

24th European Conference on Fracture (ECF24)

Procedia Structural Integrity Volume 68

Zagreb, Croatia and Online
26-30 August 2024

Part 1 of 2

Editors:

**Željko Božića
Robert Basanb
Goran Vukelićc
Siegfried Schmauderd**

**Leslie Banks-Sillse
Aleksandar Sedmakf
Francesco Iacoviello g**

ISBN: 979-8-3313-2341-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2024) The Authors. Published by Elsevier Ltd.
Creative Commons Attribution CC BY-NC-ND license.

License details: (<https://creativecommons.org/licenses/by-nc-nd/4.0>).

No changes have been made to the content of these proceedings. There may be changes to pagination, and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact the publisher:

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

Preface.....	1
<i>Željko Božić, Robert Basan, Goran Vukelic, Siegfried Schmauder, Francesco Iacoviello</i>	
Fracture Properties of Interlocking Structure by Sickle Joints Printed with a Stereolithography 3D Printer.....	3
<i>Masayuki Arai, Yukiho Saito, Hayato Fujita, Yuxian Meng</i>	
The Brittle Fracture of Bodies with Partially Healed Surface Cracks	9
<i>Ivan Shatskyi, Vasyl Perepichka, Taras Dalyak</i>	
A Novel Approach for Determining and Analyzing the Magnitude of the Plastic Zone Around a Crack Tip: An Algorithm for an Approximate Analytical Solution	16
<i>Dragan Pustaic, Martina Lovrenic-Jugovic</i>	
The Study of Critical Defects in Selective Laser Melting Material Under Very High Cycle Fatigue Loading.....	24
<i>Ilija Nikitin, Alexander Nikitin, Andrey Shanyavskiy, Boris Stratula</i>	
Boundary Element Method for 3D Fracture Mechanics Analysis in Quasicrystal Solids Under Thermal Loading	32
<i>Roman Kushnir, Heorhiy Sulym, Iaroslav Pasternak, Vitalii Kozelko</i>	
The Effect of Hydrogen Adsorption on Ti ₂ AlV (110) Surface: First-Principle Density Functional Theory Study	39
<i>D. M. Tshwane, M. S. Santosh, R. R. Maphanga</i>	
Molecular Dynamic Simulation of the Temperature Effect on Strength of Carbyne-Graphene Nanoelements	47
<i>Kotrechko Sergiy, Ovsjannikov Olexander, Barvinko Mykhailo, Stetsenko Nataliya</i>	
On Analytical Model of Interface Crack in Bonding Quasi-Brittle Material Between Distinct Elastic Media.....	53
<i>M. Dudyk, A. Kaminsky, Yu. Reshitnyk, Yu. Chornoivan</i>	
Water Diffusion in Additively Manufactured Polymers: Effect of Capillary Shapes	59
<i>Boyu Li, Konstantinos P. Baxevanakis, Vadim V. Silberschmidt</i>	
Shape Memory-Based Lattice Metamaterial: The Octet Truss Cell	66
<i>C. Corda, E. Armentani, C. Bertolin, C. Gao</i>	
Fatigue Life Prediction of ABS/Graphene Nanoplatelets 3D-Printed Composite Parts	77
<i>Soran Hassanifard, Kamran Behdinan</i>	
Performance Evaluation of Artificial Neural Networks Developed for Estimation of Fatigue Behavior of Low-Alloy Steels	84
<i>Tea Marohnic, Robert Basan</i>	
Modelling the Evolution of Fracture Process Zone Considering Strain Rate Effect	91
<i>Nhan T. Nguyen, Dat G. Phan, Ha H. Bui, Murat Karakus, Giang D. Nguyen</i>	

Corrosion Failure in Biological Fluids of Laser Melted Surface of AISI 321 Stainless Steel	99
<i>Tsanka Dikova, Natalina Panova</i>	
Comparative Evaluation of Surgical Methods in the Treatment of Chronic Irreparable Supraspinatus Tears: A Biomechanical Study.....	106
<i>E. Koumantou, C. J. Feroussis, E. D. Pasiou, S. K. Kourkoulis</i>	
The Effect of Thread Length in Cancellous Bone Fixation Under Shear Loading: A Biomechanical Study.....	112
<i>P. Langourani-Kosteletou, G. Chelidonis, E. D. Pasiou, O. Savvidou, S. K. Kourkoulis</i>	
Fatigue Strength of Laminated Bamboo Lumber	119
<i>Pascal Franck, Oliver Bletz-Mühldorfer, Leander Bathon, Ronja Scholz, Frank Walther</i>	
Failure Criterion for Thread-Like Fibers in a Thermoelastic Medium	126
<i>Oleh Yashiy, Andrii Kornichuk, Iryna Didych, Dmytro Tymoshchuk, Iaroslav Pasternak</i>	
Modelling the Properties of Shape Memory Alloys Using Machine Learning Methods.....	132
<i>Oleh Yasniy, Dmytro Tymoshchuk, Iryna Didych, Volodymyr Iasnii, Iaroslav Pasternak</i>	
Analysis of L-Shaped Functionally Graded Viscoelastic Shafts with Longitudinal Crack Under Torsion.....	139
<i>Victor Rizov</i>	
Delamination Analysis of a Fixed-Ended Multilayered Beam Under Twisted Support	146
<i>Victor Rizov</i>	
Determination of CFRP Intralaminar Fracture Properties in the Calibration of a Non-Local Damage Model for Crash Application: Unidirectional Material.....	153
<i>Maria Pia Falaschetti, Francesco Rondina, Johan Birnie Hernandez, Luca Raimondi, Lorenzo Donati</i>	
The Hybridization Effect on the Mechanical and Piezoresistive Behavior of Epoxy Nanocomposites	160
<i>J. M. Parente, A. P. Silva, P. N. B. Reis</i>	
Integrating Experimental Bond-Slip Models Into Finite Element Modeling of CFRP-Strengthened Concrete Prisms.....	166
<i>Aseel Salameh, Rami Hawileh, Maha Assad, Jamal Abdalla</i>	
Interlaminar Fracture Properties of Flax Fibre Biobased Composites Interleaved with PPS Veils	173
<i>Robert Lowe, Vishnu Prasad, Neal Murphy, Alojz Ivankovic</i>	
Novel Extruded Polystyrene Lightweight Thermoinsulating Cement Mortar: Experimental Investigation of the Mechanical Behaviour.....	184
<i>Zoi S. Metaxa, Violetta K. Kytinou, Vasileios D. Prokopiou, Adamantis G. Zapis, Nikolaos D. Alexopoulos</i>	
Comparative Numerical Analysis of Gap and Overlap Effect on Mechanical Properties of Variable Stiffness Composites	190
<i>Gül Demirel, Altan Kayran</i>	
Mechanical Characterization of Basalt Fibre Reinforced Composites Using Energy Methods	197
<i>M. Totaro, G. Risitano, G. Di Bella, P. Corigliano, D. D'Andrea</i>	
Analysis of Cavitation in Human Iliac Arterial Tissue	205
<i>Jaynandan Kumar, Anshul Faye</i>	

