, vehicle dynamics, rollover dynamics, mechanical failure analysis, and design evaluation. Extensive use of computer-based analysis, as well as momentum and energy-based equations.

2015   ÜRO Parts
Testing and Validation Engineer
Testing and validation of automotive components. Performed failure analysis of automotive components for compressive, tensile, hardness, shear, elasticity, and stiffness performance. Extensive design work for one-off testing equipment to model real-world failure scenarios.

TECHNICAL BACKGROUND

Accident Reconstruction:
Reconstruction of automobile, heavy truck, bus, bicycle, motorcycle, and pedestrian accidents. Collision analysis, scene investigation and drawings, skid and crush analysis, photography, vehicle inspection, velocity/damage analysis, and vehicle dynamics. Reconstruction of vehicular and motorcycle accidents. Design and execution of full-scale vehicle crash tests and vehicle dynamics testing and data analysis. Computer-based accident reconstruction using PC-Crash. Brake, engine, transmission, and suspension failure.

Automotive:
Diagnostics, brakes, steering, engines, cooling systems, clutches, transmissions, drive train, suspension, frame, noise/vibration/harshness (NVH).

Computer and Classical Analysis:
Computer-based accident reconstruction, finite element modeling, stress, fatigue, buckling, creep, nondestructive and destructive testing and kinematics.

Design Evaluation:
Mechanical systems and components, performance evaluation, and material selection.

High Performance Experience:
Raced non-competitive downhill and endurance mountain bikes for three years.
Team engineer in the design and testing of FSAE open-wheel racecar for four years.

ORAL PRESENTATIONS

Bonsall, J.B, "Onboard Vehicle Infotainment Forensics," 29th Annual Anti-Fraud Conference, Monterey, California – April 2018

Bonsall, J.B, "Accident Reconstruction," 35th Annual CAJPA Conference 'Adventures in Pooling,' South Lake Tahoe, California – September 2018

Bonsall, J.B, "Accident Reconstruction – How Can it Help You?" 45th Annual PARMA Conference 'Risk Wars: The Agency Strikes Back,' Anaheim, California – February 2019

Bonsall, J.B, "Accident Reconstruction to the Max! How an expert can make your case *groovy* for you!" 31st Annual Combined Claims Conference 'Stayin' Alive, Keeping Your Education and Connections Alive' Garden Grove, California – March 2019

PROFESSIONAL AFFILIATIONS

- Society of Automotive Engineering
- American Society of Mechanical Engineering
- Southwest Association of Technical Accident Investigators
- California Association of Accident Reconstruction Specialists

AWARDS AND ACCOMPLISHMENTS

- Silver Academic Achievement, recognition of receiving a GPA of 3.7 or higher, 2014.
- Bronze Academic Achievement, recognition of receiving a GPA of 3.5 or higher, 2011.
- Certificate of commendation for GPA of 3.5 or higher for two semesters, 2010.

ADDITIONAL TRAINING DETAIL

- CA2RS 3rd Quarter Training, August 2019

  - Forensic Testing and Analysis of Seat Belts with Case Studies was presented. The presentation analyzed seatbelt failure modes as well as remedies and changes to seatbelt construction beginning with the invention of the seatbelt. Methodologies to test seatbelt integrity was reviewed.

- SAE, Fundamentals of Automotive All-Wheel Drive Systems, August 2019

  - The role of automotive all-wheel drive systems as a vehicle dynamics control system was discussed. Power transfer unit and transfer case design parameters, component application to system function, the future of AWD systems, and emerging technologies that may enable future systems are covered.

- SAE, Introduction to Highly Automated Vehicles, July 2019

  - A discussion of the role of automated systems (Advanced Driver Assistance Systems, ADAS) in reducing traffic fatalities, functionality, operations, limitations, sensors, signals, and development standards for advanced assistance systems. The second day focused on operating principles, performance, advantages, and limitations of the sensor systems integrated into advanced assistance systems. A discussion of system failures, software vulnerabilities, and design and testing for the systems was completed.

- Bendix Advanced Technology Training, May 2019

  - Heavy truck advanced technology training focused on collision avoidance and mitigation systems governed by the use of LIDAR, RADAR, and SONAR to adapt to dynamic traffic situations. System uses, thresholds, and design parameters were discussed for advanced cruise control and future autonomy of heavy trucks. Lane departure warning system functions and design parameters, Electronic Stability Programs including suspension, traction, and advanced power transfer options were taught. ACOM diagnostic software to troubleshoot system issues and fix errors or issues was performed. General discussion of how a driver assist system functions and maintains function in different operating conditions was reviewed and tested.

- Bendix Air Brake Training 101, April 2019

  - Technical information on air brake inspection and repair as well as safety when working with a charged air brake system.

- Crash Safety Solutions, Human Factors for Traffic Crash Reconstruction, January 2019

  - Research of driver behavior given different roadway stimuli and situations was presented as applied to real-world crashes. A discussion of human growth as applied to behavior while on foot, bicycle, motorcycle, and automobile was applied to real-world crashes.

