

# ENGINEERING INTEGRITY SOCIETY

## Fatigue 2024



### KEYNOTES

Understanding the influence of microstructure on the properties of nickel based superalloys for disc rotors in aircraft engines - Mark Hardy, Rolls Royce

Advanced Concepts on Fatigue and Fatigue-Crack Growth of Metallic Materials - Jim Newman, Mississippi State University

Characterising fatigue crack tip deformation states in nickel base superalloys: slip character, strain accumulation and oxidation effects - Philippa Reed, University of Southampton

### PLENARIES

Scale-bridging fatigue assessment of steels – from production to performance - Frank Walther, TU Dortmund University

Design, Usage and Safety Aspects of Tubular Specimens for Materials Qualification with Pressurised Hydrogen - Ken Wackermann, Fraunhofer Institute of Mechanics of Materials IWM

### PRESENTATIONS

A comparative investigation on the multiaxial plain and notch fatigue strengths of heavy-section castings made of pearlitic and high-Si ferritic ductile cast irons - Matteo Pedranz, University of Trento

Effects Of Temperature Measurement And Adiabatic Heating During Strain Controlled Fatigue Tests - Peter Bailey, Instron

Using Fatigue Crack Growth Tests For Quality Assessment In Additive Manufacture - Peter Bailey, Instron

High- And Low-Cycle Tensile Fatigue Of All-Carbon Hybrid Quasi-Isotropic Laminate - Stepan Lomov, KU Leuven

Fracture And Fatigue Characterisation Of The Shot-Earth 772 - Andrea Zanichelli, University of Parma

Condition to Cause Fatigue Failure and Self-loosening of Bolted Joint Subjected to Transverse Vibration - Shinji Hashimura, Shibaura Institute of Technology

Phase angle effects on Thermo-mechanical fatigue (TMF) in a single crystal nickel alloy - Alberto Gonzalez, Swansea University



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Effects of microstructure and oxidation on fatigue crack initiation behavior in a titanium aluminide alloy - Yasuhiro Yamazaki, Chiba University

Plastic CTOD as fatigue crack growth characterising parameter under variable amplitude loading by using DIC - Alonso Camacho-Reyes, Universidad de Jaén

High temperature fatigue crack growth in nickel-based alloys joined by brazing and additive manufacturing - Ashok Bhadeliya, Bundesanstalt für Materialforschung und -prüfung (BAM)

Uncovering the role of building orientation and stress ratio on the fatigue behavior of L-PBF Ti6Al4V miniaturized strut-like lattice specimens - Matteo Benedetti, University of Trento

Effect of Pressurized Hydrogen on Low Cycle Fatigue of IN718: Modelling and Testing - Fabien Ebling, Fraunhofer Institute of Mechanics of Materials IWM

Phase field modelling of hydrogen-assisted fatigue - Emilio Martínez-Pañeda, Oxford University

Fatigue failure mechanisms and life prediction of a laser shock peened disk alloy - Rong Jiang, Nanjing University of Aeronautics and Astronautics

Fatigue crack propagation behavior of the grain size transition zone in a dual microstructure turbine disc - Rong Jiang, Nanjing University of Aeronautics and Astronautics

Couple Effects Of Temperature And Fatigue, Creep-Fatigue Interaction And Thermo-Mechanical Loading Conditions On Crack Growth And Dominant Failure Mechanisms Of Nickel-Based Alloy - Valery Shlyannikov, Kazan Scientific Center of Russian Academy of Sciences

Surface integrity and fatigue life prediction of film cooling hole structures using equivalent initial flaw size (EIFS) concept - Fei Li, Northwestern Polytechnical University

Study on fatigue crack propagation mechanism and model of a powder metallurgy superalloy under gas-marine environment - Leicheng Zhang, Nanjing University of Aeronautics and Astronautics

Implementation of Fatigue Crack Growth Laws in Abaqus - Giovanni Texeira, Dassault Systèmes



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Fatigue crack growth in air or in oil, under cyclic mode II + static biaxial compression - Véronique Doquet, Ecole Polytechnique