Interface and Phase-Field Dynamic Quasi-brittle Fracture of Solids Under Tension Or Compression.....	212
<i>Roman Vodicka</i>	
Stress Analysis of Axisymmetric Interface Cracks with Bridged and Damaged Zones	219
<i>M. Perelmuter</i>	
Investigations on Concrete Cone Failure of a Cast-In Anchor	225
<i>Lucie Malíková, Petr Miarka, Mohammad Sami Al Khazali, Stanislav Seitl</i>	
Enhancing Crack Resistance and Strength of Recycled Aggregate Concrete with End-Of-Life Tire Steel Fibers.....	231
<i>Asad Zia, Jaroslav Prokop, Ivan Holly</i>	
Mechanical Performance of Sustainable PE-ECC Using GGBS and Dune Sands	238
<i>Eyad Shahin, Jamal Abdalla, Rami Hawileh</i>	
Prediction of the Compressive Strength of Normal Weight Concrete with Variable Fly Ash Percentages Using Machine Learning	245
<i>Hussam Safieh, Rami A. Hawileh, Sayan Kumar Shaw, Jamal A. Abdalla</i>	
Effect of Anchor's Inclination Angle on the Flexural Enhancement of CFRP-Strengthened RC Beams.....	252
<i>Maha Assad, Rami Hawileh, Jamal Abdalla</i>	
Compressive Strength of High-Strength Concrete Modified with Synthetic Fibers at Elevated Temperatures	259
<i>Rami Hawileh, Ahmed Selim, Maha Assad, Jamal Abdalla, Abdulrahman Madkour</i>	
Intrinsic Fracture Energy of 3D Printed Cement Mortar Obtained from Snapback Behaviour in Indirect Tensile Testing.....	266
<i>Zili Huang, Giang D. Nguyen, Murat Karakus, Tung T. Tran, Ha H. Bui</i>	
The Effect of Alternating Wet-Dry Conditions in the Fatigue Life of S355G10+M Steel Under Corrosion-Fatigue Testing.....	272
<i>M. Álvarez, A. Vergara, M. Escalero, M. Olave</i>	
Effects of Pressurized Water Reactor Environment and Cyclic Loading Parameters on the Low Cycle Fatigue Behavior of 316L Stainless Steel.....	279
<i>Aleks Vainionpää, Zaiqing Que, Tommi Seppänen</i>	
pH Estimation at Corrosion Fatigue Crack Tip in 13Cr-4Ni Martensitic Stainless Steel	285
<i>A. Barabi, P.-A. Deschênes, R. Lacasse, D. Thibault, M. Brochu</i>	
Proposal Ecofriendly In-House Inhibitor for Mitigating Corrosion in the Algerian Oil and Gas Industry: Electrochemical Analysis, Surface Morphology and Mechanical Properties.....	292
<i>M. Hadj Meliani, M. Amara, H. Didouh, Fz. Khedima, G. Pluvinage</i>	
Effect of Microstructure on Creep Mechanical Behavior and Damage Mechanisms of AISI 316L (N) Austenitic Stainless Steels.....	297
<i>Marwa Ben Bettaieb, Alexandra Renault-Laborne, Sylvain Depinoy, Ludovic Vincent, Thilo F. Morgeneyer</i>	
Load Path-Dependent Fatigue Capability of Forward Rod Extruded Case Hardening Steel 16MnCrS5	303
<i>Lars A. Lingnau, Johannes Heermant, Lukas M. Sauer, Carl H. Brakmann, Frank Walther</i>	

