Exponent®
Engineering & Scientific Consulting

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Professional Profile

Matthew Doré, Ph.D., CEng, FWeldI, AMICE, is a structural welding expert at Exponent with over 25 years of experience in fatigue and fracture analysis. He specializes in failure investigations, expert witness testimony, and mechanical testing across the construction, oil and gas, renewables and defense sectors.

Dr. Doré has led numerous high-profile projects involving failure investigation, fatigue design assessment, and structural integrity consulting for global organizations and government agencies. His work encompasses experimental stress analysis, residual stress measurement, and fracture mechanics, with particular expertise in the fatigue of welded structures. He has served as a technical authority for complex engineering proposals, projects and overseen critical laboratories focused on material performance.

He has served clients in the energy (oil, gas, and hydrogen), infrastructure, and defense sectors, addressing challenges including catastrophic structural failure, sour corrosion behavior in pipelines, and fatigue crack growth acceleration. His consulting experience spans high-strength steel welded structures, additive manufacturing integrity, and the safety of repurposed gas pipelines for hydrogen transportation.

Dr. Doré's consulting approach integrates computational fatigue assessment, large-scale laboratory testing, and site-based field inspections to deliver rigorous, defensible conclusions. He is a Chartered Engineer (CEng) and a Fellow of the Welding Institute (FWeldI). Additionally, he holds significant leadership roles in international standards committees, currently serving as the Chair for BS 7608 and BS 7910 (fatigue), UK expert on fatigue and fracture committees for bridges and structures. He also serves as the UK National Delegate for the IIW Commission XIII on fatigue.

Before joining Exponent, Dr. Doré served as a Technology Fellow and Section Manager at TWI Ltd, where he managed a team of 25 engineers and research students, and oversaw the development of the sections technology roadmap. He also served as the Centre Director and Professor at the Advanced Structural Integrity Innovation Centre.

Dr. Doré earned his Ph.D. in Materials Engineering from The Open University and a BEng in Mechanical & Manufacturing Engineering from Anglia Ruskin University. He is an active contributor to the International Institute of Welding (IIW) and the British Standards Institution (BSI). He has published over 30 peer-reviewed articles on topics such as additive manufacturing, ultrasonic peening, fatigue design and fracture mechanics, and regularly presents at international conferences like Fatigue Design and Materials & Structural Integrity.

Academic Credentials & Professional Honors

Ph.D., Materials Engineering, The Open University, United Kingdom, 2016

ASME – Fatigue Design Assessment of Weldments, 2017

TWI Commendation Award, 2014

Prior Experience

Technology Fellow, Structural Integrity, TWI Ltd, Cambridge, 2024–2026

Section Manager, Fatigue & Fracture, TWI Ltd, Cambridge, 2017–2024

Centre Director, Professor in Enterprise and Innovation (Fatigue & Fracture), Advanced Structural Integrity Innovation Centre, Coventry University, 2021–2023

Team Manager, TWI Ltd, Cambridge, 2016–2017

Principal Project Engineer, TWI Ltd, Cambridge, 2014–2016

Senior Project Engineer, TWI Ltd, Cambridge, 2011–2014

Project Engineer, TWI Ltd, Cambridge, 2007–2011

Professional Affiliations

BSI WEE/37: Committee Member

WEE/37/3 BS 7910 (Chair – Fatigue)

WEE/37/9 BS 7608 (Chair)

B/525/10, CB/203: Committee member & UK Expert

IIW Commission XIII: UK National Delegate

Publications

Andrew Cosham, Matthew Doré, Fokion Oikonomidis, Menno Hoekstra, Xing Sun, Max Koronka, Nancy Thompson and Gemma Simpson. “Characterisation of the Effects of Hydrogen on Three Line Pipe Steels in the Local Transmission System”, 4th AMPP Conference & Expo 2026

Doré, M. "The Status of Research on Structural Integrity of Additive Manufacturing in Steels and Aluminium Alloys," White Paper, TWI Ltd, 2025.

Bakir, A., R. Reed, X. Zhang, A. Syed, P. Reed, P. McNutt, and M. Doré. "Fatigue performance of cold spray repaired aluminium alloy 7075," International Journal of Fatigue, vol. 198, 2025, p. 109036.

Shahriarifar, M., M. Doré, M. Dodge, K. Khan, and X. Zhang. "Investigation on the fatigue behaviour of stainless steel 316L produced by laser powder bed fusion process," Fatigue 2024 Conference Proceedings, 2024.

Bakir, A. A., X. Zhang, M. Doré, and P. McNutt. "Structural integrity of cold spray repaired aluminium alloy 7075 specimens," Fatigue 2024 Conference Proceedings, 2024.

Bakir, Ali Alpren, Xiang Zhang, Matthew Doré, and Kashif Khan. "Structural integrity assessment of cold spray repaired high-strength aluminium alloy 7075 specimens," MS&T23, 2023.

Akgun, Emre, Xiang Zhang, Tristan Lowe, Yanhui Zhang, and Matthew Doré. "Fatigue of laser powder-bed fusion additive manufactured Ti-6Al-4V in presence of process-induced porosity defects," Engineering Fracture Mechanics, vol. 259, 2022, p. 108140.

Akgun, Emre, Xiang Zhang, Romali Biswal, Yanhui Zhang, and Matthew Doré. "Fatigue of wire+arc additive manufactured Ti-6Al-4V in presence of process-induced porosity defects," International Journal of Fatigue, vol. 150, 2021, p. 106315.

