

International Conference on Structural Integrity (ICSI 2023)

Procedia Structural Integrity Volume 54

Funchal, Portugal
28 August – 1 September 2023

ISBN: 978-1-7138-9502-2

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© (2023) The Authors. Published by Elsevier Ltd.
Creative Commons Attribution 4.0 International License.
License details: <http://creativecommons.org/licenses/by/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. (2024)

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

Editorial – ICSI2023.....	1
<i>Pedro Moreira, Paulo Tavares</i>	
Effect of Sensors Locations and Magnitudes of Dynamic Loads on Dynamical Properties in Structural Health Monitoring.....	3
<i>Mohammad Shamim Miah, Werner Lienhart</i>	
Analytical Model to Simulate the Behavior of Notched Wood Beams (temperate Species) Under Creep Behavior in Outdoor Conditions	11
<i>Claude Feldman Pambou Nziengui, Serge Ekomy Ango, Chaima Jaafari, Rostand Moutou Pitti</i>	
Analytical Characterisation in Mode I Fracture of Adhesively Bonded Double Cantilever Beam Mixed Glue Joints	18
<i>Cédrick H. Ndong Bidzo, Claude F. Pambou Nziengui, Serge Ekomy Ango, Samuel Ikogou, Rostand Moutou Pitti</i>	
Investigation of the Fracture Mechanical Behavior of Amorphous Polymers Considering Crack Tip Heating	26
<i>Johannes Kaiser, Christian Bonten, Marc Kreutzbruck</i>	
Prediction of Fatigue Crack Paths Including Crack-Face Friction for an Inclined Edge Crack Subjected to Mixed Mode Loading	34
<i>Sjoerd T. Hengeveld, Davide Leonetti, Bert Snijder, Johan Maljaars</i>	
Seawater Effect on Energy-Absorption Properties of Polymer-Based Composite Sandwich Structures.....	44
<i>Norman Osa-Uwagboe, Vadim V. Silberschmidt, Emrah Demirci</i>	
Hydrogen Effects in High-Strength Lath Martensite Steel Bars for Structural Engineering	52
<i>Mihaela Iordachescu, Patricia Santos, Andrés Valiente, Maricely De Abreu</i>	
Applications of Additive Technologies in the Maintenance of Machinery and Equipment.....	59
<i>Miloslav Kepka, Miroslav Zetek, Ivana Zetkova, Yusuf Bakir, Michal Krizek</i>	
Towards Detecting the Strong Vertical Shock Induced by a Shallow Earthquake.....	67
<i>Koji Uenishi</i>	
Microstructural CZE-Based Computational Model for Predicting Tensile Fracture Behaviour of CGI	75
<i>Xingling Luo, Konstantinos P. Baxevanakis, Vadim V. Silberschmidt</i>	
Static Analysis of a Lamppost According to Eurocode EN-40	83
<i>E. S. Gonçalves, J. Gonçalves, H. Rosse, J. Costa, J. E. Ribeiro</i>	
Thermal Analysis for Testing Underground Battery Location.....	91
<i>E. S. Gonçalves, J. Gonçalves, H. Rosse, J. Costa, J. E. Ribeiro</i>	
Exploiting DIC-Based Full-Field Receptances in Mapping the Defect Acceptance for Dynamically Loaded Components.....	99
<i>Alessandro Zanarini</i>	