Comparing Direct Method and Backpropagation Method in Determining GTN Parameters: A Quantitative Study.....	310
<i>Chahboub Yassine, Szavai Szabolcs</i>	
Bending Splitting-Frequency Index (BSFI) a Nonlinear Method & Damage Characterization for 1-D Vibration-based SHM	318
<i>Gomez-Mancilla Julio C.</i>	
Failure Assessment Through Various Uncoupled Damage Models in Flow Forming Processes.....	325
<i>Tuncay Yalçinkaya, Hande Vural, Tevfik Ozan Fenercioglu</i>	
Examining the Role of Cell Structures in the Mechanical and Vibration Characteristics of 3D Printed Parts	332
<i>Büsra Eyri, Bartu Türkcan Çetin, Fevzi Çakmak Bolat, Taner Yılmaz</i>	
Non-Destructive Measurements of Moisture Content Across Concrete Walls of a U-Boat Bunker from WWII (Trondheim, Norway)	339
<i>Giulia Boccacci, Francesca Frasca, Chiara Bertolin, Anna Maria Siani</i>	
A Numerical Model for Fatigue Life Calculations of Surface Hardened Steel Components	345
<i>Ela Markovic, Robert Basan, Tea Marohnic</i>	
On the Mechanisms for Surface and Bulk Embrittlement of AA2024 and AA2198 Aluminium Alloys, Following Hydrogen Exposure	351
<i>R. J. Mostert, C. C. E. Pretorius, C-M Charalampidou, N. Alexopoulos</i>	
Dual-Actuator Mixed-mode Bending Tests on Adhesive Joints of Different Thickness	358
<i>Ihssane Kididane, Kamila Kozáková, Stephan Marzi</i>	
Assessment of Fatigue Life Under Three-Point Bending: Comparing S-D-S-ER and D-S-ER Techniques.....	365
<i>Ibrahim T. Teke, Ahmet H. Ertas</i>	
Production of Aluminum Cellular Solids, Mechanical Characterization Through Compression Tests and Correlation with Image Analysis	372
<i>A. Ceci, G. Costanza, C. Iandiorio, E. Marotta, M. E. Tata</i>	
Assessment of the Structural Parameters Significance Using the Experiment Design in the Production of Pressure Vessel Heads.....	379
<i>Nedeljko Vukojevic, Zlatan Ištvanic, Fuad Hadžikadunic, Mustafa Hadžalic, Amna Bajtarevic-Jelec</i>	
Rice Husk Ash Reduces Damage Rate of CEB Under Uniaxial Compression.....	386
<i>Marian Valenzuela, Víctor Tuninetti, Gustavo Ciudad, Shady Attia</i>	
Reference Temperature Determination of RPV Steel Using Small-Sized Fracture Toughness Specimens.....	391
<i>M. Zarazovskii, S. Shukayev, K. Lukianenko</i>	
Strength and Energetic Optimization of Dual-Adhesive T-joints	398
<i>P. M. D. Carvalho, R. D. S. G. Campilho, R. J. B. Rocha, K. Madani</i>	
Stress Ratio Effect on the Functional Behavior of the Pseudoelastic SMA.....	405
<i>N. Bykiv, S. Yankovyi, V. Iasnii</i>	
Root Cause Failure Analysis of a 9Cr-1Mo Tube in the CCR Unit of an Oil Refinery	409
<i>Reza Khadem Hosseini</i>	

Improvement in Fatigue Properties of Welded Joints Using Crack Initiation Resistant Steel Part2:Fatigue Crack Initiation Life of Rib-To-Deck Welded Joints of Orthotropic Steel Bridge Decks.....	415
<i>Akito Tabata, Masahiro Matsushita, Tetsuo Yamaguchi, Yasuhito Takashima, Toshiyuki Ishikawa</i>	
Improvement in Fatigue Properties of Welded Joints Using Crack Initiation Resistant Steel Part 1: Fatigue Strength of Weld Heat Affected Zone and Cruciform Fillet Welded Joints	420
<i>Takanori Ito, Yasuhito Takashima, Masao Kinefuchi</i>	
Evaluation of the C* Parameter in Welded Joints of 9%Cr Steels Under Consideration of the Heat Affected Zone.....	425
<i>Josef Arthur Schönherr, Falk Mueller, Christian Kontermann, Matthias Oechsner</i>	
Electrical Resistance-Based Fatigue Damage Assessment of Steels	432
<i>Lukas M. Sauer, Johannes L. Otto, Lars A. Lingnau, Jonas A. Ziman, Frank Walther</i>	
High Temperature Fracture Toughness Tests on P91 Steel for Fusion Applications	439
<i>A. F Perez, T. F. Calvet, Y. Wang, C. M. Davies</i>	
A Discussion on Two Alternative Approaches to CT Coupon Based K _{1C} Determination Providing Results Comparable with ASTM E 399.....	446
<i>Parthasarathy Iyengar, Jon Mardaras, Shwe Soe</i>	
Regularities of Fatigue Crack Initiation and Growth in Two-Phases Titanium Alloy After Beach Mark Formation Under VHCF Regime	453
<i>Shanyavskiy A., Nikitin A., Nikitin I.</i>	
Temperature and Strain Rate Sensitivity Characterization of a Ti65 Alloy by Machinal Learning Method	458
<i>Wenqi Liu, Zibiao Wang, Tao Shi, Jianrong Liu, Guian Qian</i>	
Comparative Study of Fatigue Behavior and Microstructural Evolution in As-Built and Heat- Treated Additively Manufactured 316L Stainless Steel.....	465
<i>Atef Hamada, Matias Jaskari, Walaa Abd-Elaziem, Tarek Allam, Antti Järvenpää</i>	
A New Design for Mitigating Interfering Modes in Cruciform Specimens to Enhance Ultrasonic Fatigue Testing	472
<i>Diogo Montalvão, Sina Safari, Weston Chidzikwe, Phil Sewell, Manuel Freitas</i>	
Enhancing the Fatigue Behavior of PBF-LB In718 Through Surface Quality Optimization	480
<i>Matias Jaskari, Timo Rautio, Aappo Mustakangas, Antti Järvenpää</i>	
Fatigue Limit Assessment of Interacting Small Defects by Cyclic R-Curve Analysis	486
<i>Stefan Fladischer, Michael Stoschka, Florian Grün</i>	
Fatigue Limit of Advanced Bainitic Steels: Notch Effect	493
<i>Lucia Morales-Rivas, Eberhard Kerscher</i>	
The Microstructure and Fracture Mode of Physically Simulated Heat-Affected Zones of a Weld Metal Used with 500 MPa Offshore Steel – Part 1: Impact Toughness Test Results.....	500
<i>Marcell Gáspár, Judit Kovács, Henri Tervo, Antti Kaijalainen, Jukka Kömi</i>	
The Microstructure and Fracture Mode of Physically Simulated Heat-Affected Zones of a Weld Metal Used with 500 MPa Offshore Steel – Part 2: Fractographies, Inclusions and Microstructures.....	506
<i>Henri Tervo, Marcell Gáspár, Judit Kovács, Antti Kaijalainen, Jukka Kömi</i>	