Effect of Loading Conditions on the Mechanical Behaviour of Magnetically Expanding Spinal Implants - Thomas Samuel Mosley, Northumbria University

Fatigue Crack Growth Behavior of 9310 Steel under Constant- and Variable-Amplitude Loading - Jim Newman, Mississippi State University

Mesoscale Cantilever Testing of High Cycle Fatigue Crack Initiation and Short Crack Growth in Ti-6Al-4V - Lazuardi Pujilaksono, University of Oxford

Advances in a Novel Ultrasonic Fatigue Method on CMSX-4 Meso-cantilevers - Robert Scales, University of Oxford

Influence of Deformation Heat on Small-scale Ultrasonic Fatigue Tests in 304 Stainless Steel - Jicheng Gong, University of Oxford

Fatigue Life Prediction Method of AM TA15 Based on the Statistical Model of Defects - Yao Liu, Beijing Institute of Aeronautical Materials

In vitro short-time testing method for evaluating the long-time corrosion fatigue strength of biomedical Mg alloys - Nils Wegner, TU Dortmund University

A probabilistic fatigue model using Gaussian processes and its application to additively manufactured metals - Michael Hack, Siemens Industry Software GmbH

Predicting the fatigue life of steel cables - Veronique Aubin, Université Paris-Saclay

Fatigue damage assessment of C45 via different experimental techniques and microstructural investigations - Andrea Saponaro, University of Salento

The transition of grain boundary in an additively manufactured - Xiangnan Pan, Chinese Academy of Sciences

Correlation of fatigue behaviour in pressurised hydrogen and electrolytically supplied hydrogen - Steffen Schönborn, Fraunhofer Institute for Structural Durability and System Reliability LBF

Study on thermo-mechanical fatigue crack propagation behavior of powder metallurgy superalloy - Lu Zhang, Nanjing University of Aeronautics and Astronautics



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Weight Optimization of Cast Aluminium Passenger Car Wheels with Respect to the Transferability of Cyclic Material and Fatigue Properties - Matthias Hell, RONAL GmbH

A machine learning model for fatigue lifetime prediction of metal components subjected to block loading - Kris Hectors, Ghent University

Visualization of volumetric strains in mortar under low-cycle fatigue damage using X-ray computed tomography and digital volume correlation - Chuan Kuang, Technical University of Denmark

Improved fatigue calculation of attachment welds in offshore wind structures using additive Mk factor - Jessica Taylor, Kent

Fatigue strength characterisation of wire+arc additively manufactured steel components and the relation with manufacturing imperfections - Wim De Waele, Ghent University

Crack Growth Prediction Under Multiaxial Loading - Bemim Sheen, Imperial College London

Industry-oriented assessment of the fatigue life of thin-walled profile weldments used in the construction of bus bodies - Miloslav KEPKA, University of West Bohemia

The critical distance concept to design notched 3D-printed metals against uniaxial/multiaxial fatigue - Luca Susmel, The University of Sheffield

Influence of the defect shape on the High Cycle Fatigue behavior of additively manufactured TA6V alloy - Matthieu Bonneric, University of Bordeaux

Probabilistic Modelling of Fatigue Behaviour in Inhomogeneous Metallic Materials Using Physics-based Machine Learning approaches - Enrico Salvati, TU Delft University

Refinement of Cyclic R-curve Determination of Extrinsic Short Cracks by Annealing - Lukas Walch, Materials Center Leoben Forschung GmbH

Influence factors on fatigue strength of arc-welded joints using ultra-high strength steel sheets and its improving method - Naoki Yamaguchi, JFE Steel Corporation

Impact of laser shock peening on fatigue strength of additively manufactured AlSi10Mg - Martin Matušů, Czech Technical University in Prague

Defect-based assessment of mechanical, thermal, and corrosive loads on the capability of light metal structures - Frank Walther, TU Dortmund University



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A practical approach for the fatigue life estimation of hybrid joints through testing and numerical simulations - Cristian Bagni, Hottinger Bruel & Kjaer UK Ltd

