

CURRICULUM VITAE
SUSAN M. MCFARLAND

BSC (GEOL.), MSC (MET. ENG.), P. ENG., C.F.E.I.

ACADEMIC QUALIFICATIONS

1995 MSc. Metallurgical Engineering
University of Alberta

Thesis: Acoustic Emission Monitoring of Delayed Hydride Cracking in Zirconium 2.5% Niobium, Candu Reactor Tubes.

1979 BSc Geology
University of Toronto

AVIATION QUALIFICATIONS

1981 - 1991 Canadian Commercial Helicopter Pilot - Instrument-rated Class I, Group IV.
Canadian Commercial Airplane Pilot - single engine land and sea.

Endorsements and experience on type: Bell 47, 206, 206L, Bell 212, Hughes 300, 500.
~2,900 hours total flight (2,300 hours single engine helicopters, 500 hours multi-engine turbine helicopters, 100 hours single engine airplane)

PROFESSIONAL ASSOCIATIONS and CERTIFICATIONS

- Member, Association of Professional Engineers and Geoscientists of Alberta (APEGA)
- Member, National Fire Protection Association (NFPA)
- Member, ASM International
- Member, American Society of Mechanical Engineers (ASME)
- Member, NACE International (AMPP)
- Member, Society of Petroleum Engineers (SPE)
- Member, National Association of Fire Investigators (NAFI)
- Member, American Welding Society (AWS)
- Member, American Society of Testing of Materials (ASTM)
- Member, Skate Canada
- Member, Society of Plastic Engineers (SPE)
- Member, International Association of Arson Investigators (IAAI)

EXPERT TESTIMONY

Qualified as an expert witness in the area of failure analysis in the Court of Queen's Bench.
Qualified as an expert witness in Provincial Court of Alberta

COURSES, SEMINARS & TECHNICAL TRAINING

- 2023 Drawing Interpretation, ASME, July 2023
- 2022 Emerging Technologies in Fire Investigation, CFI Trainer, IAAI, June 2022
- 2022 Fire Investigator Scene Safety, CFI Trainer, IAAI, June 2022
- 2022 Lithium-Ion Battery Fires, CFI Trainer, IAAI, March 2022
- 2022 Fire Chemistry, CFI Trainer, IAAI, March 2022
- 2022 Alternative Fuel Vehicles, CFI Trainer, IAAI, March 2022
- 2022 Physical Evidence at the Fire Scene, CFI Trainer, IAAI, March 2022
- 2021 Electric and Hybrid Vehicle Design Basics, CFI Trainer.net, IAAI, November 2021
- 2021 Electric and Hybrid Vehicle Fires, CFI Trainer.net, IAAI, November 2021
- 2021 ASME Section IX/ASME B31.3, June 8 to 10, 2021 Online Webinar
- 2021 2020 NFPA 25: Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems Online Training Series, January 2021;
- 2021 2017 NFPA 25: Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems Online Training Series, January 2021;
- 2020 Introduction to Appliances, IAAI, November 2020;
- 2019 The Scientific Method of Fire and Explosion Investigation, IAAI, December 2019
- 2019 Fire-Safe Building Design: An Introduction into Automatic Sprinkler Systems, Johnson Controls
- 2019 Effective Investigation and Testimony, CFI Trainer.net, IAAI
- 2019 Residential Electrical Systems, CFI Trainer.net, IAAI
- 2019 Ensuring Compliance with the Alberta Building Code, Edmonton, Alberta October 2019
- 2019 2016 NFPA 13: Fire Sprinkler Installation Requirements, Self-Guided Online Training. November 2019
- 2019 *Welding Procedure Specifications From Conception to Implementation*, Edmonton, Alberta, March 2019
- 2018 *Plumbing Systems Design for Multi-Residential, Commercial, Industrial and Institutional Buildings*, Edmonton, Alberta, June 2018
- 2018 *Tire Forensics and Accident Investigation*, Tennant & Associates, Edmonton, Alberta, April 2018
- 2017 *Hot Wheels, Vehicle Fire Investigation Seminar*, Leduc, Alberta
- 2017 *Fire Protection Systems*, CFI Trainer.net, International Association of Arson Investigators (IAAI)
- 2017 *Thermometry, Heat and Heat Transfer*, CFI Trainer.net, IAAI
- 2016 *Documenting the Event*, CFI Trainer.net, IAAI
- 2016 *Basic Electricity*, CFI Trainer.net, IAAI
- 2016 *Investigating Natural Gas Systems*, CFI Trainer.net, IAAI
- 2015 *ASME B31.3 Process Piping Design*, New Orleans, LA
- 2014 *ASME BPV, Section IX: Welding, Brazing and Fusing Qualifications*, San Diego, CA
- 2013 *NACE Corrosion Control In The Refining Industry* - Edmonton, AB Canada
- 2012 *NACE Edmonton - A Non-Metallic Mini Seminar*, Edmonton, Alberta
- 2012 *APEGA - Business English Level II* - Seminar, Edmonton, Alberta
- 2011 EPIC Educational Program Innovations Center - *Structural Engineering for Non-Structural Engineers*, Edmonton, Alberta
- 2010 Codes Standards Training Institute (CASTI) - *CSA Z662 (Oil and Gas Pipeline Systems) Construction and Inspection*, Edmonton, Alberta
- 2009 ASM International - *Metallography and Failure Analysis* - Seminar and Practical Session, Edmonton, Alberta
- 2008 Canadian Institute of Steel Construction - *Bolting and Welding for Design Engineers*, Fort McMurray, Alberta
- 2007 ASM International - *NDT Techniques and Flaw Detection*, Edmonton, Alberta
- 2006 American Welding Society - *What's New in Welding Consumables*, Edmonton Alberta
- 2006 ASM International - *Metallurgical Failure Analysis*, Edmonton, Alberta
- 2005 NACE International - Edmonton Section - *Petroleum & Natural Gas Industries Materials For Use in H2S-containing Environments in Oil & Gas Production* - Edmonton, Alberta
- 2003 Canadian Welding Bureau Seminar, CSA W59 –*Welded Steel Construction*, Edmonton, Alberta