Quantitative Fractography in the DBT Regime of 9Cr-1Mo Ferritic/martensitic Steel.....	513
<i>Swastik Soni, Abhishek Tiwari, R. N. Singh</i>	
Optimization of TMCP Parameters to Improve the Mechanical Properties of 201LN Stainless Steel for Cryogenic Applications.....	520
<i>Ahmed W. Abdelghany, Sumit Ghosh, Tun Tun Nyo, Ali Smith, Mahesh Somani</i>	
Application of Self-Heating Method to Estimate Fatigue Limit of 42CrMo4+QT Steel Under Fretting Fatigue Conditions.....	527
<i>Martin Nesládek, Martin Matušu, Tomáš Karas, Jirí Kuželka, Jan Papuga</i>	
Influence of Vanadium on Microstructure and Mechanical Properties of High-Alloyed Steel	534
<i>Aleksandar Todić, Milan T. Djordjević, Dušan Arsić, Ružica R. Nikolić, Dragan Cvetković</i>	
Crashworthiness Simulations with LS-DYNA Investigating the Effect of Strain Rate-Dependent Material Models	540
<i>E. Ezgi Aytimur</i>	
Controlled Horizontal and Vertical Cutoff of Reinforced Concrete Structures by Means of Electric Discharge Impulses	547
<i>Koji Uenishi, Hiroshi Yamachi, Junichiro Nakamori, Shintaro Sakaguchi</i>	
Acceleration and Deceleration of Unzipping Supershear Fracture Propagating Along a Straight Perforation Line Consisting of Small-Scale Cracks	554
<i>Koji Uenishi, Kaichi Akimoto, Masanao Sekine</i>	
Role of High-Frequency Loads in Hydraulic Unit Destruction.....	559
<i>Evgeniia Georgievskaya</i>	
Experimental Investigation of Notched Identification Based on Maximum Resistance Force in Steel Specimens Using an Artificial Neural Network	566
<i>A. Oulad Brahim, R. Capozucca, E. Magagnini, S. Khatir, Y. Bouzid</i>	
A Numerical Study of the Ballistic Performance of Multi-Layered Targets Through Uncoupled Damage Models.....	573
<i>Hande Vural, Sümeyye Tekbas, Nazlıcan Gökdemir, Tuncay Yalçinkaya</i>	
Enhancement of Mechanical Properties of high-Mn TWIP Steel with Fast Heating Process: Insights into Microstructural Evolution and Performance Optimization	581
<i>Atef Hamada, Ali Khosravifard, Matias Jaskari, Antti Järvenpää, Mahmoud Khedr</i>	
Comparison of the Stiffnesses of Three Types of Porous Structures.....	588
<i>Katarina Monkova, Peter Pavol Monka, Željko Božić, Iva Racki</i>	
The Evaluation of the Fracture Characteristics of Metal-Ceramic Composites Produced by Additive Manufacturing	592
<i>Masoom Farrokhtar, Gabriella Bolzon, Lisa Biasetto, Vanessa Gastaldi</i>	
Effect of Temperature on Tensile and Fatigue Properties of AlSi10Mg Lattice Structures Fabricated by Additive Manufacturing.....	596
<i>Shiyu Suzuki, Natsuki Tsushima</i>	
Orthotropic Mechanical Behavior of 3D Printed Ceramics: Experimental Analysis and Testing	603
<i>A. Jiménez, B. Hortigón, E. Vázquez, C. Rivera, C. Galán</i>	
Cyclic-Elastic Behavior in Plastically Pre-strained Lattice Structures.....	610
<i>Ivan Senegaglia, Giuseppe Macoretta, Tommaso Grossi, Bernardo Disma Monelli</i>	

Anisotropy of Gyroid and Stochastic Lattice Structures Under Axial Loading.....	619
<i>Antti Järvenpää, Miguel Araya Calvo, Timo Rautio</i>	
The Effect of Build Strategy on the Residual Stress Distribution in Additively Manufactured Duplex Stainless Steel Pressure Vessels	626
<i>A. E. Odermatt, N. Al-Hamdany, G. Abreu Faria, S. Degener, N. Kashaev</i>	
Fatigue Cracking in Additively Manufactured Titanium Aluminides.....	634
<i>Mauro Filippini</i>	
The Two-Parameter Fracture Criterion with Two-dimensional Crack Tip Front Constraint	641
<i>Yu. G. Matvienko, A. M. Pokrovskii</i>	
A Cyclic Resistance Curve Approach to Estimating Fatigue Limit in the Presence of Over- and Underloads.....	646
<i>Kimmo Kärkkäinen, Joona Vaara, Miikka Vääntänen, Mari Åman, Tero Frondelius</i>	
Effect of Process Parameters on Final Geometry and Quality in Hot Tube Spinning Process	653
<i>Gunes Murat, Erdem Nagihan, Yigit Mehmet</i>	
Fatigue Life Predictions of Notched Samples Based on Average Strain Energy Density.....	660
<i>Jan Klusák, Kamila Kozáková</i>	
Creep Crack Growth Testing and Analysis of Laser Powder Bed Fusion 316L Stainless Steel	666
<i>Amy Milne, Vignesh Siriam, Catrin M. Davies</i>	
FEM Module Development Considering TRIP	674
<i>Rintaro Tsuda, Ritsuki Morohoshi, Noriyuki Tsuchida, Tomoya Kawabata</i>	

