Dinu G. Matei

M.Sc., P.Eng., Consulting Engineer

1336 Sandhill Drive
Ancaster, Ontario
L9G 4V5

EDUCATION

Master of Science in Materials Science (1999)
University of Calgary, Calgary, Canada

Bachelor of Science in Mechanical Engineering (1992)
Technical University of Cluj-Napoca, Cluj-Napoca, Romania

HONOURS AND AWARDS

NSERC Scholarship, University of Calgary, Calgary, Alberta, Canada, 1998-1999

ASM International, Calgary Chapter Scholarship, University of Calgary, Calgary, Alberta, Canada, 1999

TEMPUS Scholarship, University of Nottingham, Nottingham, England, 1993-1994

PROFESSIONAL REGISTRATION/LICENSING

Designated Consulting Engineer (PEO) since 2012
Professional Engineers Ontario (PEO) since 2007

TECHNICAL AFFILIATIONS

Member – Materials and Manufacturing Ontario (MMO) – 1999
Member – American Society for Metals (ASM) – 1998
Member – National Association of Corrosion Engineers (NACE) – 1998
Member – American Society of Mechanical Engineers (ASME) – 2013

PROFESSIONAL EXPERIENCE

Qualified as an expert witness in the Court of King's Bench of Manitoba
Involved in more than 2,500 failure analysis investigations:

- consumer and industrial product/equipment failure analysis
- residential and commercial plumbing system failure analysis
- residential and commercial oil storage tank failure analysis
- automotive and transportation equipment/component failures
- corrosion and fatigue related failures
- components' failure due to inadequate material selection and/or improper installation
- glass/ceramics/composites/polymers failures
- fractography and fracture surface analysis
- metallurgical analysis of microstructures
- materials testing and characterization based on ASM, ASME, NACE, CSA standards and/or customer specifications
- experienced in using analytical tools for materials characterization: XRD, XRF, SEM, ESEM, EDX, DSC, optical microscopy
- work experience with insurance companies, independent adjusters, law firms, corporate risk managers and international work experience with partners from United States, England, France, Austria, Romania
- involved in 23 projects leading to development of new materials and processes
- authored 28 technical papers and publications

2008 to Present

Senior Consulting Forensic Engineer, Materials Engineering, ***Origin and Cause***
Ancaster, Ontario, Canada

- perform mechanical and metallurgical failure analysis investigations on a large variety of engineered materials (metals, plastics, ceramics) and components to accurately determine the origin and cause of a vast array

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of service failures (residential, consumer products, commercial, industrial, oil and gas, mining, agriculture and transportation).
- perform materials and components examination, testing, analysis and characterization.
- prepare complex and accurate detailed technical reports related to failure analysis and provide litigation technical support to insurance companies, law firms, independent adjusters, and corporate risk managers.

2007
Metallurgical Engineer, ***Bodycote Testing Group Canada, Inc.***
Cambridge, Ontario, Canada

- performed metallurgical investigations and failure analysis of engineered materials and components used in automotive, mining, oil and gas, and consumer product industries, on issues related to metallurgy, fracture, fatigue, corrosion and other means of materials degradation.
- performed materials testing and characterization based on ASM, ASME, NACE, CSA standards and/or customers' specifications.
- prepared complex and accurate technical reports for a diverse industrial clientele.

2003 to 2006
Project Engineer, ***Bodycote Testing Group Canada, Inc.***
Cambridge, Ontario, Canada

- performed work related to the research, development, production, processing, heat treatment and quality control of high-temperature corrosion resistant, anti-coking and metal dusting resistant coatings developed for petrochemical industry.
- identified new applications opportunities for existing and developmental high-temperature corrosion resistant coatings.
- coordinated the coatings deposition technology transfer to a manufacturing plant in Liverpool, UK.
- developed chemical formulations and proper heat-treatment cycles for consolidation of deposited coatings.

2002
Project Engineer (Contract), ***ARCiNA LLC, State College***
Pennsylvania, USA

- managed the development of "Tough-Coated Hard Powders for Cutting Tools" project.
- initiated the "Development of Novel Materials for Wire Drawing Dies" project by means of mechanical alloying.
- performed materials testing and characterization of metallic and ceramic materials.
- prepared extensive research proposals for the Ben Franklin Foundation of Pennsylvania.

1999 to 2001
Development Engineer, Corporate Engineering Group, ***IonBond Inc.***, ISO 9000,
Toronto, Ontario, Canada

- served on Corporate Engineering Team as liaison between R&D and Production.
- developed fast and safe processes and designed hardware for chemical/electrochemical removal of thin film coatings from tool steels without affecting the substrate.

