

Table of Contents

Preface and Committees

Lamb-Wave Based Damage Detection in Anisotropic Composite Plates Z. Sharif-Khodaei and F. M.H.Aliabadi	1
Analysis of 3D Planar Crack Problems by Body Force Method A. Hasib and A. Saimoto	5
Long Life Fatigue Behavior of Shot Peened Steels A. Plumtree	9
A Finite Fracture Mechanics Model for the Prediction of the Notched Response and Large Damage Capability of Composite Laminates A. Arteiro, G. Catalanotti, J. Xavier and P.P. Camanho	13
Low-Cost System to Evaluate Impact Localization in Composite Plates A.L.A. Ribeiro, N. Mastelari and C.A. Cimini	17
Modeling Delamination Growth in Composite Panels Subjected to Fatigue Load A. Riccio, F. Ronza, A. Sellitto and F. Scaramuzzino	21
Definition of a Constitutive Material Model for Progressive Failure Analysis of Composite Laminates A. Riccio, C. di Costanzo, P. di Gennaro and F. Scaramuzzino	25
Round Timber Bolted Joints with Steel Plates under Static and Cyclic Loading A. Lokaj	29
A Multiscale Approach to Polycrystalline Materials Damage and Failure I. Benedetti and F. M.H.Aliabadi	33
A Multi-Scale Scheme for Modelling Fracture under Dynamic Loading Conditions A. Karamnejad and L.J. Sluys	37
Estimation of the Crack Behaviour in the Compressive Layer of the Alumina-Zirconia Ceramic Laminate L. Náhlík, B. Máša and P. Hutař	41
Fatigue Life Assessment of Self-Expandable NiTi Stent C.S. Nes, A. Enkelhardt, L. Bogdan and N. Faur	45
Modelling Mixed-Mode Fracture Using an Energy-Based Damage Model J. Alfaiate, D. Dias-da-Costa and L.J. Sluys	49
Multi-Scale Mechanical Property Characterisation of Quasi-Brittle Filter Graphite D. Liu, P.J. Heard, P.E.J. Flewitt and D.J. Smith	53
FE Analysis of Functionally Graded Material Plate during Debonding Case with Different Boundary Conditions W.M.K. Helal and D.Y. Shi	57
Optimized Design of Strengthening Structure with Hat-Shaped Cross-Section by Carrying out Buckling Test K. Natori, K. Katanoda, Y. Hashimoto, Y. Arao and T. Tanaka	61
High Magnification Studies of Fatigue Crack Propagation B. Moreno, A. Garcia-Gonzalez, P. Cobos-Rodriguez, M. Martinez, M. Lopez-Prieto and P. Lopez-Crespo	65
Fracture Behavior of Notched Round Bars Made of Gray Cast Iron Subjected to Torsion M. Marcon, D.A. Cendón, F. Berto, P. Lazzarin and M. Elices	69
Polymethylmethacrylate Data from U-Notched Specimens and V-Notches with End Holes: A Synthesis by Means of Local Energy A. Campagnolo, F. Berto, P. Lazzarin and M. Elices	73
High Temperature Fatigue Tests of a Cu-Be Alloy and Synthesis in Terms of Linear Elastic Strain Energy Density F. Berto, P. Gallo and P. Lazzarin	77
Fatigue Behaviour of DLC Coated Al 7075-T6 Alloy in an Aggressive Mixture S. Baragetti, R. Gerosa and F. Villa	81
Gaussian Specimens for Gigacycle Fatigue Tests: Evaluation of Temperature Increment A. Tridello, D.S. Paolino, G. Chiandussi and M. Rossetto	85

