



# David King

BASc PE

Principal, Senior Engineer

## contact

✉ david.king@meaforensic.com

📞 949.273.1121

📍 Los Angeles

## expertise

Collision Reconstruction

## areas of specialization

Accident Reconstruction

Train accidents

Heavy truck and bus accidents

Crashworthiness and severity assessment

Computer modeling

Crash data recorder and air bag analysis

Tire inspections

David King is a senior engineer at MEA Forensic and leads the Collision Reconstruction group in Los Angeles. Since joining the firm in 1984, he has investigated over 5,000 accidents. David investigates accidents involving a variety of vehicles including heavy trucks, buses, and trains. He assesses factors such as speed, collision severity, impact sequence, occupant movement, seat belt use and opportunities for drivers to avoid a crash.

David has a Bachelor's degree in Mechanical Engineering from the University of British Columbia and is registered as a professional engineer in California and Washington State. He has testified in court as an expert witness hundreds of times. When testifying, David aims to educate the court about what the physical evidence means using concise language to explain complex problems. He also uses high-quality graphics, illustrations, and animations to help the court understand his conclusions.

The field of forensic engineering has changed over the years; "Now we use 3D scanners to collect millions of measurements and create virtual models of vehicles and crash sites," says David. These models can be used in a physics-based computer simulation program to re-create the movement of vehicles before, during and after an accident. Also, most vehicles now store "black box" data that MEA's engineers can download after a crash. "We have more ways to approach our cases," David notes, "traditional engineering analysis, computer simulation, and analyzing black box data."

David was involved in the MEA's first research project. "At the time, we noticed that there was a lack of detailed information about how bumpers performed in low-speed impacts, so we started conducting our own tests." Since then, David has been involved in many more studies and experiments and is currently focused on rollover accidents. MEA's research allows David and his colleagues to approach casework from a position of knowledge and with the technical tools needed to find answers.

## education

Bachelor of Applied Science, Mechanical Engineering, University of British Columbia, 1984.

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## professional status

Registered Professional Engineer, State of Washington, June 2004. License number 40967.

Registered Professional Engineer, State of California, September 2004. License number M32995.

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## professional associations

California Association of Accident Reconstruction Specialists (CA2RS), since 2002.

Washington Association of Technical Accident Investigators (WATAI), since 2001.

Southwestern Association of Technical Accident Investigators (SATAI), since 1994.

Canadian Association of Technical Accident Investigators & Reconstructionists (CATAIR), since 1986.

American Society of Mechanical Engineers (ASME), since 1985.

Society of Automotive Engineers (SAE), since 1985.

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## professional experience

### MEA Forensic Engineers & Scientists

Principal, Senior Engineer, 1984 to present

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Responsible for technical investigations, primarily those involving motor vehicle accident investigation and reconstruction. Involved in over 3000 technical investigations to date, including severity assessment, collision sequence, occupant kinematics, seat belt use and effectiveness, vehicle speed analysis, pedestrian impacts and visibility. Has also conducted research in areas such as bumper performance in low-speed motor vehicle accidents, the accuracy and sensitivity of commercial crash data recorders, and the effects of fatigue on long-haul truck drivers. Qualified as a Professional Mechanical Engineer with expertise in Accident Reconstruction in courts in British Columbia, Arizona, California, Colorado, Illinois, Louisiana, New York and Washington State. Co-owner of MEA Forensic Engineers & Scientists since 1993.

## research activities

Assisted in the design, fabrication, and software development for a 5th Wheel used to assess vehicle performance and the dynamics of vehicles in low-speed impacts. This product and its technology are marketed by MEA Forensic Engineers & Scientists and have been used to collect data for most of the company's technical publications and its low-speed collision database.

Participated in a long-term research program involving five vehicles and over 900 staged collisions, the results of which were published at the Society of Automotive Engineers International Congress, Detroit, Michigan, February 1996. A follow-up SAE paper in 1997 used prototype moving barriers in 700 staged collisions to assess their usefulness in determining the severity of low speed impacts. A 1999 SAE paper used the MEA 5th Wheel to collect data for 1,624 tests involving bumper isolators from 15 vehicles to evaluate the applicability of barrier testing for single bumper isolators.

Co-investigator of a multi-disciplinary research project entitled "Identification of injury mechanisms in low-speed rear-end automobile impacts". The goal of this research, conducted in the summer of 1996, was to determine whether the symptoms reported in low-speed rear-end impacts are caused by a muscular injury. This research was conducted in cooperation with Biomechanics Research & Consulting of El Segundo, CA and was partially funded under a grant awarded by the Science Council of British Columbia through their "Technology, BC" funding competitions.

