



Mark Bailey

MASc PEng PE

Principal, Senior Engineer

contact

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📍 Vancouver

expertise

Aviation Investigations

Failure Analysis

areas of specialization

Metallurgy

Mechanical and material failures

Transportation defects

Industrial and consumer product failures

Failures in building plumbing and gas systems

A Senior Engineer at MEA Forensic, Mr. Mark Bailey has investigated thousands of accidents, failures, and losses over the last 30 years. From the Vancouver office, he leads MEA's Aviation and Failure Analysis groups. Mark is responsible for determining root and contributing causes of failures in aircraft, vehicles, industrial equipment, building components, and consumer products.

When a product, machine, or device fails, clients look to Mark for clear answers. "Some of our clients may not have dealt with this situation before," he says, "we can help them determine the right questions to ask and then start digging for the answers." Mark relies on his background in mechanical and metallurgical engineering and on a range of techniques such as microscopy, metallography, fractography, stress analysis, and simulation to determine why a failure occurred. It can also be important to determine whether the failure is related to deficiencies in design, manufacturing, maintenance, or use.

Mark has a Bachelor's degree in Mechanical Engineering and a Master's degree in Metals and Materials Engineering from the University of British Columbia. He is registered as a professional engineer in British Columbia and Washington State. Mark has testified as an expert witness in several Canadian provinces and US states.

Mark has been involved in MEA's research on a variety of topics since joining the firm in 1989. Most recently he has studied the failure of plumbing pipe and why wheels fall off moving cars and trucks. Wheel separations are rare events but can be disastrous. "Because of our research, we are known across the country as the leading experts on this subject," he says.

education

Master of Applied Science, Metals and Materials Engineering, University of British Columbia, 1988.

Bachelor of Applied Science, Mechanical Engineering, University of British Columbia, 1985.

professional status

Registered Professional Engineer (Mechanical), Association of Professional Engineers and Geoscientists of British Columbia, 1989.
P.Eng. #16706

Registered Professional Engineer (Metallurgical), State of Washington, 2003. P.E. #40587

Certified Fire and Explosion Investigator (CFEI), National Association of Fire Investigators, 2006.

Certified Vehicle Fire and Explosion Investigator (CVFEI), National Association of Fire Investigations, 2013.

professional associations

International Society of Air Safety Investigators (ISASI), since 2009.

National Association of Fire Investigators (NAFI), since 2006.

ASM International (ASM), since 1989.

professional experience

MEA Forensic Engineers & Scientists

Senior Engineer, 1989 to Present

Registered professional mechanical and metallurgical engineer with 29 years experience investigating failures. Failure consultancy includes evidence and site examination, metallurgical analysis, fractography, friction and wear, ignition and combustion, dynamics, stress analysis, sequence of events, codes and standards compliance, experimentation to evaluate hypotheses for failed systems and components, reporting, and mediation, deposition, and trial attendance.

Investigated thousands of failures in:

Transportation:

Ground vehicle engines, fuel systems, suspensions, wheels, brakes

Bicycles

Aircraft internal combustion and turbine engines

Helicopter gearboxes

Marine engines and propulsion

Personal watercraft

Building mechanical systems:

Plumbing

HVAC

Fire protection

Drainage

Industrial machinery and accidents:

Conveyors, forklifts and materials handling

Food processing equipment

Refrigeration

Packaging

Agricultural machinery

Warnings and guards

Fall arrest

Consumer products:
Kitchenware
Exercise equipment
Ladders
Furniture

Qualified as an Expert Witness in the Supreme and Provincial Courts of British Columbia, Alberta Court of Queen's Bench, Circuit Court of the State of Oregon, Superior Court of the State of California, Washington State Superior, and District Courts.

research activities

Mr. Bailey focuses on whether failures are linked to defective use, maintenance, manufacture, or design. His work includes evidence and site examinations, metallurgical and materials analysis, fractography, friction and wear studies, combustion research, stress analysis, events sequence determination, and assessing code compliance.

