mea forensic
Let the evidence speak®

Jonathan Lawrence MASc PEng PE

President, Senior Engineer

contact jonathan.lawrence@meaforensic.com 604.277.4829 Vancouver

expertise

- Collision Reconstruction

areas of specialization

- Collision reconstruction
- “Black box” crash data
- Heavy-trucks
- Night-time visibility
- Low-speed collisions

Jonathan Lawrence is a senior engineer in MEA Forensic’s Collision Reconstruction group. He has investigated over three thousand automobile accidents involving a variety of issues such as speed, collision severity, seat belt use, and avoidance possibilities. Using scientifically-rigorous methods, Jonathan reconstructs the events at the heart of his clients’ cases. He has presented his findings in court many times and is registered as a professional engineer in British Columbia and Washington State.

Jonathan holds a Bachelor’s degree from Queen’s University and a Master’s degree in Mechanical Engineering from the University of Waterloo. His Master’s thesis involved fatigue tests of welded steel assemblies. “What I learned about research and testing helps me get better answers for my clients every day, and to recognize strengths and weaknesses in the work of other engineers.”

Specialized collision reconstruction software, “black box” data in cars and dashcam videos are examples of new tools that have become available to forensic engineers since Jonathan joined MEA in 1994. “The fundamental physics principles that we use to analyze car crashes have been understood since Isaac Newton,” he observes, “but how we apply these principles and what evidence we apply them to continually evolves.” Nowadays, new cars store information about speed, impact severity and whether the driver steered, braked or accelerated in the event of a crash. This “black box” data is easily downloaded, but cannot always be accepted at face value. Jonathan has published peer-reviewed studies focused on the reliability and accuracy of this evidence.

A long-time car enthusiast, Jonathan is interested in advanced driver-assistance systems (ADAS) such as lane keeping, adaptive cruise control, and automatic emergency braking. “ADAS may affect some of our typical assumptions,” he says. “We commonly assume that a car’s speed remains constant if the driver did not accelerate or brake, but because ADAS can independently change the speed of the car, this assumption may be false.” Technology that promises to prevent collisions can also create liability for car companies in the event of a crash.

As the president of MEA, Jonathan is committed to maintaining the firm’s reputation for high-quality, independent and objective

work. “It is a pleasure to work with a team dedicated to core values of honesty and integrity.”

education

MASc, Mechanical Engineering, University of Waterloo (1991)

BS (Honours), Mechanical Engineering, Queen’s University (1989)

professional status

Registered Professional Engineer

Engineers and Geoscientists BC, since 1994

Professional Engineer in the State of Washington, since 2002

professional associations

Society of Automotive Engineers (SAE)

Washington Association of Technical Accident Investigators (WATAI)

professional experience

MEA Forensic Engineers & Scientists
President, Senior Engineer, 1994 to Present

Conducts technical investigations involving motor vehicle accident reconstruction, failure analysis, and research. Involved in over 1500 technical investigations with particular expertise determining: impact severity, vehicle speed, seatbelt use and effectiveness, and cases involving pedestrians, nighttime visibility and event data recorders. Qualified and testified to give expert evidence as a Mechanical Engineer in the field of Accident Reconstruction on civil and criminal matters in the Supreme and Provincial Courts of British Columbia.

Ontario Hydro Research Division, Toronto, ON
Research Engineer, 1991 to 1993

Involved in the design and testing of containers for storage, transportation, and disposal of radioactive materials. Responsible for crash and fire testing prototype transportation containers.

University of Waterloo, Waterloo, ON
Graduate Researcher, 1989 to 1991

Conducted graduate research work which included experimental and analytical studies of the fatigue failure and fracture of welded steel joints.

research activities

Mr. Lawrence has led studies into the accuracy and limitations of “black box” data from modern cars. This crash data, downloaded from the airbag systems of cars, can provide information about speed, steering, braking and throttle in the seconds leading up to a crash, as well as information about the severity of the collision and whether occupants were wearing their seatbelts.

Mr. Lawrence has been involved in experiments designed to test the engineering techniques used to reconstruct high and low-

speed collisions and loss of control accidents. These studies quantified the accuracy of typical reconstruction methods and identified their limitations.

