

**DAVID J KING, PE**  
**PRINCIPAL, SENIOR ENGINEER – TRANSPORTATION GROUP**

**EDUCATION**

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

**PROFESSIONAL STATUS**

Registered Professional Engineer, State of Washington, June 2004. License number 40967.  
Registered Professional Engineer, State of California, September 2004. License number M32995.

**PROFESSIONAL ASSOCIATIONS**

California Association of Accident Reconstruction Specialists (CAARS), 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.

**PROFESSIONAL EXPERIENCE**

**MEA FORENSIC ENGINEERS & SCIENTISTS**

Principal, Senior Engineer, 1984 to present

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.

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**

### **PEER-REVIEWED CONFERENCE PROCEEDINGS**

Lawrence JM, Fix RC, Ho AM, King DJ, D'Addario PM (2010). Front and Rear Car Crush Coefficients for Energy Calculations (2010-01-0069). Society of Automotive Engineers.

Allin BD, Ising KW, King DJ (2007). Digital camera calibration for luminance estimation in nighttime visibility studies (2007-01-0718). Society of Automotive Engineers.

Wilkinson CC, Lawrence JM, King DJ (2007). The Accuracy of General Motors Event Data Recorders in NHTSA Frontal Barrier Tests. Crash Data Retrieval System User's Conference, Houston, TX.

Wilkinson CC, Lawrence JM, Heinrichs BE, King DJ (2006). The Timing of Pre-Crash Data Recorded in General Motors Sensing and Diagnostic Modules (2006-01-1397). In: Accident reconstruction (SP-1999). Warrendale, PA: Society of Automotive Engineers.

Wilkinson CC, Lawrence JM, Heinrichs BE, King DJ (2005). The accuracy and sensitivity of 2003 and 2004 General Motors event data recorders in low-speed barrier and vehicle collisions (2005-01-1190). In: Accident Reconstruction (SP-1930). Warrendale, PA: Society of Automotive Engineers.

Lawrence JM, Wilkinson CC, King DJ, Heinrichs BE, Siegmund GP (2002). The accuracy and sensitivity of event data recorders in low-speed collisions (2002-01-0679). In: Advances in Safety Test Methodology (SP-1664). Warrendale, PA: Society of Automotive Engineers.

Heinrichs BE, Lawrence JM, Allin BD, Bowler JJ, Wilkinson CC, Ising KW, King DJ, Ptucha SJ (2001) Low-speed impact testing of pickup truck bumpers (2001-01-0893). Accident reconstruction: Crash analysis (SP-1572), pp. 187-209. Warrendale, PA: Society of Automotive Engineers.

King DJ, Ptucha SJ, Heinrichs BE, Goudie DW (1999). Comparison testing of bumper isolators. (1999-01-0096). Accident reconstruction: Technology & animation V IX (SP-1407), pp. 101-118. Warrendale, PA: Society of Automotive Engineers.

Wheeler JB, Smith TA, Siegmund GP, Brault JR, King DJ (1998). Validation of the Neck Injury Criterion (NIC) using kinematic and clinical results from human subjects in rear-end collisions. In: Proc. 1998 International IRCOBI Conference on the Biomechanics of Impact, pp. 335-348. Bron, France: IRCOBI Secretariat.

King DJ, Ptucha SJ, Gardiner JMK (1998). Speed change determination in low speed impacts - A comparison of techniques (980023). Warrendale, PA: Society of Automotive Engineers.

King DJ, Mumford DK, Siegmund GP (1998). An algorithm for detecting heavy-truck driver fatigue from steering-based measures (98-S4-O-10). In Proc of 16th International Technical Conference on the Enhanced Safety of Vehicles. Washington, DC: National Highway Traffic Safety Administration.

Siegmund GP, King DJ, Lawrence JM, Wheeler JB, Brault JR, Smith TA (1997). Head/neck kinematic response of human subjects in low-speed rear-end collisions (973341). In: Proc. 41st Stapp Car Crash Conference (P-315), pp. 357-385. Warrendale, PA: Society of Automotive Engineers.

King DJ, Bowler JJ, Ptucha SJ (1997). Determination of bumper characteristics using prototype moving barriers (970956). Accident reconstruction: Technology and animation VIII (SP-1237), pp. 211-239. Warrendale, PA: Society of Automotive Engineers.

Siegmund GP, King DJ, Mumford DK (1996). Correlation of steering behavior with heavy-truck driver fatigue (961683). In: Sensors, safety systems and human factors (SP-1190), pp. 17-38. Warrendale, PA: Society of Automotive Engineers.