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Project Manager for a 1993/94 study involving 17 long haul-truck drivers. The deterioration of the drivers' vehicle control was used to build an algorithm to predict driver inattentiveness. Co-authored a number of research papers on the topic.

Co-author of a study determining pick-up truck bumper behavior in vehicle-to-barrier and vehicle-to-vehicle collisions.

Co-author of technical papers on air bag deployment thresholds and assessing the sensitivity and accuracy of collision data recorders (CDR's).

MEA has conducted crash tests to validate complex vehicle collision and trajectory models. Experiments involved high-speed and low-speed collisions between moving vehicles. Vehicles were driven by remote control. Data recorded included the pre-impact vehicle speeds, point of impact, rest position, vehicle path from impact to rest, vehicle weights, and sliding tire friction coefficient. Vehicle linear and angular velocity changes were assessed using overhead high-speed video. Vehicle longitudinal and lateral accelerations before, during and after impact were recorded with on-board electronic "black-box" crash recorders. These accelerations were used to determine vehicle velocity change and principal direction of force. Location and depth of vehicle crush were also recorded. Vehicle dynamics were simulated using separate trajectory and collision models. Post-collision trajectories were simulated using a 3D discrete-kinetic time forward model which treats the vehicle as a rigid body suspended on the tires. Collisions were simulated using a 3D model based on the principles of conservation of linear and angular momentum. Data from these collisions and others have been used to validate an accident reconstruction program called PC-Crash. The crash tests and the PC-Crash analyses are summarized in SAE 2000-01-0849 and 2001-01-0507.

## publications

Decelerations for Vehicles with Anti-lock Brake Systems (ABS) on Dry Asphalt and Concrete Road Surfaces

Rollover and Near-Rollover Kinematics During Evasive Steer Maneuvers

SUV Kinematics during a Steer-Induced Rollover Resolved Using Consumer-Grade Video, Laser Scans and Match-Moving Techniques

Using Force-Displacement Data to Predict the EBS of Car into Barrier Impacts

Vehicle Kinematics and Deceleration Rates of Four Staged SUV Rollovers

On the directionality of rollover damage and abrasions

Front and Rear Car Crush Coefficients for Energy Calculations

Digital camera calibration for luminance estimation in nighttime visibility studies

Low-speed impact testing of pickup truck bumpers

## lectures & presentations

Mr. King frequently provides collision reconstruction-related presentations to insurance and legal clients, and to police communities. The merit of these sessions has been recognized by the California State Bar Association, which has approved the presentations for continuing legal education credit.

October 2007 – Minimal damage collision assessment techniques/crash test results/acceleration-deceleration test results/night time visibility assessment.

March 2003 – SATAI Spring Meeting. Presentation on CDR speed accuracy.

October 2002 – CAARS Winter Meeting. Crash test presentation.

November 2001 – SATAI Winter Meeting. Presentation on CDR.

October 2001 – WATAI Winter Meeting. Presentation on CDR.

December 1999 – SAE Accident Reconstruction TOPTEC, Costa Mesa, CA.

August 1999 – SAE Vehicle Safety Restraint Systems TOPTEC, Costa Mesa, CA

April 1997 – Low speed rear end, lateral and sideswipe collisions. Presentation for the Institute of Police Training and Management,

University of North Florida, Jacksonville, FL.

Fall 1996 – Correlation of steering behavior with heavy truck driver fatigue. Presentation of technical paper at the Technical Conference on Enhancing Commercial Motor Vehicle Driver Vigilance, Washington, DC.

August 1996 – Low speed collision demonstration. SAE Low Speed Collision TOPTEC, Vancouver, BC.

August 1996 – Correlation of steering behavior with heavy-truck driver fatigue. Presentation of technical paper at SAE Future Transportation Technology Conference, Vancouver, BC.

July 1996 – Southwest Association of Technical Accident Investigators demonstration and seminar given on low-speed impacts, Phoenix, AZ.

May 1996 – Burnet, Duckworth & Palmer, Low speed impact reconstruction and occupant kinematics lecture, Calgary, AB.

April 1996 – Northern California Fraud Investigations Association 7th Annual Meeting. Low speed impact demonstration and presentation. Monterey, CA.

April 1996 -Institute of Police Technology and Management Special Problems in Traffic Accident Investigation, Jacksonville, FL. Low speed impact demonstration and presentation.

November 1995 – SAE International Truck & Bus Meeting and Exposition, Winston-Salem, NC, paper presentation and panel discussion.

July 1995 – Southwest Association of Technical Accident Investigators seminar given on low-speed impacts, Phoenix, AZ.

May 1995 – Lecture on low speed vehicle collision reconstruction. The Canadian Institute, Calgary, AB.