Electric-Field-Induced Crack Growth in a Piezoelectric Ceramic - Kristin Hockauf, University of Applied Sciences Mittweida

The effect of process parameters on fatigue life of specimens turned from 42CrMo4+QT - Jan Papuga, Czech Technical University in Prague

A practical methodology for the fatigue testing of hybrid joints - Alex Pierpoint, HBK

Stability of compressive residual stresses in austempered ductile iron (ADI) under cyclic loading - Ulrike Hähnel, University of Applied Sciences Mittweida

Influence of microstructure and defect size on the stability of the critical distance method for fretting crack nucleation - Hugo Lannay, Ecole Centrale de Lyon

Fretting fatigue of shafts under varying contact pressure and creep slip conditions in bearing-shaft contacts - Lukas Suchy, Technische Universität Chemnitz

Evaluation of non-proportional multi-axial stress states in drive-train components related to contacts - Jonathan Schanner, Technische Universität Chemnitz

Consideration of elastoplasticity and viscoplasticity during thermomechanical fatigue simulations of a pipe bend using the FEM-implemented Prandtl operator approach - Domen Seruga, University of Ljubljana

Effect of Artificial Corrosion on Retardation of Fatigue Crack Growth - Assessment by Local Cyclic Plasticity - Homare Shibata, Sumitomo Heavy Industries, Ltd

Investigations on experimental fatigue life and damage of designed hybrid composite laminates with negative and positive Poisson's ratio - Jairan Nafar Dastgerdi, Kent

Cracking and Damage Mechanisms in Nitrided Ti64 Grade 5 Alloy after High Cycle Fatigue - Svjetlana Stekovic, Linköping University

Pre-Crack Depth Dependence on Fatigue Crack Non-Propagation Condition for 18Ni Lath Martensitic Steel - Shun Kino, Kyushu University

Proposal of a Fatigue Crack Extension Mode and its Prediction Method — Damage Accumulation Mode Fatigue Crack Propagation - Shigeru Hamada, Kyushu University



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On the role of the internal and surface defects in the fatigue and structural integrity of additively manufactured 316L steel - Jairan Nafar Dastgerdi, Kent

Achieving high confidence in fatigue reliability of automotive battery systems - Andrew Halfpenny, HBK

Effects of pitting corrosion on fatigue performance of legacy cast iron pipe materials - Luke Ronayne, University of Southampton

Mechanistically based fatigue lifetime predictive model for legacy steam turbine blades - Ara Masis Khodavirdi, University of Southampton

Effects of frequency and dwell on the fatigue crack propagation in single crystal Ni-based superalloy CMSX-4 at intermediate service temperature - Joseph Doyle, University of Southampton

Evaluation of fatigue striations in a Nickel-based superalloy - Yousif Alyousif, University of Southampton

In Situ Full-field Strain Mapping by HR-EBSD and J-Integral Analysis of a Short Fatigue Crack in Ni - Xiao Su, Oxford University

Advantages of Laser Shock Peening over the Conventional Shot Peening of the fatigue lifetime of Aluminium 2024 Alloy - Hayder Ahmad, Safran

Predictions of crack growth rates, R-ratio effects and overload behaviour based on smooth specimen LCF test data and using a strip yield-type model - Steve Williams, Swansea University

Role of columnar  $\beta$  grains on fatigue crack growth behaviour in additive manufactured titanium alloy Ti6Al4V - Abdul Khadar Syed, Coventry University

Cracking behaviour and lifetime predictability of an austenitic stainless steel in solution annealed and cold deformed states when loaded under static compression and cyclic torsional loads - Timothy Ngeru, University of Duisburg-Essen

Frequency Domain Fatigue Approach for Sine Swept Loadings - Giovanni Texeira, Dassault Systèmes

Short fatigue crack behaviour in a new aluminium alloy AlMgSc fabricated by wire based directed energy deposition - Jin Ye, Coventry University