PART 2

Understanding of Relationship Between Fracture and Slip Behaviour in Permendur Alloys Using Multiscale Mechanical Testing of Poly- and Single-crystalline Specimens	681
<i>Yuki Tampa, Yoji Mine, Daiki Kato, Motoki Ohta</i>	
Digital Twin Based Simulations for the Evaluation of Small-Scale Tensile Specimen Tests	687
<i>T. Fekete, D. Antók, L. Tatár, P. Bereczki</i>	
Numerical Analysis of Microstructure Influence on Mechanical Properties and Failure Behaviour of Compacted Graphite Iron	694
<i>Xingling Luo, Konstantinos P. Baxevanakis, Vadim V. Silberschmidt</i>	
The Stress Field Dependency of Martensitic Transformation in Metastable Austenitic Stainless Steel.....	701
<i>Ritsuki Morohoshi, Tomoya Kawabata</i>	
Investigation of Microstructural Evolution in Nano-Structured Bainite During Paris Law Regime of Fatigue Crack Growth	708
<i>Bhawesh Chhajed, Sudharm Rathore, Avnish Kumar, Aparna Singh</i>	
Enhanced Room Temperature Impact-Toughness in Nano Pearlite.....	715
<i>Rahul Singh, Kushal Mishra, Aparna Singh</i>	
Predicting the Penetration Rate of Diamond Core Drilling of Igneous Rocks Using P-Wave Velocity.....	722
<i>Sair Kahraman, Abdalrahim A. M. Malakni</i>	

Effects of Quenching and Tempering Conditions of a Low-Alloy Pressure Vessel Steel (A508 Gr.3) on Its Brittle Fracture Initiation and Toughness	727
<i>Julie Papin, Jean-Baptiste Delattre, Jean Luc Flament, Bernard Marini, Anne-Françoise Gourgues-Lorenzon</i>	
Bayesian Analysis of Fracture of Polyamide 12 U-Notched Specimens	734
<i>F. J. Gómez, T. Gómez-Del-Rio, J. Rodríguez</i>	
Influence of FDM Printing Parameters on the Compressive Mechanical Properties and Fracture of ABS Material.....	741
<i>Marko Delic, Vesna Mandic, Srbslav Aleksandrovic, Dušan Arsic, D. Adamovic</i>	
Mechanical Characterization of Nylon CF Printed by FDM Process by Using Energy Methods	746
<i>Danilo D'Andrea, Giacomo Risitano, Pasqualino Corigliano, Dario Santonocito, Davide D'Andrea</i>	
Laser Beam Welding of Aeronautical Al-Cu-Li Sheets: Quasi-static Tensile Mechanical Performance and Quality Assessment of Welded Joints.....	756
<i>T. N. Examilioti, C. M. Charalampidou, N. D. Alexopoulos</i>	
Restoration of Steel Properties After Long-Term Operation at Bends of TPP Steam Pipelines by Heat Treatment	762
<i>Halyna Krechkovska, Ivan Tsybailo, Oleksandra Student, Lesya Svirskia, Serhiy Korniy</i>	
Evaluation of Surface and Volume Damages Under HCF and VHCF Loading for Quenched and Tempered Steels.....	769
<i>S. R. Raghuraman, A. Shrivastava, F. Weber, A. Gramlich, P. Starke</i>	
Refill Friction Stir Spot Welding: Effects of Energy Input on Residual Stresses and Mechanical Properties in AA6082-T6	776
<i>Niklaas Becker, Emad Maawad, Benjamin Klusemann</i>	
Investigation of Methods for Estimation of Fatigue Parameters and Behavior of Aluminum and Titanium Alloys	782
<i>Robert Basan, Tea Marohnic, Željko Božic, Ela Markovic</i>	
Influence of Cracks and Residual Stresses on the Limit Load of Thick-Walled Cylinders.....	788
<i>Saeid Hadidimoud, Amid Gholampour</i>	
UAV-Based Thermographic Inspection of Wind Turbine Blades for Structural Integrity Assessment: Preliminary Findings	795
<i>Hugo Mesquita Vasconcelos, Pedro J. Sousa, Susana Dias, Nuno Viriato, Pedro M. G. P. Moreira</i>	
Low-Temperature Fracture Toughness of Electron-beam Welded Low-carbon Martensitic-austenitic Steel.....	802
<i>Sakari Pallaspuro, Ann-Christin Hesse, Tamás Tóth, Niko Aho, Jukka Kömi</i>	
Fatigue Crack Growth and Fracture Toughness of Shot Peened 6060 T6 Aluminium Alloy	809
<i>Erik Calvo-García, Óscar Barro, Pablo Pou-álvarez, Aida Badaoui, Rafael Comesaña</i>	
Quantification of Fatigue Life Improvement in S550MC Weldments by HFMI Treatment Using 2D SBFM Model.....	815
<i>M. Mahatab, R. Ranjan</i>	
Development of a Numerical Model for Estimating the Hardness of Steel After Quenching	822
<i>Ema Kukuljan, Robert Basan, Dario Iljkic, Ela Markovic</i>	