Mr. Bailey often stages experiments to evaluate hypotheses for failed components, machines and processes. In addition to general laboratory and engineering shop facilities, MEA Forensic has specific tools to assist with failure analysis:

Optical and digital microscopes, and 3D scanners for documenting and measuring evidence
Fourier transform infrared spectroscope for identifying materials
Blast chamber for pressure testing plumbing parts
Dynamometer for studying wheel separations

publications

Mechanisms of wheel separations

lectures & presentations

Mr. Bailey frequently provides seminar presentations to law firms and other organizations. Presentations have been provided in British Columbia, Alberta, Washington, California, Arizona, Nevada, Michigan, Florida and Illinois.

October 2013 – Product Liability Seminar. Lecture for the Insurance Institute of British Columbia, Vancouver, BC.

July 2012 – Water Escapes caused by Polymer Failures. Lecture for National Association of Subrogation Professionals, Toronto, ON.

June 2012 – Property Loss Seminar. Lecture for the Insurance Institute of British Columbia, Vancouver, BC.

February 2012 – The Challenges of experts in Litigation. 13th Annual Aviation Conference, Alexander Holburn Beaudin & Lang LLP and Paterson MacDougall LLP, Toronto, ON.

September 2011 – Subrogation Panel, National Insurance Conference of Canada, Vancouver, BC.

April 2011 – Water Escape Seminar. Lecture for the Insurance Institute of British Columbia, Kamloops, BC.

March 2011 – Water Escape Seminar. Lecture for the Insurance Institute of British Columbia, Victoria, BC.

January 2011 – Property Loss Seminar. Lecture for the Insurance Institute of British Columbia, Vancouver, BC.

November 2010 – Water Escape Seminar. Lecture for the Insurance Institute of British Columbia, Kelowna, BC.

March 2009 – Mechanisms of Wheel Separations. Presentation of technical paper at SAE International Congressional Exposition, Detroit, MI.

November 2007 – Forensic Engineering in Practice. Lecture for the Insurance Institute of British Columbia, Vancouver, BC.

October 2006 – Failure Analysis of PVC Pipe Joint Separations. Presentation of technical paper at MS&T Conference and

Exhibition, Cincinnati, OH.

June 2004 – Forensic Engineering in Practice. Lecture for the Insurance Institute of British Columbia, Vancouver BC.

March 2000 – Data from five staged car-to-car collisions and comparison with simulations. Presentation of technical paper at SAE International Congress and Exposition, Detroit, MI.

August 1997 – Chief instructor for 5-day instructional seminar on high speed and low speed collisions, MEA Forensic Engineers and Scientists, Richmond, BC.

February 1995 – Data and methods for estimating the severity of minor impacts. Presentation of technical paper at SAE International Congress and Exposition, Detroit, MI.

February 1994 – Characteristics of specific automobile bumpers in low-speed impacts. Presentation of technical paper at SAE International Congress and Exposition, Detroit, MI.

training and professional development

October 2013 – Vehicle Fire, Arson and Explosion Investigation Science and Technology Seminar, Lexington, KY.

June 2012 – Used Oil Analysis Basics, Noria Corp. (online training course).

September 2010 – IAAI Annual Training Course, International Association of Arson Investigators, Sooke, BC.

April 2009 – SAE International Congress and Exposition, Detroit, MI.

October 2006 – Canadian National Advanced Fire, Arson and Explosion Training Program, Markham, ON.

October 2006 – Materials Science Technology Conference and Exhibition, Cincinnati, OH.

November 2005 – FTIR Sample Preparation and Spectral Interpretation, Spectros Associates, Cleveland, OH.

March 2005 – Fractography, ASM International Materials Engineering Institute, Knoxville, TN.

June 2003 – Practical Interpretation of Microstructures, ASM International Materials Engineering Institute, Cleveland, OH.

May 2003 – Metallographic Techniques, ASM International Materials Engineering Institute, Cleveland, OH.

March 2003 – Air Brake Theory and Air Brake Pre-trip Inspection, Fraser Valley Driving School, Surrey, BC. Air brake endorsement obtained (licensed to operate air brake equipped vehicles)

March 2000 – SAE International Congress and Exposition, Detroit, MI.

November 1995 – 39th Stapp Car Crash Conference, San Diego, CA.

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

February 1994 – SAE International Congress and Exposition, Detroit, MI.

August 1992 – BH2VK Crash Testing Project and Seminar, San Bernardino, CA.