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Impact of shot peening on the fatigue strength of arc-welded advanced high strength steel - Abdoul Nabara, LAMPA

Numerical Approaches In The Fatigue Damage Simulation In Quasibrittle Materials - Ignacio Iturrioz, Federal University of Rio Grande do Sul

Analytical and experimental investigations of wire arc additively manufactured components made of 3Dprint AM35 grade - Xiongfeng Ruan, KU Leuven

Predicting fatigue crack initiation in milled aerospace grade Ti-6Al-4V parts under cyclic loading using CP-FEM - Mauro Francisco Arcidiacono, Advanced Forming Research Centre

High-Cycle and Very-High-Cycle Fatigue Behavior and Life Prediction of Ti-6Al-4V Fabricated by Laser Powder Bed Fusion - Liang Zheng, Harbin Institute of Technology

Microscopic damage healing of aluminum alloy based on pulse current - Yali Yang, Shanghai University of Engineering Science

Key issues with residual fatigue life estimation in steels, highly scattered and non-conservative thresholds, crack closure mechanisms, influencing factors, relevant material properties - Tomáš Vojtek, Czech Academy of Sciences

Predicting fatigue crack initiation in milled aerospace grade Ti-6Al-4V parts under cyclic loading using CP-FEM - Mauro Francisco Arcidiacono, University of Strathclyde

Experimental validation of a model for predicting multiaxial fatigue of pitted grey cast iron water pipes - Edward John, University of Sheffield

Monitoring and quantification of ultrasonic fatigue damage in copper based on internal friction measurement - Faxin Li, Peking University

Effect of discontinuous printing on the fatigue limit of selective laser melted Ti6Al4V specimens - Amirhossein Jabbari Mostahsan, Graz University of Technology

Fatigue of Ultrasonic Spot Welded Joints of Lightweight Materials - Daolun Chen, Toronto Metropolitan University

A review on the fatigue cracking of twin boundaries: Crystallographic orientation and stacking fault energy - Linlin Li, Chinese Academy of Sciences

Fatigue performance of modern submerged arc welds in 85mm grade S355 steel - Carol Johnston, TWI



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High-temperature viscoelastic-viscoplastic deformation of 316 Stainless Steel - K Sithole, University of Nottingham

Real time structural health prediction for critical industrial application - Chris Hyde, University of Nottingham

The high-temperature fatigue properties of additively manufactured nickel-copper alloys with dispersion strengthening particles - Ivo Šulák, Czech Academy of Sciences

Effect of zinc coating and grease on the fretting fatigue life of crossed steel wires contacts: application to offshore spiral ropes - Siegfried Fouvry, Ecole Centrale de Lyon

A new additive manufacturing factor dominating fatigue performance of alloys - Youshi Hong, Chinese Academy of Sciences

Thermomechanical fatigue properties of additively manufactured Nickel-based superalloy IN939 - Markéta Gálíková, Czech Academy of Sciences

A Study Of The Effects Of Loading Cycle Interaction On Fcg Of Pwr Components - Mike P Nielsen EdF Energy Nuclear Services

Structural Integrity of Cold Spray Repaired Aluminium Alloy 7075 Specimens - Ali Bakir Coventry University

Hydrogen embrittlement and fatigue crack growth rate in API 5L X52 steel pipeline under cyclic internal pressure load - Omar Bouledroua, Sonatrach

The effects of H<sup>+</sup> fusion plasma loading on the low-cycle thermal fatigue behavior of tungsten - James Hargreaves, Dutch Institute for Fundamental Energy Research (DIFFER)

Investigating the Role of Low Temperature Hot Corrosion on Crack Initiation and Propagation in Single-Crystal Nickel Alloys Under Fatigue Conditions - Mustafa Elsherkisi, Frazer-Nash Consultancy

Hot corrosion fatigue behavior of a shot peened nickel based superalloy - Li Yong, Swansea University

Continuum Damage Mechanics Approach for SLM-Manufactured Nickel-Based Superalloy under Variable Fatigue Loading Conditions - Huang Yuan, Tsinghua University