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- coordinated installation of newly developed technology within all North American companies' centers, recommended design and process modifications.
- prepared ISO 9000 documents and developed processes standardizations.

1997 to 1999

Associate Researcher/Teaching Assistant, ***Department of Mechanical Engineering, University of Calgary***, Calgary, Alberta, Canada

- performed experimental work on "Hydrogen Embrittlement of Steels" in collaboration with partners from oil and gas industry
- performed the first scientific evaluation of "Hydrogen Vacuum Foil Permeation Method for Monitoring Internal Corrosion In Carbon Steels" used in petrochemical industry.
- wrote extensive literature reviews on "Hydrogen Diffusivity in Materials" and "Mechanically Alloyed Materials".
- taught advanced courses in the materials science and engineering field (metallurgy, corrosion, failure analysis) at both undergraduate and graduate level.

1993 to 1996

Associate Researcher/Teaching Assistant, ***Technical University Cluj-Napoca, Department of Materials Science and Engineering***

Cluj-Napoca, Romania

- involved in projects leading to development of new materials by means of powder metallurgy (intermetallics, wear resistant coatings, magnetic materials, shape memory alloys).
- taught classes on powder metallurgy and metallic materials technology at graduate level.
- key member of team organizing the 1st International Conference on Powder Metallurgy in Romania.

FURTHER TRAINING AND EDUCATION

- "Breaking Bad: The 4N6 of Engineering Failure Investigations and Why Accidents Do Not Happen", Department of Materials Science and Engineering, University of Toronto, June 4, 2021
- "Microstructure of Ferrous Alloys" – web seminar, Struers Inc., April 17, 2018
- "Creep Failure of Plastics", web seminar - Society of Plastic Engineers, April 2016
- "Understanding Why Ceramics Fail and Designing for Safety", DVD Course, The American Ceramic Society, Ohio 2015
- "Plastics Pipe 101" - training course, Jana Laboratories, Toronto, Ontario March 25 & 26, 2014
- "An Introduction to Plastic Component Failure Analysis", web seminar – The Madison Group 2012
- "Fall Protection" course #4022 – Armour Safety Ltd., Regina, Saskatchewan 2011
- "Respiratory Protection" course – Consumer's Co-operative Refineries Ltd. Regina, Saskatchewan 2011
- "Metallography of Fasteners", web seminar, Struers. 2010
- "Mechanical Failure Modes of Plastics", web seminar – Storck Materials Technology 2009
- "Failure Analysis of Metals", web seminar – Storck Materials Technology 2009

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- "The Effects of Impact & Other Rapid Loading Mechanisms on Plastic Deformation", web seminar – Society of Plastic Engineers 2009
- "Certified Fire and Explosion Investigator Training Program" – IAAI Ontario Chapter Kingston, Ontario 2009
- "Stress Corrosion Cracking" course – ASME, Calgary, Alberta 1999
- "Corrosion Science course – University of Calgary, Calgary, Alberta 1998
- "H_2S Alive" course – Petroleum Industry Training Service, Calgary, Alberta 1998
- "Corrosion Science" course –University of Calgary, Calgary, Alberta 1998
- "Mechanical Behavior of Materials" course –University of Calgary Calgary, Alberta 1997 to 1998
- "Mechanically Alloyed Materials" R&D Program – University of Nottingham, Nottingham, England 1993 to 1994

