CRASH ENGINEER
VEHICLE ACCIDENT RECONSTRUCTION CONSULTING

Michael H. Rangel, P.E., ACTAR

Mr. Rangel is a licensed professional engineer and accredited accident reconstructionist with over 25 years of experience investigating and analyzing vehicular collisions. He has experience as the lead engineer on over 7,500 collisions involving heavy trucks, buses, passenger vehicles, motorcycles, ATV's, bicycles and pedestrians. He has reconstructed high-speed single vehicle and multiple vehicle collisions involving heavy contact, rollovers, vaults and spins. He has performed analysis of low-speed collisions to determine collision severity and direction of force; utilized to address issues regarding occupant injury potential. He is experienced with the inspection of vehicle structures for determination of crush energy and vehicle interiors for determination of restraint usage and occupant interaction with air bags and other vehicular interior structures. He has experience in the determination of occupant loading and indications of methods of egress during ejections. He has inspected vehicle lighting for determination of operation at the time of impact. He is experienced with performing downloads of air bag control modules (ACM) from passenger vehicles and engine control modules (ECM) of heavy trucks. These modules are also referred to as "Black Boxes".

Mr. Rangel has written mathematical models and computer algorithms to model the ground-based motion of passenger vehicles and articulated units. He is experienced in utilizing industry accepted accident reconstruction software to simulate collision events. He is proficient in creating 3D animations of collision events based on the simulations. Mr. Rangel has presented expert witness testimony in both deposition and trial settings.

EDUCATION

The University of Texas at San Antonio
BS Mechanical Engineering 1996

LICENSING AND ACCREDITATION

Licensed Professional Engineer
Texas No. 100010
Oklahoma No. 24201

Accreditation Commission for Traffic Accident Reconstruction
ACTAR No. 1587

PROFESSIONAL MEMBERSHIPS

National Society of Professional Engineers (NSPE) since 2015
American Society of Mechanical Engineers (ASME) since 1997
Society of Automotive Engineers (SAE) since 1997

SPECIALIZED COURSEWORK AND CONFERENCES

- Association for the Advancement of Automotive Medicine (AAAM), 63rd Annual Scientific Conference, Madrid, Spain, October 2019.
- Association for the Advancement of Automotive Medicine (AAAM), 62nd Annual Scientific Conference, Nashville, TN, October 2018.
- Association for the Advancement of Automotive Medicine (AAAM), 61st Annual Scientific Conference, Las Vegas, NV, October 2017.

- Online Bosch Full CDR Technician, Institute of Police Technology and Management, September 2016.
- Highway Engineering I: An Introduction, Red Vector, September 2013.
- Highway Engineering II: Highway Administration, Planning and Evaluation, Red Vector, September 2013.
- Better Roadway Design – Curvature and Passing Zones, Red Vector, September 2013.
- Nighttime Temporary Traffic Control, ATSSA Webinar, August 24, 2011.
- *Signal Lamp Sequence and Timing Analysis, Houston,* TX, May 2010.
- *Crash Data Retrieval (CDR) User's Conference, Houston,* TX, January 2009.
- *ARC-CSI Crash Conference,* Las Vegas, NV, June 2008.
- *DDEC Reports / Data Extraction*, Detroit Diesel Facility, Troy, MI, August 2006.
- *Crash Data Retrieval Operator Certification Course,* Collision Safety Institute, Irving, TX, October 2005.
- *Air Brake Course,* Bendix, Atlanta, GA, October 2005.
- *Cummins, Caterpillar, Detroit/Mercedes ECM Capabilities and Resources, A Lawyer's Perspective of ECM Data & Scientific Materials Analysis,* Irving, TX, June 2005.
- *PC-CRASH Advanced Training Workshop,* MacInnis Engineering Associates, LTD., Vancouver, BC, July 2003.
- *Traffic Accident Reconstruction 2,* Northwestern University Center for Public Safety, Evanston, IL, November 2002.
- *Injury Scaling Uses and Techniques,* AAAM, Washington, D.C., April 2002.
- *Current Issues in Using Crash Injury Data,* SAE, Troy, MI, February 2001.
- *Computerized Traffic Accident Reconstruction 3 – Introduction to EDSMAC,* Northwestern University Center for Public Safety, Evanston, IL, October 2000.
- *PC-CRASH and PC-RECT Training Workshop,* MacInnis Engineering Associates, LTD., Las Vegas, NV, June 2000.
- *Microcomputer-Assisted Traffic Accident Reconstruction – EDCRASH,* Northwestern University Traffic Institute, Evanston, IL, October 1999.
- *Photogrammetry in Accident Reconstruction,* SAE, Troy, MI, May 1998.
- *Traffic Accident Reconstruction 1,* Northwestern University Traffic Institute, Evanston, IL, October 1997.
- *Finite Element Analysis – Applications Overview,* SAE, Troy, MI, June 1997.