November 1994 – SAE International Truck & Bus Meeting and Exposition, Seattle, WA, paper presentation and panel discussion.

August 1994 – Low speed collision demonstration and panel participant. SAE Low Speed Rear Impact Collisions – TOPTEC, Professional Development Program, Irvine CA.

February 1993 – SAE International Congress and Exposition, Detroit, MI, paper presented.

August 1992 – CATAIR, Kelowna, BC, Low Speed Impact Seminar.

August 1988 – CATAIR, Saskatoon, SK, Lecture on SLAM software.

August 1986 – CATAIR, Kelowna, BC, Lecture on SLAM software.

## training and professional development

October 24-25, 2019 – CA2RS Conference, Palm Desert, CA.

March 12-14, 2019 – SAE Applied Vehicle Dynamics course, Thermal, CA.

November 11-12, 2016 – Consumer Attorneys of California Conference, San Francisco, CA.

May 2-6, 2016 – World Reconstruction Exposition, Orlando, FL.

June 24-25, 2015 – American Public Transportation Association (APTA) Risk Management Seminar, Salt Lake City, CA.

April 21-25, 2015 – SAE World Congress 2015, Detroit, MI.

March 24-25, 2015 – ASME Joint Rail Conference, San Jose, CA.

January 30, 2014 – CAARS Training, Santa Ana, CA.

December 9-12, 2013 – Applying Automotive EDR Data to Traffic Crash Reconstruction, SAE International Seminar, Cerritos, CA.

June 10-14, 2013 – Advanced Transit Rail Investigation, US DOT Transportation Safety Institute, Los Angeles, CA.

April 2-6, 2012 – Transit Rail Incident Investigation, US DOT Transportation Safety Institute, Atlanta. GA.

January 2012 – CDR Summit, Houston, TX.

January to May 2011 – Auto 100 Automotive Fundamentals, Saddleback College, Mission Viejo, CA.

January 2011 – CDR Summit, Houston, TX.

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December 2010 – SAE Accessing and Interpreting Heavy Vehicle Event Data, Cerritos, CA.

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October 2007 – CAARS Crash testing, acceleration-deceleration testing and pedestrian dummy impact testing, Anaheim, CA.

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January 2007 – CDR Summit, Houston, TX.

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October 2005 – Technology Tire Seminar, Standards Testing Labs, Akron, OH.

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June 2005 – ARC/CSI Conference, Las Vegas, NV.

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April 2005 – SAE Tire as a Vehicle Component, Course ID C0101.

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April 2005 – SAE Tire and Wheel Safety Issues Seminar, Course ID C0102.

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April 2005 – SAE International Congress and Exposition, Detroit, MI.

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May 2004 – Leica Basic Total Station Operation & Field Calibration training.

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March 2003 – SATAI Spring Meeting.

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October 2002 – CAARS Winter Meeting.

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November 2001 – SATAI Winter Meeting

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October 2001 – WATAI Winter Meeting.

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December 1999 – SAE Accident Reconstruction TOPTEC, Costa Mesa, CA.

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August 1999 – SAE Vehicle Safety Restraint Systems TOPTEC, Costa Mesa, CA.

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February 1998 – SAE International Congress and Exposition, Detroit, MI.

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November 1996 – Twenty-Fourth International Workshop on Human Subjects for Biomechanical Research, Albuquerque, NM.

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August 1996 – SAE Low Speed Collision TOPTEC Professional Development Program (Organizer and presenter), Vancouver, BC.

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July 1996 – Southwest Association of Technical Accident Investigators seminar, Phoenix, AZ.

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April 1996 – Institute of Police Technology and Management Special Problems in Traffic Accident Investigation, Jacksonville, FL.

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November 1995 – SAE International Truck & Bus Meeting and Exposition, Winston-Salem, NC.

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July 1995 – Southwest Association of Technical Accident Investigators seminar, Phoenix, AZ.

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November 1994 – SAE International Truck & Bus Meeting and Exposition, Seattle, WA.

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August 1994 – SAE Low Speed Rear Impact Collisions – TOPTEC, Professional Development Program, Irvine CA.

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November 1993 – SAE Stapp Car Crash Conference, San Antonio, TX.

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February 1993 – SAE International Congress and Exposition, Detroit, MI.

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April 1992 – North Shore Driving School, Vancouver, BC, Commercial Vehicle Air Brakes Course (theory only).

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June 1991 – Canadian Multidisciplinary Road Safety Conference VII, Vancouver, BC.

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August 1989 – CATAIR Annual Meeting, Kelowna, BC.

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August 1988 – CATAIR Annual Meeting, Saskatoon, SK.

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August 1986 – CATAIR Annual Meeting, Kelowna, BC.

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