Filiatraut DD, Cooper PJ, King DJ, Siegmund GP, Wong PKH (1996). Efficiency of vehicle-based data to predict lane departure arising from loss of alertness due to fatigue. In: Proc. of 40th Annual Conference of the Association for the Advancement of Automotive Medicine, pp. 363-376. Des Plaines, IL: Association for the Advancement of Automotive Medicine.

Siegmund GP, King DJ, Montgomery DT (1996). Using barrier impact data to determine speed change in aligned low-speed vehicle-to-vehicle collisions (960887). Accident reconstruction: Technology & animation V (SP-1150), pp. 147-168. Warrendale, PA: Society of Automotive Engineers.

Siegmund GP, King DJ, Mumford DK (1995). Correlation of heavy-truck driver fatigue with vehicle-based control measures (952594). Warrendale, PA: Society of Automotive Engineers.

King DJ, Siegmund GP, Montgomery DT (1994). Outfitting a Freightliner tractor for measuring driver fatigue and vehicle kinematics during closed-track testing (942326). Warrendale, PA: Society of Automotive Engineers.

Siegmund GP, Bailey MN, King DJ (1994). Characteristics of specific automobile bumpers in low-velocity impacts (940916). In: Accident reconstruction: Technology & animation IV (SP-1030), pp. 333-371. Warrendale, PA: Society of Automotive Engineers.

King, D, Siegmund, G., Bailey, M. (1993). Automobile bumper behavior in low speed impacts (930211). Warrendale, PA: Society of Automotive Engineers.

McIsaac BR, King DJ (1993). Friction measuring devices - A comparative review. In: Proc. of Canadian Multidisciplinary Road Safety Conference VIII, pp. 249-266. Saskatoon, SK: Transportation Centre, University of Saskatchewan.

Bailey MN, King DJ, Romilly DP, Thomson R (1991). Characterization of automotive bumper components for low speed impacts. In: Proc. of Canadian Multidisciplinary Road Safety Conference VII, pp. 190-203. Vancouver, BC: Department of Civil Engineering, University of British Columbia.

#### **BOOK CHAPTERS**

Siegmund GP, King DJ, (1997). Low-speed impacts: Understanding the dynamics of low-speed, rear-end impacts; Methods of investigation and of quantifying their severity. In: Bohan (Ed.), Forensic Accident Investigations, 2, pp. 5-110. Charlottesville, VA: Lexis Law Publishing.

#### **OTHER PUBLICATIONS**

King DJ (2009). Event Data Recorders: "Black Box" data sources in automobile and trucks. Journal of Consumer Attorneys for Southern California, September 2009.

King DJ (2007). Hanging by a tread: The role of tires in accident reconstruction. Journal of Consumer Attorneys for Southern California, September 2007.

Clay J, King DJ (1997). DNA testing in motor vehicle accident investigations. The Canadian Independent Adjuster, June 1997; 39(2): pp. 4-5, 8-9.

Mumford D, King D, Lawrence J, Savinkoff M, Shumborski, W (1997). Inverted vehicle drag tests: Assessing the effect of speed on deceleration rates. Accident Investigation Quarterly, 13, (Winter), pp. 28-35. Abridged version published in Impact, Vol. 6,(3), pp. 51-54.

Hicks B, Field D, Bowler J, Ptucha SJ, King DJ (1997). Speed change from curb impacts. *Accident Reconstruction Quarterly*, 15 (Summer), pp. 20-26.

Brault JR, Wheeler JB, Siegmund GP, King DJ (1996). Human subject protection in low-speed rear-end automobile testing. In: *Proc. of 24th International Workshop on Human Subjects in Biomechanical Research*, pp. 141-152. Washington, DC: US Department of Transportation, National Highway Traffic Safety Administration, November 3, 1996.

Siegmund GP, King DJ, Mumford DK (1994). Fatigued-driver identification study: Analysis of 17 truck drivers to identify vehicle-based criteria to detect driver fatigue. Vancouver, BC: Insurance Corporation of British Columbia.

King DJ, Brewer E, Grage J, ABS Affected Yaw. (draft distributed).

King DJ, Siegmund GP (1992). The effect of dynamic brake failure on the braking performance of a BC Transit trolley bus. Vancouver, BC: BC Transit Corporation.

## **LECTURES AND 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**

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.

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

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

January 2007 – CDR Summit, Houston, TX.

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

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

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

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

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

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

March 2003 - SATAI Spring Meeting.

October 2002 - CAARS Winter Meeting.

November 2001 - SATAI Winter Meeting

October 2001 - WATAI Winter Meeting.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

August 1989 - CATAIR Annual Meeting, Kelowna, BC.

August 1988 - CATAIR Annual Meeting, Saskatoon, SK.

August 1986 - CATAIR Annual Meeting, Kelowna, BC.

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