Effect of Thermal-Expansion Mismatch on Thermomechanical Behaviour of Compacted Graphite Iron	828
<i>Minghua Cao, Konstantinos P. Baxevanakis, Vadim V. Silberschmidt</i>	
Fracture Stress Triaxiality of Ti-6Al-4V for Computational Design of Damage Tolerant Aeroengines.....	835
<i>Víctor Tuninetti, Carlos Beecher, Héctor Sepúlveda, Laurent Duchêne, Gonzalo Pincheira</i>	
A New Artificial Neural Network Model for Predicting Fatigue Limit and Fracture Toughness Values of Some Stainless Steels	839
<i>Dj. Ivkovic, D. Arsic, A. Sedmak, D. Adamovic, A. Mitrovic</i>	
Structure and Mechanical Properties of Biopolymer Films with Incorporated Tea Tree Essential Oil	845
<i>Krastena Nikolova, Maria Marudova, Alexander Pashev, Sofia Milenkova, Anelia Gerasimova</i>	
Multi-Material Laser Powder Bed Fusion: The Effect of Cross-contaminations of Cu Particles in AlSi10Mg Feedstock on the Mechanical Properties of the Part	854
<i>Christopher Singer, Max Horn, Georg Schlick, Johannes Schilp, Nikolaos D. Alexopoulos</i>	
The Effect of In-Service Degradation of X52 Gas Pipe Steel on Fracture Toughness of Hydrogenated Specimens Evaluated by the J-integral Method	861
<i>H. Nykyforchyn, O. Tsyurulnyk, H. Krechkovska, M. Hredil, I. Tsybailo</i>	
Serviceability Assessment of Existing Gas Pipelines Under Hydrogen Transportation	868
<i>Olha Zvirko</i>	
Evaluation of Environment-Assisted Cracking Using Wedge-loaded Compact Tension Specimens	874
<i>A. H. Jabbari, Z. Silvayeh, P. Auer, J. Stippich, J. Domitner</i>	
Fracture Behaviour of Pipeline Steel Depending on Hydrogen Content in Material.....	880
<i>Andriy Syrotyuk, Ihor Dmytrakh, Rostyslav Leshchak, Oleh Malyk</i>	
Phase Field Modelling of Freezing-Induced Cracking.....	887
<i>Q. M. Vuong, Y. Charles, M. Q. Thai, J. Li</i>	
Numerical Simulation of Corrosion Attack on Al-Cu-Li 2198 Alloy in Different Ageing Tempers	894
<i>Louka Eleftheria-Sotiria, Paraskevas Papanikos, Christina Margarita Charalampidou, Nikolaos D. Alexopoulos</i>	
An Analysis of Frequency Effect in Fatigue Data of Metal Alloys with Different Crystal Structures	901
<i>Rita Dantas, Vítor Gomes, Michael Gouveia, Filipe G. A. Silva, Abílio De Jesus</i>	
Fracture Modeling and Experimental Study on Interfacial Adhesion in a Thermal Barrier Coating System on Ni-Based Superalloys	908
<i>Elena Fedorova, Andrey Burov, Egor Moskvichev, Nadezhda Sukhodoeva</i>	
A New Concept for Large-Scale Pressure Systems Structural Integrity Computations.....	915
<i>Tamás Fekete</i>	
The Effect of Infill Density on Fracture Toughness Results of PLA Material	922
<i>Aleksa Milovanovic, Tomáš Babinský, Aleksandar Sedmak, Ivana Filipovic, Miloš Milošević</i>	
Effect of Design Optimization and Material Selection on the Fatigue Performance and Fracture Mechanism of a Crank Arm	929
<i>Shahriar Afkhami, Kalle Lipiäinen, Erin Komi, Tero Pesonen, Masoud Moshtaghi</i>	