Mr. Lawrence has also studied methods for predicting how drivers detect hazards at night. Detection distance can be determined from light measurements made during a scene re-enactment.

publications

The Effect of Target Features on Toyota's Autonomous Emergency Braking System

The Accuracy of Toyota Vehicle Control History Data during Autonomous Emergency Braking

The Accuracy and Sensitivity of 2005 to 2008 Toyota Corolla Event Data Recorders in Low-Speed Collisions

Front and Rear Car Crush Coefficients for Energy Calculations

Threshold visibility levels for the Adrian Visibility Model under nighttime driving conditions

Low-speed impact testing of pickup truck bumpers

lectures & presentations

May 8, 2015 – The Liability Expert: From retainer to analysis to report. Canadian Defence Lawyers Boot Camp, Vancouver, BC.

January 2014 – Electronic Crash Data in "Black Boxes". Continuing Legal Education Society of British Columbia (CLEBC), Vancouver, BC.

December 2007 – Accident Reconstruction: Engineering Expert Evidence. Canadian Defence Lawyers Boot Camp, Vancouver, BC.

April 2007 – The Science of Seatbelts and Airbags. Lindsay Kenney Annual Insurance Seminar, Vancouver, BC.

September 2006 – Physics and collision mechanics, Royal Canadian Mounted Police Level III Collision Analyst course, Pacific Region Training Centre, Chilliwack, BC.

March 2003 – The accuracy of pre-crash speed captured by event data recorders. SAE International Congress and Exposition, Detroit, MI.

March 2003 – Building a strong case using the latest research and technology in accident investigation and reconstruction. Insight Conference: Admissibility of Forensic and Demonstration Evidence for Insurance Claims, Toronto, ON.

December 2002 – Crash Data Recorders in Cars – New Technology. Trial Lawyers Association of British Columbia, Vancouver, BC.

November 2002 – Event Data Recorder presentations to law firms in Kelowna, Vernon, and Kamloops, BC.

March 2002 – The accuracy and sensitivity of event data recorders on low-speed collisions. SAE International Congress and Exposition, Detroit, MI.

August 2001 – Conducted a high-speed car crash test and presented the collected data at the 4th International Conference on Accident Investigation, Reconstruction, Interpretation and the Law, Vancouver, BC.

February 1999 – Seat back and head restraint response during low-speed rear-end automobile collisions. Whiplash-Associated Disorders, World Congress, Vancouver, BC.

August 1997 -High-speed and low-speed collision seminar, MEA Forensic Engineers & Scientists, Richmond, BC.

February 1997 – Measuring head restraint force and point of application during low-speed rear-end automobile collisions. SAE International Congress and Exposition, Detroit, MI.

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

1995 to present – Accident reconstruction presentations to various insurance offices, law offices and police detachments. Topics covered include "black box" crash recorders data, low speed collision reconstruction, seat belt use assessment and use of PC-Crash, computer simulation software. Some presentations also involve low speed vehicle collision demonstrations.

training and professional development

March 22–25, 2021 – iNPUT-ACE Video Evidence Symposium 2021, Online.

December 2011- Accessing and Interpreting Heavy Vehicle Event Data Recorders, SAE International, Oxnard, CA.

June 2010 – The Tire as a Vehicle Component and Tire and Wheel Safety, Dr. Joseph D. Walter, Richmond, BC.

May 2009 – Bosch Crash Data Retrieval (CDR) System Data Analyst Certification Course, Collision Safety Institute (CSI), Langley, BC.

February 2008 – Crash Data Retrieval Technician Course, Richmond, BC

April 2005 – Special Training in Traffic Crash Reconstruction Conference, Institute of Police Technology and Management (IPTM), Jacksonville, FL.

June 2003 – Airbrake Course, Valley Driving School, Surrey, BC.

March 2003 – Society of Automotive Engineers World Congress, Detroit, MI.

July 2002 – Detroit Diesel Electronic Controls Data and Prodriver Reports course, Detroit, MI.

March 2002 – SAE International Congress and Exposition, Detroit, MI.

August 2001 – 4th International Conference on Accident Investigation, Reconstruction, Interpretation and the Law (AIRIL 01), Vancouver, BC.

June 2001 – Crash Data Retrieval System training course, Vetronix Corporation, Santa Barbara, CA.

February 1999 – Whiplash-Associated Disorders, World Congress, Vancouver, BC.

February 1997 – SAE International Congress and Exposition, Detroit, MI.

August 1996 – SAE Low-Speed Collision TOPTEC, Vancouver, BC.

June 1995 – PC-Crash workshop and PC-Rect software.

February 1995 – SAE International Congress and Exposition, Detroit, MI.