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- 2003 Canadian Welding Bureau, CSA W47.1, *Certification of Companies for Fusion Welding of Steel Structures*, Edmonton, Alberta
- 2001 Canadian National Advanced Fire, *Arson and Explosion Investigation Training Program*, Toronto, Ontario
- 1989 Transportation Safety Institute - *FAA Aircraft Accident Investigation, Part 2*, FAA School, Oklahoma City, Oklahoma
- 1988 Continental Airlines for Transport Canada, *Cockpit Resource Management Course*, Ottawa, Ontario
- 1988 *Transport Canada Inspector Orientation Course*, Transport Canada Training Institute, Cornwall, Ontario
- 1987 Transportation Safety Institute - *FAA Helicopter Accident Investigation Course*, Bell Helicopters, Fort Worth, Texas

PUBLICATIONS

- Aviation Occurrence Report "Risk of Collision Between: Boeing 737-210C, C-GNWI and Gates Learjet 35 C-GBWL", Report Number 90W0021
- Aviation Occurrence Report "Canadian Helicopters Ltd. Bell 204B (Helicopter) C-FBHY", Report Number 90W0176
- Aviation Occurrence Report "E3C/Boeing 707 Snore 41 and C12/Beech 200 North 49", Report Number 90W0032
- Aviation Occurrence Report "Cameron/Dairy Queen (Balloon) C-GHZF", Report Number 89W0127

PROFESSIONAL CAREER

Anderson Associates Consulting Engineers Inc. 1995 – Present
Partner/Metallurgical/Materials/Forensic Engineer

- Material failure analysis of mechanical parts and equipment including transmissions, valves, propane, gasoline and diesel engines, specialty oilfield downhole tools, drill pipe, steel, polymer, and glass fiber reinforced pipelines, welded components and large industrial cranes.
- Fire Protection System specialist, failure analysis and inspection of wet, dry, antifreeze fire sprinkler systems, steel and plastic sprinkler piping, couplings, standpipes and fire pumps.
- Extensive metallographic analysis of alloy, stainless steels and nickel alloys including laser and plasma transferred arc (PTA) applied tungsten carbide and specialty nickel alloys.
- Extensive corrosion analysis - boiler corrosion and high temperature corrosion of reformer tubing.
- Development of heat treating procedures for carbon, alloy and stainless steels and nickel alloys.
- Welding engineering and development of welding procedures in alloy steels and nickel alloys.
- Failure analysis of chillers, ball, radial and roller bearings.
- Quality assurance testing including specification writing, interpretation and compliance testing, mechanical testing and materials selection.
- Non-destructive evaluation.
- Fire and explosion origin and cause analyses has included - industrial and residential buildings, gas plants, refinery, vehicle, large tractor units and cranes, heavy oil upgraders, compressor stations and generators.
- Automobile, snowmobile and aircraft accident reconstruction.

Transportation Safety Board of Canada 1987 – 1995
Operational Accident Investigator

- Aircraft Accident Investigator - Investigator-in-charge and assistant on over 150 helicopter, airplane and air traffic service (ATS) accidents or incidents.
- Part of Head Office Review Committee.
- Photographic documentation.
- Surveying the accident scene by ground and aerial techniques.
- Interviewing witnesses.
- Cooperation with local law enforcement agencies.
- Liaison with Transport Canada officials regarding aviation safety concerns.
- Extensive research was conducted to determine accident cause and possible prevention. Often engines/components were re-examined using test equipment. A significant amount of report writing was involved with the process; several accident reports were published. Duties also included dealing with the legal profession in Canada and the US.

Canadian Commercial Helicopter Pilot 1981 - 1987

- VFR helicopter flying experience in BC, Alberta, Ontario and the Yukon. Duties included managing a base of operations, flying in support of mineral exploration crews, fire suppression and support, slinging operations including long line and controlled burning (drip torch), fish and wildlife and powerline surveys.
- IFR helicopter flying experience as a co-pilot on a medium lift, air ambulance service based in Ontario.

Geologist 1977 - 1981

- During university and shortly afterwards, employed as a geological assistant and exploration geologist, involved mainly in regional exploration for base metals in Ontario, BC and the Yukon.