Fracture-Mechanical Assessment of the Effect of Defects on the Fatigue Life of Additively Manufactured Titanium Aluminides	936
<i>Mirko Teschke, Frank Walther</i>	
Mechanical Characterization and Modeling of Cyclic and Time Dependent Behavior of a Soft 3D Printed Photopolymer.....	942
<i>A. Avanzini, D. Battini, S. Bonometti, F. Libonati</i>	
Titanium Lattice-Cored Short Beams: In-plane Flexural Behaviour Numerical Simulation.....	949
<i>Costanzo Bellini, Rosario Borrelli, Vittorio Di Cocco, Stefania Franchitti, Luca Sorrentino</i>	
Effect of Notches on Static and Dynamic Bending of 3D Printed PLA and PLA Reinforced with Short Carbon Fiber	955
<i>Estera Valean, Liviu Marsavina, Sergiu-Valentin Galatanu, Pietro Foti, Filippo Berto</i>	
The Effect of Surface Treatment on the Fatigue Life of Aluminium 2139-AM Components Manufactured Additively by PBF-LB/M.....	962
<i>J. Köckritz, D. Kögler, R. Szlosarek, S. G. Langenhan, M. Kröger</i>	
Finite Element Analysis of a Titanium Bicycle Frame	969
<i>Emanuele Vincenzo Arcieri, Sergio Baragetti</i>	
Elevated Temperature Fatigue Behavior of Notched Specimens Produced by L-PBF in Inconel 718	974
<i>Giuseppe Macoretta, Bernardo Disma Monelli, Filippo Berto</i>	
Effects of Post-Heat Treatment on the Mechanical Properties of Additive Manufactured 316L Stainless Steel and Inconel 625 Super Alloy	981
<i>Yasith H. Rajashilpage, Rasid A. Yildiz, Mohammad Malekan</i>	
Computational Welding Mechanics-Based Approach for the Optimization of Process Parameters in Laser Welding of IN792 Nickel-Base Alloy	988
<i>Paolo Ferro, Alessandra Varone, Giuliano Angella, Francesco Cognini, Fabio Bergamini</i>	
Indentation Behavior of Additively Manufactured 316L Stainless Steel Welded Joints Via Gas Tungsten Arc Welding and Laser Welding	1003
<i>Mohamed Elsayed, Mahmoud Khedr, Antti Järvenpää, A. M. Gaafer, Atef Hamada</i>	
Numerical Assessment of Cold Crack Susceptibility of X65 Pipe Steel During In-Service Repair Welding of Pipeline in Transportation of Gas-hydrogen Blends	1010
<i>Oleksii Milenin, Olena Velykoivanenko, Galyna Rozyinka, Nina Pivtorak</i>	
Gas Tungsten Arc Welding of Low Carbon Steel with Ni-Cr and Medium Mn Stainless Steels	1017
<i>Mahmoud Khedr, Ibrahim R. Awad, Tamer S. Mahmoud, Atef Hamada</i>	
Influence of GTAW and SMAW Techniques on the Mechanical Behavior of S275JR Low Carbon Manganese Steel Welded Joints.....	1024
<i>Ibrahim R. Awad, Hamed A. Abdel-Aleem, Ahmed Gaafer, Mahmoud Khedr</i>	
Tuning Mechanical Response of Nonuniform Triangular Lattice Material Via Graph Neural Network Based Inverse Design Algorithm	1031
<i>Giuseppe Bonfanti, Federica Buccino, Laura Maria Vergani, Chao Gao</i>	
Microstructure-Based Tensile Indicator for Assessing High-cycle and Very-high-cycle Fatigue of Titanium Alloys with Additive and Conventional Manufacturing.....	1038
<i>Xiangnan Pan, Zhiqiang Tao, Youshi Hong</i>	

Microstructure Based Analysis of Plasticity and Failure of Dual Phase Steels	1045
<i>Eren Çeliks, Ibrahim Yelek, Merthan Özdemir, Tuncay Yalçinkaya</i>	
Effect of Hydrogen on Plasticity in Advanced High-Strength Steels Used in Automotive Applications.....	1051
<i>Adam Ståhlkrantz, Birhan Sefer, Tuomo Nyysönen, Olli Oja</i>	
Hydrogen Embrittlement Behaviors of A286 in High-Pressure Gaseous Hydrogen and Pre-charged Hydrogen A286	1059
<i>Akihiko Fukunaga</i>	
Hydrogen-Assisted Fatigue Crack Growth in Pipeline Steels: A Machine Learning Approach	1066
<i>Hamidreza Rohani Raftar, Mahdieh Safyari, Masoud Moshtaghi</i>	
Hydrogen Interaction with Post-Processed L-PBF 316L Stainless Steel.....	1074
<i>Liesbet Deconinck, Pedro A. Ferreira, Zaiqing Que, Roy Johnsen, Xu Lu</i>	
Hollow Specimen Method for Mechanical Testing in Gaseous Hydrogen	1081
<i>Robert Sundström</i>	
The Mechanical Properties of X70 Steel Pre-Charged in Blend of Hydrogen and Methan	1091
<i>Jan Kec, Lukáš Jeníček, Jakub Jindra, Miloslav Poupa</i>	
Dual Nature of Retained Austenite on Mechanical Properties of a Medium Manganese Steel with and Without Hydrogen	1098
<i>Vahid Javaheri, Ehsan Ghassemali, Roohallah Surki Aliabad, Saeed Sadeghpour, Jukka Kömi</i>	
The Effect of Hydrogen Gas on Tensile and Fatigue Properties of High Strength Carbon Steels	1105
<i>Eduard Navalles, Nuria Fuertes, Esa Virolainen, Caroline Klar Jaans, Birhan Sefer</i>	
The Effect of Low-Temperature Tempering on Hydrogen Diffusion and Trapping in Direct-quenched Martensitic Steel.....	1115
<i>Renata Latypova, Lisa Claeys, Kim Verbeken, Tom Depover, Sakari Pallaspuo</i>	
The Effect of High-Pressure Hydrogen Gas at Room and High Temperature on the Mechanical Performance of Conventional and Additively Manufactured Ni-base Alloys	1121
<i>Birhan Sefer, Pontus Rydgren, Frans Palmert, Zhe Chen, Nuria Fuertes</i>	
Screening the Mechanical Degradation of Combustion Engine and Exhaust Metallic Materials in High Pressure and High Temperature Hydrogen Gas Environment	1129
<i>Birhan Sefer, Pontus Rydgren, Eduard Navalles, Niklas Israelsson, Nuria Fuertes</i>	
Modelling of Hydrogen-Induced Failure in Polycrystalline Materials Through a Strain Gradient Crystal Plasticity Framework	1140
<i>Berkehan Tatli, Tuncay Yalçinkaya</i>	
Fatigue and Fracture Behaviour of High-Strength Lath Martensitic Steel	1147
<i>Mihaela Iordachescu, Patricia Santos, Andrés Valiente</i>	
Investigation of the Correlation Between Fatigue Behavior and Fatigue Crack Growth in Short Fiber Reinforced Polymers	1153
<i>Reza Afsharnia, Gabriel Stadler, Gerald Pinter</i>	
Temperature-Corrected Electrical Resistance in Fatigue Life Prediction Methods for Higher Testing Frequencies.....	1159
<i>J. A. Ziman, M. Maul, F. Weber, L. M. Sauer, P. Starke</i>	