CAREER ENGAGEMENTS

09/10 – Present

Crash Engineer, L.L.C., San Antonio, Texas

Principal Engineer. Provide investigation and analysis of passenger vehicle, heavy truck, motorcycle, bicycle and pedestrian collisions. Conduct vehicle and site inspections, digital mapping of collision sites and imaging of passenger vehicle Event Data Recorders (EDR). Utilize mathematical models and prepare computer simulations and animations to model and visualize vehicular collisions. Prepare professional reports and present expert witness testimony.

06/04 – 09/10

Rimkus Consulting Group, Inc., Irving, Texas

Senior Consultant. Provided case management of vehicle accident reconstruction projects involving passenger vehicles and heavy trucks. Coordinated and conducted inspections of vehicles and collision sites. Communicated with clients and coordinated events. Presented training seminars to insurance companies and law firms on topics of vehicle accident reconstruction and occupant kinematics.

04/97 – 05/04

Biodynamic Research Corporation, San Antonio, Texas

Engineer. Provided engineering analysis and project support in the area of accident reconstruction and occupant kinematics. Conducted static and dynamic testing and data collection and filtering

of various dynamic occurrences. Wrote computer mathematical models of vehicular collisions and occupant kinematics. Created simulations and corresponding animations of vehicular collisions and dynamic events. Prepared technical reports of case findings and research projects. Analyzed and compiled statistical data from the NASS database. Participated in SBIR governmental projects. to include the mathematical modeling of human rated centrifuges.

01/97 – 04/97

Takata Seat Belts Incorporated, San Antonio, Texas

Project Manager. Utilized Unigraphics Solid Modeling software to translate two-dimensional Japanese seatbelt component and assembly drawings into three-dimensional solid models.

05/94 – 08/96

Biodynamic Research Corporation, San Antonio, Texas

Engineer Intern. Prepared vehicle specifications for accident reconstruction. Performed preliminary reconstruction efforts alongside engineers. Assisted with testing and data acquisition. Performed manipulation and interpretation of data using numerical methods.

SEMINARS INSTRUCTED

6/26/08

Technology in Collision Reconstruction, Irving, Texas
One-hour presentation on accident reconstruction technology.
TDI Course Number: 32831CG010; Number of Attendees: 10

10/16/08

Impact & Damage Analysis in Low-Speed Vehicle Collisions, Plano, Texas
One-hour presentation on low-speed accident reconstruction technology.
TDI Course Number: 21510CG101; Number of Attendees: 14

11/18/08

How to Analyze & Photograph a Vehicle Accident, Dallas, Texas
One-hour presentation on photographing vehicles involved in an accident.
TDI Course Number: 1290CG010; Number of Attendees: 10

11/18/08

Damage Analysis for Consistency & Detecting Fraud, Dallas, Texas
One-hour presentation on accident reconstruction technology and detecting fraud.
TDI Course Number: 33214CG010; Number of Attendees: 16

12/3/08

Vehicle Accident Analysis & Reconstruction, Hurst, Texas
Three-hour presentation on accident reconstruction technology.
TDI Course Number: 12926CG030; Number of Attendees: 11

12/10/08

Impact & Damage Analysis in Low-Speed Vehicle Collisions, Dallas, Texas
One-hour presentation on low-speed accident reconstruction technology.
TDI Course Number: 4313; Number of Attendees: 10

12/10/08

How to Analyze & Photograph a Vehicle Accident, Dallas, Texas
One-hour presentation on photographing vehicles involved in an accident.
TDI Course Number: 11409; Number of Attendees: 10

3/25/09

Vehicle Accident Reconstruction, Irving, Texas
One-hour presentation on accident reconstruction technology.
TDI Course Number: 11637; Number of Attendees: 12

6/9/09

Vehicle Accident Reconstruction, Richardson, Texas
One-hour presentation on accident reconstruction technology.
TDI Course Number: 11637; Number of Attendees: 23

7/24/09

Vehicle Accident Analysis & Reconstruction, Grand Prairie, Texas
One-hour presentation on analysis and reconstruction technology.
TDI Course Number: 26057; Number of Attendees: 11

9/18/09

Vehicle Accident Reconstruction, Oklahoma City, Oklahoma
Three-hour presentation on accident reconstruction technology.
TDI Course Number: 1002952; Number of Attendees: 8

5/25/10

Vehicle Accident Analysis & Reconstruction, Dallas, Texas
Three-hour presentation on accident analysis and reconstruction technology.
TDI Course Number: 12926CG030; Number of Attendees: 16

PUBLICATIONS

VAN Poppel, JA; Pancratz, DJ; Rangel, MH; Barton, BJ; Banks, RD; Bomar, JB, Jr. Simulation of Thrust-Vectored Aircraft Maneuvers in a Human Centrifuge: Model Validation and Design for the Dynamic Environment Simulator. Final Report for USAF SBIR Contract #F41624-96C-6027 Prepared for AFRL Human Effectiveness Directorate, USAF, Brooks AFB, Texas. September 1998.