- SATAI Winter Conference, January 2019

  - Three real-world crash tests including auto v. motorcycle v. auto and a broadside preceding a rollover were conducted. Seminars on driver acceleration behaviors, Monte Carlo calculation method, pedestrian walking speeds, and nighttime crashes on unlit and lighted roads.

- SAE, Applied Vehicle Dynamics, May 2018

  - Three-day course discussing the fundamental physics components which govern how a vehicle behaves when presented with a stimulus. Longitudinal slip and weight transfer, braking fundamentals and stability, cornering forces, electronic stability and braking systems, and vehicle testing were followed with behind-the-wheel driving sessions to demonstrate key concepts discussed in the classroom.

- SAE, Vehicle Crash Reconstruction: Principles and Technology, April 2018

  - Day one focuses on principles of accident reconstruction including HVE concepts, evidence documentation and photography, vehicle performance, momentum and crush analyses, planar impact mechanics, and simulations. Day two focuses on types of collisions and the variety of methods available to reconstruct each type. Day three continues rollover crash reconstruction and reviews electronic data recorder analysis, heavy truck crashes, video analysis, and a continuation of simulation work.

- EDR Users Summit, 2018

  - Updates and information regarding past, present, and future Event Data Recorders in passenger vehicles and heavy trucks were presented.

- EDC Accident Reconstruction Certificate, January 2018

  - In depth review of physics concepts and calculations used in the EDCRASH program. CDC, PDOF, trajectory and linear momentum analyses were presented. Case studies were reviewed throughout the course.

- Berla, Vehicle Forensics & iVe Certification, September 2017

  - The course focuses on the full spectrum of vehicle forensics to provide investigators with the skills to identify, acquire, and analyze data from vehicle systems using iVe. The course starts with gaining a basic understanding of the available data and moves into practical exercises with vehicle disassembly and system removals. Investigators will work through the identification of the vehicles and systems, conduct hands-on acquisitions of the systems, learn troubleshooting techniques as well as learn how to analyze the data from each system.

- SAE, Introduction to Brake Control Systems: ABS, TCS, and ESC, May 2017

  - Overview of hydraulic brake systems, steering systems, and mechanical interfaces of tire-roadway friction surfaces. Anti-Lock Braking System (ABS) design and implementation

and advancement through electronic controls such as Traction Control Systems (TCS), Electronic Stability Control systems (ESC), Dynamic Rear Proportioning Valve (DRP) were reviewed and related to vehicle and driver behavior.

➢ Collision Safety Institute – CDR Data Analyst Training, May 2017

- Discussion of issues related to retrieved data from current generation Event Data Recorders (EDR) was related to real-world crashes. Top level reconstructions were performed using reports generated from the Bosch Crash Data Retrieval (CDR) tool.

➢ EDR Users Summit, March 2017

- Updates and information regarding past, present, and future Event Data Recorders in passenger vehicles and heavy trucks were presented.

➢ SAE, Vehicle Dynamics for Passenger Cars and Light Trucks, January 2017

- Discussion of how vehicle dynamics guides development of vehicles given end user feedback. Fundamentals and technical aspects of tires, brakes, suspension, steering, rollover, cornering, and ride were presented.

➢ SAE, Accessing and Interpreting Heavy Vehicle Event Data Recorders, October 2016

- Introduction to multiplexed vehicle electronic systems and data networks as applied to in-vehicle communication between electronic systems. Technical focus on how to retrieve, maintain, and store electronic data for forensic analysis. Vehicle inspection and data interpretation using forensically sound techniques to maintain retrieved data. Verification of SAE technical papers were performed in a hands-on environment.

➢ CA2RS 2nd Quarter Training, June 2016

- A review of intersection collisions including traffic signal analysis and photogrammetry methods for collision reconstruction was presented.

➢ SATAI Spring Conference, March 2016

- A review of laser scanning, impact energy principles, child restraints, and PACCAR-HINO Event Data Recorder updates were presented.

➢ SAE, Applying Automotive EDR Data to Traffic Crash Reconstruction, October 2015

- Highly technical and in-depth discussion of Event Data Recorder (EDR) reports as retrieved by the Bosch Crash Data Retrieval (CDR) program. Discussion of each supported manufacturer, unsupported manufacturer, and supported/unsupported data recorders was presented. Application of the information and concepts to real-world crashes was performed throughout the course.

➢ SATAI Fall Conference, September 2015

- Multiple crash tests, including sideswipe, pedestrian, and head-on crashes were performed. A review of laser scanning, human factors, and KARCO crash testing facilities and procedures were presented.

➢ FARO 3D Scanning Training Course, September 2015

- Evaluate laser scanning techniques and principles to maintain quality scan product. Discuss proper setup and use of the scanner given different scanning situations to effectively document a subject. Explore the use of FARO software to maintain scan quality and effectively create a point cloud from raw scans.