Johnston, C. and M. Doré. "Comparison of the Fatigue Performance of Galvanised M72 Bolts With Design Standard Recommendations," Materials Technology, vol. 3, 2021.

Zhang, Yanhui and Matthew Doré. "Comparison of Fatigue Crack Growth Rates of Different Specimen Geometries," OMAE2021-62388, 2021.

Boruah, Dibakor, Xiang Zhang, and Matthew Doré. "Experimental evaluation of interfacial adhesion strength of cold sprayed Ti-6Al-4V thick coatings using an adhesive-free test method," Surface & Coatings Technology, 2020.

Zhang, Yan-hui, Matthew Doré, and Jazeel R. Chukkan. "Evaluation of the solutions for calculating misalignment-induced stress concentration factor at girth welds in pipelines," OMAE2020-18288, 2020.

Sun, Xing and Matthew Doré. "Improved bending correction factor for fatigue assessment of welded joints," Proceedings of the Thirtieth International Ocean and Polar Conference, ISOPE, 2020.

Akgun, Emre, Romali Biswal, Matthew Doré, and Xiang Zhang. "Failure causes of an additive manufactured TI-6AL-4V and implications on fatigue design," Engineering Integrity Society, Fatigue 2020, 2020.

Boruah, Dibakor, Xiang Zhang, and Matthew Doré. "Theoretical prediction of residual stresses induced by cold spray with experimental validation," Multidiscipline Modelling in Materials & Structures, 2019.

Boruah, Dibakor, Xiang Zhang, and Matthew Doré. "Evaluation of residual stresses induced by cold spraying of Ti-6Al-4V on Ti-6Al-4V substrates," Surface & Coatings Technology, 2019.

Boruah, Dibakor, Xiang Zhang, and Matthew Doré. "An analytical method for predicting residual stress distribution in selective laser melted/sintered alloys," Materials Research Forum LLC, 2018.

Zhang, Yan-hui and Matthew Doré. "Fatigue crack growth assessment using BS 7910:2013 - Background and recommended developments," International Journal of Pressure Vessels and Piping, vol. 168, 2018, pp. 79-86.

Mikkola, E., M. Doré, G. Marquis, and M. Khurshid. "Fatigue assessment of high-frequency mechanical impact (HFMI) - treated welded joints subjected to high mean stresses and spectrum loading," Fatigue & Fracture of Engineering Materials & Structures, vol. 38, no. 10, 2015, pp. 1167-1180.

Doré, Matthew J. and Stephen J. Maddox. "Investigation of Fatigue Crack Acceleration under Variable Amplitude Loading for a Structural Steel and Aluminium Alloy," Advanced Materials Research, vol. 891-892, 2014, pp. 581-587.

Mikkola, Eeva, Matthew Doré, and Mansoor Khurshid. "Fatigue strength of HFMI treated structures under high R-ratio and variable amplitude loading," Procedia Engineering, vol. 66, 2013, pp. 161-170.

Gerritsen, Christoph, Sofie Vanrostenberghea, and Matthew Doré. "Diode laser weld toe re-melting as a means of fatigue strength improvement in high strength steels," Procedia Engineering, vol. 66, 2013, pp. 171-180.

Doré, Matthew J. and Stephen J. Maddox. "Accelerated Fatigue Crack Growth in 6082 T651 Aluminium Alloy Subjected to Periodic Underloads," Procedia Engineering, vol. 66, 2013, pp. 313-322.

Maddox, S. J., M. J. Doré, and S. Smith. "A case study of the use of ultrasonic peening for upgrading a welded steel structure," Welding in the World, vol. 5, no. 9-10, 2011, pp. 56-67.

Freeman, R., C. Kong, M. Doré, and L. Zhang. "Optimisation of Laser Direct Metal Deposition for Additive Manufacture and Repair of Alloy 718," Aeromat 20 Conference and Exposition American Society for Metals, 2010.

Maddox, S. J., M. J. Doré, and S. Smith. "Investigation of ultrasonic peening for upgrading a welded structure," IIW doc. XIII-2326-10, 2010.

Thomas, W., D. Staines, P. Tubby, M. Doré, and M. Gittos. "Friction Skew-stir welding - Fatigue performance." INALCO 2004, 2004.

Project Experience

Structural Integrity & Fatigue Analysis

- Performed advanced fatigue crack growth assessments and failure investigations for the Boston Manor and Gade Valley Viaducts to evaluate the condition of electroslag welds and bottom flanges.
- Led hydrogen compatibility and integrity studies on the repurposing of existing gas pipelines for gaseous hydrogen transportation.
- Conducted structural integrity assessments for a high-profile confidential investigation of the Forth Bridge.

Energy & Offshore Engineering

- Managed a long-term Joint Industry Project (JIP) focused on the characterization of materials retrieved from decommissioned offshore structures.
- Investigated sour corrosion behavior in C-Mn steel riser welds for subsea applications.

Advanced Manufacturing & Repair Technologies

- Evaluated the structural integrity and interfacial adhesion strength of cold-sprayed Ti-6Al-4V coatings and additive manufactured components.
- Optimized post-weld improvement techniques for high-strength steel welded structures as part of an EU Commission initiative.

Transport & Infrastructure Support

- Supervised the weld repair and inspection of a cracked half-joint on a critical railway bridge.
- Managed a European Collaborative project involving testing programs across four companies in three countries.