PRESENTATIONS

- "Water Claims", Intact Insurance seminar, Toronto, June 8, 2023
- "Water Claims", Wawanesa Insurance seminar, Toronto, June 7, 2023
- "Insurance Fraud Awareness", presentation at TD Insurance, Toronto, March 15, 2023
- "Complex Material Failure Claims", Origin and Cause webinar, 5th Annual National Tour, November 17, 2021
- "Fraudulent Water Claims", webinar, Insurance Institute of British Columbia, May 25, 2021
- "Personal Injuries" OCI webinar, April 14, 2021
- "Water Damage Claims: Appliances & Plumbing", webinar, Insurance Institute of British Columbia, August 20, 2020
- "Failure Analysis of Plumbing Components: Flexible Toilet Water Connections", MS & T Conference, Columbus, OH, USA, October 2018
- "Forensic Evaluation of Ball Valve Failures in HVAC Recirculation Lines of High-Rise Residential Buildings", MS & T Conference, Pittsburgh, USA, October 2017
- "Residential Oil Spills: A Messy Business", Origin and Cause webinar, February 2016
- "Ask An Expert: Open-Mic Discussions with Leading Forensic Engineers", Origin and Cause webinar, November 2015
- "Properly Preserving Evidence", with Mazen Habash., P.Eng., "Subrogation Trends" seminar, OIAA-Thunder Bay Chapter, Thunder Bay, March 5, 2015
- "How to Maximize a Claim's Subrogation Potential by Properly Preserving Evidence", with Mazen Habash, P.Eng., Origin and Cause webinar, November 26, 2014
- "Water Losses, Are There Any Chances for Subrogation?" presented at Ecclesiastical Insurance National Claims Conference Toronto, Ontario, Canada, May 2013
- "Failure Analysis Investigations", Origin and Cause seminar, Saskatoon, Saskatchewan, Canada, September 2012
- "Failure Analysis Investigations", Kitchener/Waterloo OIAA Chapter, Kitchener, Ontario, Canada, March 2012
- Fuel Oil Spills from Aboveground Oil Storage Tanks, presented at Norfolk Mutual Insurance Company Broker Lunch & Learn event, Tillsonburg, Ontario, Canada, October 2011
- "Corrosion Generated Hydrogen Flux Measurements Using a Vacuum Gradient" poster presented at NACE 1999 International Conference October 1999, 2nd prize awarded by NACE, Ottawa, Canada, October 1999

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- "Corrosion Generated Hydrogen Flux Measurements Using A Vacuum Gradient" M.Sc. Thesis, University of Calgary, Calgary, Alberta, Canada, June 1999

PUBLICATIONS

- "Water Claims – Copper Pipes and What can Go Wrong", Without Prejudice, vol. 88, no.1, pp.12-18, September 2023
- "Toilet Water Supply Liner: The Low-Priced Culprit of High-Priced Insurance Claims", OIAA KW Chapter, Bulletin, pp. 15-18, December 2013.
- "Metallurgical Failure Analysis: The Importance of Sample Removal and Handling", Without Prejudice, Vol.73, No.9, pp. 6-10, May 2009
- "Accelerated Stripping of TiN Coatings from Steel Substrates" in Proceedings at International Conference on Materials and Manufacturing Technologies, MATEHN '02, Cluj-Napoca, Romania, September 2002
- W.J.D.Shaw, D. G. Matei: "Hydrogen Permeation and Conversion Equivalency Factors, Part I and Part II", in Proceedings at RoPM 2000 International Conference, Cluj-Napoca, Romania, July 2000
- W.J.D.Shaw, D.G.Matei, M.Fraser: "Understanding the Behavior of the Vacuum Foil Hydrogen Permeation Technique", paper no.463 presented at NACE 2000 International Conference, Orlando, Florida, USA, March 2000
- "Hydrogen Diffusivity in Materials", special report, University of Calgary, November 1998, published by The Van Horne Institute, Canada, 1999
- D.G. Matei, G. Matei: "The Use of Lognormal Distribution for the Characterization of Metal Powder Granulometric", in Proceedings at the 2nd International Conference on Materials and Manufacturing Technologies, MATEHN '98, Cluj-Napoca, Romania, September 1998
- W.J.D. Shaw, D.G. Matei: "Fundamental and Applied Studies of Hydrogen Embrittlement", special report, University of Calgary, Calgary, Alberta, Canada, September 1998
- "Aspects of Hydrogen Embrittlement in Steels", special report , University of Calgary, Calgary, Alberta, Canada, August 1998
- D.G. Matei, W.J.D. Shaw: "Limits and Correlations of Vacuum Induced Hydrogen Flux in Corrosive Environments", special report, University of Calgary, Calgary, Alberta, Canada, July 1998
- W.J.D. Shaw, D.G. Matei: "Hydrogen Flux Measurements and Relationships to Corrosion" paper presented at International Pipeline Conference, Calgary, Alberta, Canada, June 1998
- W.J.D. Shaw, H.B. Freeman, D.M. Jayasinghe, D.G. Matei: "Correlations between Corrosion, Electrochemical Hydrogen Flux and a Vacuum Foil Technique", paper no. 391, presented at Corrosion '98 International Conference, San-Diego, California, USA, March 1998
- W.J.D. Shaw, D.G. Matei, D.M. Jajasinghe: "Effects of Various Parameters on Vacuum Induced Hydrogen Flux" paper presented at NACE Regional Conference, Victoria, British Columbia, Canada, February 1998
- "Stress Corrosion Cracking", special report, University of Calgary Calgary, Alberta, Canada, December 1997
- "Current State of Diffusion Welding of Materials", special report, University of Calgary, Calgary, Alberta, Canada, December 1997
- "Catalysts and Inhibitors", special report, University of Calgary, Calgary, Alberta, Canada, November 1997
- "Mechanically Alloyed Materials", special report, University of Calgary, Calgary, Alberta, Canada, August 1997
- D.G.Matei, W.J.D. Shaw: "Hydrogen Permeation Conversions and Equivalency Factors", special report as part of "Fundamental and Applied