On the Use of Full-Field Receptances in Inverse Vibro-Acoustics for Airborne Structural Dynamics.....	107
<i>Alessandro Zanarini</i>	
Hydrogen Embrittlement Behavior of Iron-Based Superalloy A286.....	115
<i>Akihiko Fukunaga</i>	
Influence of Mo Content on Susceptibility of Medium-Carbon Martensitic High-Strength Steels to Hydrogen Embrittlement: Single and Double Q&T	123
<i>Magdalena Eškinja, Gerald Winter, Jürgen Klarner, Holger Schnideritsch, Masoud Moshtaghī</i>	
Fatigue Analysis of Additively Manufactured Specimens from AlSi10Mg with Different Levels of Powder Recycling.....	135
<i>Martin Matuš, Jakub Rosenthal, Jan Papuga, Jan Šimota, Libor Beránek</i>	
Damage Analysis of the Prestressing Strand-Wires from a 50-Year-Old Urban Viaduct	143
<i>Maricely De Abreu, Mihaela Iordachescu, Andrés Valiente</i>	
Role of Prior Austenite Grain Structure in Hydrogen Diffusion, Trapping, and Embrittlement Mechanisms in As-Quenched Martensitic Steels.....	149
<i>Renata Latypova, Eric Fangnon, Olli Nousiainen, Sakari Pallaspuro, Jukka Kömi</i>	
Finite Element Analysis of Unnotched and Notched Functionally Graded Steel Specimens	156
<i>Ela Markovic, Robert Basan, Jelena Srnec Novak, Andrej Žerovnik</i>	
Development of Test Method for Fatigue Crack Growth Using DCB Specimens with Thick Adhesive Bondline	164
<i>Rahul Iyer Kumar, Wim De Waele</i>	
Damage Evolution of a Hydrogen Charged Grade X56 Pipeline Steel Evaluated Using X-Ray micro-CT	172
<i>Robin Depraetere, Wim De Waele, Margo Cauwels, Tom Depover, Stijn Hertelé</i>	
Study of Hydrogen Trapping at Carbides After Gaseous Charging at Elevated Temperatures.....	180
<i>Liese Vandewalle, Tom Depover, Kim Verbeken</i>	
Crack Detection and Crack Size Measurement in Round Specimen Using Multiple Potential Drop Measurements.....	188
<i>Jürgen Bär</i>	
Determining the Length of Short Surface Cracks with DC Potential Drop Measurements.....	196
<i>Naveen Kumar Kanna, Jürgen Bär</i>	
Evaluation of the Tensile Properties of X65 Pipeline Steel in Compressed Gaseous Hydrogen Using Hollow Specimens.....	204
<i>Florian Konert, Alessandro Campari, Jonathan Nietzke, Oded Sobol, Antonio Alvaro</i>	
Evaluating Hydrogen Embrittlement Susceptibility of a 2205 DSS	212
<i>L. B. Peral, A. Díaz, R. Rodríguez Aparicio, J. M. Alegre, I. I. Cuesta</i>	
Investigation of Fiber Bragg Grating's Spectrum Response to Strain Gradient.....	218
<i>V. P. Matveenko, G. S. Serovaev, N. A. Kosheleva, E. B. Galkina</i>	
Advanced Acoustic Emission Signal Processing Techniques for Structural Health Monitoring	225
<i>Claudia Barile, Vimalathithan Paramasamy Kannan, Giovanni Pappalettera, Caterina Casavola</i>	

Hydrogen-Assisted Degradation of an X70 Pipeline Steel Evaluated by Single Edge Notched Tension Testing	233
<i>Margo Cauwels, Robin Depraetere, Wim De Waele, Stijn Hertelé, Kim Verbeken</i>	
Dynamic Transient Analysis of the Reactor Core Barrel During LB LOCA.....	241
<i>Oleksii Ishchenko, Vladislav Filonov, Yaroslav Dubyk</i>	
Hydrogen Interaction with FCC CoCrFeMnNi High Entropy Alloy.....	250
<i>Lisa Claeys, Mohammadhossein Barati Rizi, Kim Verbeken, Tom Depover</i>	
Improving of Mechanical Properties of Printed Maraging Steel	256
<i>Ivana Zetková, Petr Thurnwald, Petr Bohdan, Karel Trojan, Šárka Houdková</i>	
Experimental Investigation of Modulation Transfer Technique for Damage Detection of Structures.....	264
<i>Jakub Gorski, Kajetan Dziedziech, Andrzej Klepka</i>	
Performance of a Polymeric Coating Material Applied to a Concrete Structure Affected by Internal Expansive Chemical Reactions	271
<i>João Custódio, Helena Silva, Maria Paula Rodrigues, Susana Cabral-Fonseca, Filipa Moraes</i>	
Effect of CFRP Wraps on the Compressive Strength of Normal and Structural Lightweight Concrete	279
<i>Rami A. Hawileh, Hind Alharmoodi, Abdallah Hajjaj, Abdulaziz Aljarwan, Jamal A. Abdalla</i>	
Effect of Increasing the Number of Anchors on the Flexural Performance of FRP-Strengthened RC Beams	287
<i>Rami A. Hawileh, Maha Assad, Jamal A. Abdalla</i>	
Investigations of the Hybrid Beam Behavior During the Three-Point Bending Test.....	294
<i>Jaroslav Václavík, Lukasz Dopierala, Jan Chvojan</i>	
Notch Effect on the Fatigue Behaviour of AlSi10Mg Aluminium Alloy Obtained by Additive Manufacturing	300
<i>R. F. Fernandes, J. S. Jesus, L. P. Borrego, J. A. M. Ferreira, J. D. Costa</i>	
On the Use of Uniaxial One-Parameter Damage Laws for Estimating Fatigue Life Under Multiaxial Loading.....	307
<i>R. Branco, J. D. Costa, L. P. Borrego, Z. Marciak, F. Berto</i>	
Investigation on Geometric Imperfections of Tensile Test Specimens Using Optical Full-Field Measurements and Digital Twin-Based Simulations	314
<i>T. Fekete, D. Antók, L. Tatár, P. Bereczki</i>	
Comparative Study of Hydrogen Uptake in Low Alloyed Carbon and Austenitic Stainless Steels Under Cathodic Hydrogen Charging in Aqueous Electrolyte and Gaseous Hydrogen Charging	322
<i>Daria Palgan, Markus Uhlirsch, Nuria Fuertes, Birhan Sefer</i>	
Considering Environmental Effects on Porous Concrete Applications: An Experimental Investigation	332
<i>Aikaterini Marinelli, Lukman Puthiyaveetil Haroon Rasheed</i>	
Microstructure and Hardness Properties of a S690QL Steel Welded Joint.....	340
<i>Paulo Mendes, Mário Monteiro, Rui Pedro Silva, José A. F. O Correia, Ana Reis</i>	
Direct Assessment of Mode I Fracture Properties in Silver Fir Using MMCG Specimen and Digital Image Correlation.....	354
<i>O. Cochet, J. Xavier, R. F. Martins, R. Moutou Pitti</i>	