Investigating Fracture Behaviour of Single-Cell Lattice Materials Via XFEM: Voxel-based Approach	1166
<i>Bahman Paygozar, Recep M. Gorguluarslan</i>	
Computational Framework for Fatigue Analysis of Metals with Nonconstant Cyclic Stress-Strain Curve	1173
<i>Robert Szlosarek, Chinmay Salvi, Pia Nitzsche, Sebastian Henkel, Matthias Kröger</i>	
The Effect of Salt Fluxing During Liquid Treatment on the Dispersion of the Tensile Properties of an AlSi9Cu3(Fe) Alloy	1181
<i>V. Milani, G. Angella, G. Timelli</i>	
Modelling the Effect of Carbide Population and Bainitic Grain Size on the Fracture Toughness of Three Forged Low Alloy Steels	1188
<i>Cainã Bemfica, Ludovic Vincent, Bernard Marini, Jean-Philippe Mathieu, Pierre Joly</i>	
Development of a Damage-Dependent Modified Material Model for Enhanced Description of Transient Material Behavior	1196
<i>T. Korschinsky, B. Möller, M. Kiel, M. Hecht</i>	
Fatigue Life Assessment of Ship Propulsion Shafting Due to Torsional and Bending Vibration	1203
<i>Alen Marijancevic, Sanjin Braut, Roberto Žigulic, Ante Skoblar</i>	
Novel Indicators & Nonlinear Method for Onset Damage Detection in Very High Cycle Fatigue Tests (VHCF)	1208
<i>J. C. Gomez-Mancilla</i>	
Mixed Mode Fracture Toughness of R260Mn Rail Steel Using Compact Tension Shear Specimens	1216
<i>Sjoerd T. Hengeveld, Davide Leonetti, H. H. (Bert) Snijder, Johan Maljaars</i>	
Experimental and Numerical Investigation on Crack Propagation in High Strength Steels and Conventional Steels	1223
<i>Monisha Manjunatha, Tugrul Comlekci, Jonatan Marin Perez, Yevgen Gorash, Donald Mackenzie</i>	
The Effect of Heat and Mechanical Treatments on the NiTi SMA Tensile Behaviour	1230
<i>C. Bellini, V. Di Cocco, F. Iacoviello, F. Berto, S. Natali</i>	
Fracture Behavior of Simulated Heat Affected Zones in S690QL High Strength Steel	1237
<i>D. Tomerlin, D. Kozak, T. Vuherer, N. Enzinger, N. Gubeljak</i>	
Evaluation of Crack Front Geometry by Strain Field Classification Using Neural Networks	1245
<i>Giovanni Chianese, G. P. Pucillo, D. Leonetti</i>	
Double Edge Notched Tensile Testing of PET/ PA Blends	1252
<i>Carlos Fernandes Da Silva, Nicolas Willy Ferreira, Alessandra Fernandes Santos, Cláudio Geraldo Schön</i>	
Closed-Form Analysis of Crack Initiation in Layered Systems Under Thermal Loading	1259
<i>D. Linn, W. Becker</i>	
Estimating Microscopic Defect Size from Acoustic Emission Monitoring of Mode I, Mode II and Mixed-Mode I/II Delamination Propagation in GFRP Laminates Under Quasi-static Loads	1266
<i>Andreas J. Brunner, Maria Gfrerrer, Veronika Koss, Gerald Pinter</i>	

Obtaining Traction-Separation Laws of Adhesive Joints Using Optical Fiber Strain Measurements - Part B (Mode III)	1273
<i>Lukas Dominik Geisel, Stephan Marzi</i>	
Obtaining Traction-Separation Laws of Adhesive Joints Using Optical Fiber Strain Measurements - Part a (Mode I)	1280
<i>Lea Aydin, Stephan Marzi</i>	
Stress State Dependent Phase Field Modeling of Ductile Fracture	1287
<i>I. Yucel, C. Erdogan, T. Yalçinkaya</i>	
Experiments and Numerical Simulations on Low Cycle Ductile Damage and Failure Under Shear Loading Conditions	1294
<i>Steffen Gerke, Zhichao Wei, Marleen Harting, Michael Brüning</i>	
The Self-Heating Effect on Hybrid Composites.....	1301
<i>P. N. B. Reis, A. Katunin, D. Wachla</i>	
Stress Intensity Factors in Pressurised Thermal Shock Analysis for Through Clad Defects in a WWER Type Reactor Pressure Vessel.....	1305
<i>Vitalii Antonchenko, Yaroslav Dubyk, Volodymyr Iasnii</i>	
An Innovative Solution for Determining Stress Intensity Factors (SIF) Using the GMDH Neural Network.....	1312
<i>Morteza Khomami Abadi, Mohammad Zaman Kabir, Kamran Nikbin</i>	
Method for Predicting Crack Size Using Amplitude Change in Titanium Alloy Under Bending Vibration.....	1319
<i>Junji Sakamoto, Naoya Tada, Takeshi Uemori</i>	
Numerical Analysis of Impact Damage at Different Impact Speeds	1324
<i>Emanuele Vincenzo Arcieri, Sergio Baragetti, Željko Božić</i>	
Alloying Impacts on Austenite Stability and Fatigue Crack Propagation in Medium-Carbon Direct-quenched and Partitioned Steels	1329
<i>S. Ghosh, G. Kumar, S. Pallaspuo, M. Somani, J. Kömi</i>	
Mechanical and Fracture Mechanics Investigations of Unidirectionally Fibre-Reinforced Thermoplastic Polymer Tapes	1337
<i>R. Lach, S. Celevics, I. Jahn, M. John, W. Grellmann</i>	

Author Index