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Studies on Hydrogen Embrittlement", University of Calgary, Calgary, Alberta, Canada, May 1997

- G. Matei, D.G. Matei, V. Moraru: "Studies on the Metal and Alloys Atomization Methods", in Proceedings at 1st Ulusal Toz Metalurjisi Konferansi, pp.67-89. 1996, Ankara, Turkey, 1996
- G. Matei, D.G. Matei: "Atomization of Melted Aluminium using the Three Fluids Method", in Proceedings at Powder Metallurgy World Congress, PM'94, pp.357-360, Paris, France, 1994
- G. Matei, J.Kis, D.G. Matei: "Water Atomization Technique Applied to CrWCoFe Alloy", in Proceedings at 1st International Conference on Materials and Manufacturing Technologies, MATEHN '94, pp.341-346, Cluj-Napoca, Romania, 1994
- G. Matei, N. Jumate, I. Chicinas, D.G. Matei: "Metal Powders Elaboration in View of Surface Vitrification", in Proceedings at 1st International Conference on Materials and Manufacturing Technologies, MATEHN '94, Cluj-Napoca, Romania, 1994
- J. Kis, K.H. Roman, D.G. Matei: "Powder of CrWCoFe Produced by Water Atomization Technique", in Proceedings at Junior-Euromat Conference, Lausanne, Switzerland, 1992, pp. 302-303, 1992

SELECTED RESEARCH AND DEVELOPMENT PROGRAMS

- "Development of High-Temperature Resistant Anti-Coking Coatings for the Ethylene Industry", Bodycote Materials Testing Group, Cambridge, Ontario, Canada, 2004-2006
- "Development of Metal Dusting Resistant Coatings", Bodycote Materials Testing Group, Cambridge, Ontario, Canada, 2004-2006
- "Development of Superhard, Long Lasting Picks (Cutter Bits) for Low-Cost Cutting of Rocks, Minerals, Asphalt, and Concrete by Means of Powder Metallurgy", ARCiNA LLC, State College, Pennsylvania, USA, Alpine Corp., State College, Pennsylvania, USA, Austrian Research Centers in Seibersdorf, Austria, 2002
- "WC-Co-TiN and WC-Co-Al_20_3 Hardmetals for Cutting Tools by Means of Mechanical Alloying of Elemental Powders", ARCiNA LLC, State College, Pennsylvania, Austrian Research Centers in Seibersdorf, Austria, 2002
- "Development of Tough-Coated Hard Nano Powders (TCHP) "project, ARCiNA, LLC, State College, Pennsylvania, USA, EnDurAloy Corp., Savannah, Georgia, USA, 2002
- "Fast Stripping of Titanium Nitride Coatings from the Surface of Cutting Tools Using a Blend of Chemicals", IonBond, Inc., Cambridge, Ontario, Canada 1999-2001
- "Stripping of Aluminum Titanium Nitride Coatings", IonBond, Inc., Cambridge, Ontario, Canada 2001
- "Electrochemically Controlled Stripping of Chromium Nitride Coatings from the Surface of Stamping, Forming, Die-Casting, and Other Tools", IonBond, Inc., Cambridge, Ontario, Canada 1999-2001
- "Stripping of Zirconium Nitride Coatings", IonBond, Inc., Cambridge, Ontario, Canada, 2000
- "Limits and Correlation of Vacuum Induced Hydrogen Flux in Corrosive Environments". Sponsors: Diversity Corporation, NSERC, University of Calgary, Calgary, Alberta, Canada 1998-1999
- "Fundamental and Applied Studies of Hydrogen Embrittlement". Sponsors: Alberta Energy, NOVA Corporation of Alberta, Mobile Oil Canada, Interprovincial Pipe Line Inc., Trans Gas, CANMET, Shell Canada Ltd., Foothills Pipe Lines, Syncrude Canada Ltd., Chevron Research and Technology, University of Calgary, Calgary, Alberta, Canada 1997-1999

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- "Al_3Ni Intermetallics Obtained by Means of Mechanical Alloying", University of Nottingham, Nottingham, England, 1994