Fatigue Life Assessment of WAAM-Processed Ti-6Al-4V	361
<i>Nikolai Kashaev, Anton Odermatt, Lexuri Vázquez, Pedro Alvarez</i>	
Damage Accumulation and Fracture of Polymer Composites Under Preliminary Biaxial Cyclic Loading.....	369
<i>Artur Kuchukov, Oleg Staroverov, Artur Mugatarov</i>	
Crack Resistance of AA6156 Welded Stringer Panels.....	376
<i>Aleksandar Sedmak, Blagoj Petrovski, Aleksandar Grbovic, Simon Sedmak, Nenad Milosevic</i>	
Criteria for the Onset of Structural Integrity Degradation Due to High-Temperature Hydrogen Attack of a Carbon- Manganese Steel	381
<i>R. J. Mostert, A. Van Zyl, C. C. E. Pretorius, V. M Mathoho</i>	
Impact Analysis of an Adhesive Joint Using a Meshless Method	390
<i>Luís D. C. Ramalho, Isidro J. Sánchez-Arce, Diogo C. Gonçalves, Raul D. S. G. Campilho, Jorge Belinha</i>	
Application of the Dual-Adhesive Technique for Static Improvement of Single-Step Joints	398
<i>D. F. T. Carvalho, R. D. S. G. Campilho, L. D. C. Ramalho, R. D. F. Moreira, K. Madani</i>	
EXtended Finite Element Method Applied to the Tensile Strength Evaluation of Scarf Adhesive Joints.....	406
<i>I. R. S. Araújo, G. J. C. Pinheiro, R. J. B. Rocha, R. D. S. G. Campilho, L. D. C. Ramalho</i>	
The Thermal Influence on the Material Durability of Additive Manufactured Glass Fibre Reinforced Polymer with Embedded Fibre Bragg Grating Sensor.....	414
<i>Magdalena Mieloszyk, Artur Andrearczyk, Ruta Rimasauskienė, Marius Rimasauskas, Anita Orlowska</i>	
Fatigue Behavior and Numerical Assessment of Welded Aluminum EN AW 7020 Tube Joints Under Multiaxial Loading	423
<i>Jenny Köckritz, Thomas Fürstner, Robert Szlosarek, Matthias Kröger</i>	
Influence of Irregular Rivet-Die Offsets on the Integrity and on the Load-Bearing Capacity of Self-Piercing-Riveted Aluminum Alloy Joints.....	431
<i>Zahra Silvayeh, Jennifer Stippich, Peter Auer, Josef Domitner</i>	
Numerical Modeling of Thermal Effects on the Mechanical Behavior of Additive Manufactured Continuous Carbon Fiber Reinforced Polymer: From Microscale to Macroscale	437
<i>Isyna Izzal Muna, Magdalena Mieloszyk</i>	
Data-Driven Discovery and DFT Modeling of Fe4H on the Atomistic Level.....	446
<i>Dejan Zagorac, Jelena Zagorac, Milos B. Djukic, Burak Bal, J. Christian Schön</i>	
Structural Properties of Full-Scope AlN/BN Compounds Investigated Using Ab Initio Calculations	453
<i>Jelena Zagorac, Matej Fonovic, Milos B. Djukic, Svetlana Butulija, Dejan Zagorac</i>	
Mechanical Behaviour and Failure Modes of the Selected Carpentry Joints in Flexural Elements	460
<i>Anna Karolak, Jerzy Jasienko</i>	
Longitudinal Fracture of Functionally Graded Beams with Non-Linear Rheological Behaviour	468
<i>Victor Rizov</i>	
Delamination of Multilayered Viscoelastic Inhomogeneous Beams Under Moving Loading.....	475
<i>Victor Rizov</i>	

