OCI Group

Dinu Matei

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Dinu is a Lead Engineer with more than 30 years experience in the industry, including more than 23 years in Mechanical, Materials, Product, and Equipment Failure Investigations. Dinu has been the lead investigator on more than 2,500 complex and multi-disciplinary investigations in those fields for the insurance industry, risk managers, law firms, manufacturing companies, and private clients. Dinu is a Registered Professional Engineer in the province of Ontario, is designated as a Consulting Engineer, and has been qualified as an expert witness in the Court of King's Bench of Manitoba and Saskatchewan.

Dinu has participated in 23 multi-national projects which resulted in the development of new materials and processes. He has taught at undergraduate and graduate levels on materials science and engineering and on failure analysis, and is an active mentor for engineers in training. Dinu is a member of the American Society for Metals (ASM International), American Society for Mechanical Engineers (ASME), Association for Materials Protection and Performance (AMPP, formerly known as NACE, National Association of Corrosion Engineers). Throughout his career, Dinu has delivered both technical papers and presentations at several international conferences on materials science and engineering.

Dinu's experience and expertise is in a variety of complex metallic and non-metallic (plastic) materials/mechanical failures, mechanical systems and equipment failures, product liability, corrosion, oil spills, residential and commercial plumbing systems and appliances failures, personal injuries associated with product failures, break and entries, insurance fraud, and sprinkler system failures.

EDUCATION

University of Calgary
Master of Science in Materials Science
Calgary, Alberta, Canada
1999

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

TECHNICAL AFFILIATIONS

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

COURT EXPERIENCE

Qualified as an expert witness in the Court of King's Bench of Manitoba and Saskatchewan.

PROFESSIONAL EXPERIENCE

Senior Consulting Forensic Engineer, Materials Engineering

OCI Group (Formerly Origin and Cause Incorporated)
Burlington, Ontario
2008 – Present

- 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 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

Metallurgical Engineer

Bodycote Testing Group Canada, Inc.
Cambridge, Ontario
2007

- 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

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

- 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

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

- 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

Development Engineer
Corporate Engineering Group, IonBond Inc., ISO 9000
Toronto, Ontario
1999 – 2001

- 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
- 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

Associate Researcher/Teaching Assistant
Department of Mechanical Engineering, University of Calgary
Calgary, Alberta
1997 – 1999

- 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

Associate Researcher/Teaching Assistant
Technical University Cluj-Napoca, Department of Materials Science and Engineering
Cluj-Napoca, Romania
1993 – 1996

- 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 & EDUCATION

“Plastic Part Failure; Analysis, Design, and Prevention”, University of Wisconsin, School of Continuing Education, Milwaukee, USA (October 15–17, 2024)

“Freezing Pipes and Water Damage”, Origin and Cause, Webinar (November 29, 2023, and February 23, 2024)

“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”, Struers Inc., Web Seminar, (April 17, 2018)

“Creep Failure of Plastics”, Society of Plastic Engineers, Web Seminar (April 2016)

“Understanding Why Ceramics Fail and Designing for Safety”, The American Ceramic Society, DVD Course, Ohio (2015)

“Plastics Pipe 101”, Jana Laboratories, Training Course, Toronto, Ontario (March 25, 26, 2014)

“An Introduction to Plastic Component Failure Analysis”, The Madison Group, Web Seminar (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”, Struers, Web Seminar (2010)

“Mechanical Failure Modes of Plastics”, Storck Materials Technology, Web Seminar (2009)

“Failure Analysis of Metals”, Storck Materials Technology, Web Seminar (2009)

“The Effects of Impact & Other Rapid Loading Mechanisms on Plastic Deformation”, Society of Plastic Engineers, Web Seminar (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)

“H2S 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 – 1998)

“Mechanically Alloyed Materials” R&D Program, University of Nottingham, Nottingham, England (1993 – 1994)

PRESENTATIONS

Guest Speaker, “Personal Injuries”, Forensic Engineering Course, Dept. of Materials and Engineering, University of Toronto, Toronto, Ontario (March 10, 2025)

“Personal Injuries”, OCI Group National Tour, Mississauga, Ontario (April 29, 2025)

“Personal Injuries: The Cause and the Damages Done”, Origin and Cause, Webinar (October, 2, 2024)

“CAT Failure Investigations”, Origin and Cause 8th National Tour, Webinar (May 29, 2024)

“Water Claims”, Intact Insurance Seminar, Toronto, Ontario (June 8, 2023)

“Water Claims”, Wawanesa Insurance Seminar, Toronto, Ontario (June 7, 2023)

“Insurance Fraud Awareness”, presentation at TD Insurance, Toronto, Ontario (March 15, 2023)

“Complex Material Failure Claims”, Origin and Cause 5th Annual National Tour, Webinar (November 17, 2021)

“Fraudulent Water Claims”, Insurance Institute of British Columbia, Webinar (May 25, 2021)

“Personal Injuries”, OCI Group, Webinar (April 14, 2021)

“Water Damage Claims: Appliances & Plumbing”, Insurance Institute of British Columbia, Webinar (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, Ontario (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 (May 2013)

“Failure Analysis Investigations” Seminar, Origin and Cause, Saskatoon, Saskatchewan (September 2012)

“Failure Analysis Investigations”, Kitchener/Waterloo OIAA Chapter, Kitchener, Ontario (March 2012)

“Fuel Oil Spills from Aboveground Oil Storage Tanks”, Presented at Norfolk Mutual Insurance Company Broker Lunch & Learn Event, Tillsonburg, Ontario (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, Ontario (October 1999)

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

PUBLICATIONS

Personal Injuries: Under The Microscope", Without Prejudice, Vol.89, No.6, pp.16-19, (February 2025)

"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 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 & 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-Al203 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)

“Al3Ni Intermetallics Obtained by Means of Mechanical Alloying”, University of Nottingham, Nottingham, England (1994)