SAMAS 2: Structural Health and Ballistic Impact Monitoring and Prognosis on a Military Helicopter	482
<i>Vasiliki Panagiotopoulou, Claudio Sbarufatti, Marco Giglio</i>	
Failure Analysis of a Composite Structural Spar and Rib-To-Skin Joints	490
<i>Wojciech Skarka, Ramesh Kumpati, Michal Skarka</i>	
Aerodynamic Optimization of an UAV	498
<i>Wojciech Skarka, Bartosz Rodak</i>	
Load Analysis on the Drone Protection Cage Increasing Collision Resistance	506
<i>Wojciech Skarka, Magdalena Szczepanek, Maciej Pospiech, Aleksander Jassak, Roman Niestrój</i>	
Investigation of Full Field of Material Properties of X52 Welded Joint.....	514
<i>T. Košco, V. Chmelko</i>	
Data-Driven Spectral Damage Estimator for Non-Stationary Vibration Loading	521
<i>Arvid Trapp, David Fräulin, Marcin Hinz, Peter Wolfsteiner</i>	
Inflation Mechanics of Aortic Phantoms: An Experimental Study.....	536
<i>Hugo Mesquita, Daniela Azevedo, Rodrigo Valente, Pedro J. Sousa, Pedro M. G. J. Moreira</i>	
Surface Defect Detection Systems for Railway Components.....	545
<i>Francisco Afonso, Pedro Sousa, Susana Aguiar, João Nunes, Pedro Moreira</i>	
Development of a Photogrammetric System for Railway Retaining Walls Analysis	553
<i>Francisco Afonso, Pedro Sousa, Nuno Viriato, Francisco Barros, Pedro Moreira</i>	
Experiments for a Fatigue Damage Analysis Applied in Leaf Spring Suspensions of Freight Wagons	561
<i>V. M. G. Gomes, N. M. P. Pinto, P. A. Montenegro, J. A. F. O Correia, A. M. P De Jesus</i>	
Hybrid Selective Laser Melting, Direct Energy Deposition Process Strength-Based Optimization for Hot-Forming Tool	568
<i>Daniel F. O. Braga, Lucas Azevedo, G. Cipriano, Pedro M. G. P. Moreira</i>	
Savitzky-Golay Smoothing and Differentiation Filters for Damage Identification in Plates	575
<i>J. V. Araújo Dos Santos, H. Lopes</i>	
The Stress Dead Zones in the Formulation of the Line Spring Model	585
<i>Francisco Q. De Melo, Vasco Amorim, Hugo Mesquita, Francisco Afonso, Pedro M. G. P. Moreira</i>	
Effect of Seawater Corrosion on the Mechanical Behaviour of S690 Steel	593
<i>Ana Dantas, Rita Dantas, Gonçalo P. Cipriano, Abílio De Jesus, José A. F. O. Correia</i>	
Finite Element Modeling of Concrete Prisms Externally Strengthened with Near Surface Mounted FRP System	601
<i>Ahmed Selim, Shahed Alhomsi, Haider Hasan, Jamal A. Abdalla, Rami A. Hawileh</i>	
Behavior of Normal and Recycled Aggregates Beams Strengthened with Different Types of Externally Bonded Shear Reinforcement	609
<i>Jamal A. Abdalla, Rami A. Hawileh, Maha Ass'Ad, S. S. Ahmed, O. Abdulkader</i>	

The Role of Hydrogen in the Corrosion-Induced Reduction of Plane-Stress Fracture Toughness and Strain-Induced Intergranular Cracking of AA2024	617
<i>C. C. E. Pretorius, R. J. Mostert, C-M Charalampidou, N. Alexopoulos</i>	
Design of Experiments Based Optimization of Direct Energy Deposition Inconel 625 Processing for a Power Generation Turbine Blade	626
<i>Daniel F. O. Braga, Lucas Azevedo, G. Cipriano, Pedro M. G. P. Moreira</i>	
Structural Integrity of Dissimilar Materials and Dissimilar Additive Manufacturing Processes: A Review.....	631
<i>Daniel F. O. Braga, Lucas Azevedo, G. Cipriano, Pedro M. G. P. Moreira</i>	
Multiscale Optical Methods to Measure the Fatigue Crack Closure	638
<i>Behzad V. Farahani, Frederico Direito, Pedro J. Sousa, Paulo J. Tavares, Pedro Moreira</i>	

Author Index