Vibrational and Inertial Effects of Methane Hydrates in the Failure of a Pipeline F. Caputo, F. Cascetta, G. Lamanna, G. Rotondo and A. Soprano	89
Evaluation by FEM of the Influence of the Preheating and Post-Heating Treatments on Residual Stresses in Welding R. Sepe, E. Armentani, G. Lamanna and F. Caputo	93
Fatigue Behaviour of Full Scale Flat Stiffened Aeronautic Panels R. Sepe, E. Armentani, G. Lamanna and F. Caputo	97
Numerical Study of a Plate with a Pre-Cracked Circular Notch F. Caputo, A. de Luca, G. Lamanna and A. Soprano	101
Numerical Simulation and Experimental Investigation of Damage Behaviour on Al6061 Laser Welded Joints H.Y. Tu, S. Schmauder and U. Weber	105
Flexural Property and Mode I Interlaminar Fracture Toughness of Plain Woven Carbon Fiber Reinforced Plastics after Water Absorption and Freezing H. Katogi and K. Takemura	109
Effect of Acid Treatment on Mechanical Performance of Polyvinyl Alcohol/Halloysite Nanocomposites K. Fujii, A.N. Nakagaito and H. Takagi	113
A Theory for Mathematical Framework of Fatigue Damage on S-N Plane H. Eskandari and H.S. Kim	117
Topology Optimization of Geometrically Non-Linear Structures Using Iso-XFEM Method M. Abdi, I. Ashcroft and R.D. Wildman	121
Fracture Mechanisms in High-Cycle Fatigue of Selective Laser Melted Ti-6Al-4V M. Simonelli, Y.Y. Tse and C.J. Tuck	125
Investigation of Residual Stresses in Selective Laser Melting L. Parry, I. Ashcroft, D. Bracket and R.D. Wildman	129
Experimental Evaluation of Fatigue Resistance of ETG[®]88 and C45+C Steels Considering Stress Concentrators and Scale Factor I. Černý and D. Mikulová	133
Fatigue and Fracture Resistance of an Aircraft Landing Gear Steels V-ROL N and VIP P-ROL N Heat Treated to Lower Strength Limit I. Černý and J. Sís	137
The Effect of Specimen Size on the Determination of Residual Stress in Polymer Pipe Wall J. Poduška, J. Kučera, P. Hutař, M. Ševčík, J. Krivánek, J. Sadílek and L. Náhlík	141
Description of Fatigue Crack Propagation under Mixed-Mode II+III in Terms of J-Integral J. Horníková, P. Šandera, T. Vojtek and J. Pokluda	145
Fatigue Crack Propagation in Hydrogen Gas in Low Alloyed Steel C. Sarrazin-Baudoux, C. Gardin, V.X. Tran, T.H. Pham and J. Petit	149
Fatigue Crack Propagation in Thin Wires of Ultra-High Strength Steel J. Petit and C. Sarrazin-Baudoux	153
Hydrogen-Assisted Rolling-Contact Fatigue of Wind Turbines Bearings J. Toribio, M. Lorenzo, D. Vergara and V. Kharin	157
Inelastic Dynamic and Non-Linear Static Seismic Performance of a Building with RC Walls that Collapsed in the Chile's Earthquake of February 2010 and a Building with RC Concrete Frame Designed in the Mexico City J.A. Avila, D.A. Lopez and J.A. Avila-Haro	161
Influence of the V-Notch Opening Angle on Critical Applied Force Values for the Crack Initiation from the Sharp V-Notch K. Štegnrová, L. Náhlík and P. Hutař	165
Influence of Annealing Process on Crystallinity of Glass Fiber Reinforced Easily Degradable PLA Composites K. Tanaka, M. Miyamura, Y. Okamoto, T. Katayama, T. Katayama and S. Yoshikawa	169
Effect of High Temperature on Fiber/Matrix Interfacial Properties for Carbon Fiber/Polyphenylenesulfide Model Composites K. Tanaka, J. Nishio, T. Katayama and S. Enoki	173
Effect of Hot Water Environment on Tensile Fracture Properties of Carbon Fiber Reinforced Polyoxamide Composites K. Tanaka, S. Maehata, T. Katayama and M. Shinohara	177

Stability Evaluation of Gearbox for Independent Wheel Drive under Various Driving Mode Y.S. Kim and S.C. Yoon	181
Time to Failure Size Effect for Tensile Creep Specimens K. Nowak	185
Corrosion Resistance Testing of the Galvanized Sheet Metal Braze Welding Joints A.V. Magda and C. Codrean	189
Fatigue Behaviour of Al 6082-T6 Friction Stir Welded Tubular Joints under Torsional Loading D.G. Hattingh, M.N. James, L. Susmel and R. Tovo	193
The Effect of Soil Load on Fracture Behaviour of Three-Layer Polymer Pipe for Non-Pressurised Applications M. Ševčík, F. Arbeiter, P. Hutař, G. Pinter and L. Náhlík	197
High-Cycle Fatigue Damage of Oxygen-Free and Deoxidized-Phosphorous Copper Processed by Equal Channel Angular Pressing M. Goto, N. Teshima, S.Z. Han, J.H. Ahn and T. Yakushiji	201
Long Term High-Temperature Environmental Effect on Impact Toughness in Austenitic Alloys M. Calmunger, G.C. Chai, S. Johansson and J. Moverare	205
The Importance of Micro-Crack Evolution under Oxidation/Creep Conditions in Component Failure Life Predictions A. Mehmanparast and K. Nikbin	209
Automation Using Matrix Switch for Piezoelectric Actuator/Sensor Based Structural Health Monitoring S.Y. Meng and M.H. Aliabadi	213
Localization of Barely Visible Impact Damage (BVID) in Composite Plates S.Y. Meng, Z. Sharif Khodaei and F. M.H. Aliabadi	217
Fracture in the Single Cantilever Beam Test with Large Scale Bridging M.K. Budzik, H.M. Jensen and J. Jumel	221
Intersection of Interface Crack Front with Free Edge A. Moberg, M.K. Budzik and H.M. Jensen	225
Fatigue Strength Simulation and Prediction of a Turbine Blade M. Růžička, J. Jurenka, M. Nesládek and J. Džugan	229
Study of Nanostructured Composites Using the Sclerometry Method N. Lvova, S. Perfilov and A. Useinov	233
Validity of the Finite Fracture Mechanics Based Asymptotic Analysis for Predictions of Crack Deflection in Thin Layers of Ceramic Laminates O. Ševeček, D. Leguillon, T. Profant and M. Kotoul	237
Characterization of Local Deformation in Welded Joints Using a Combined Experimental and Numerical Approach P. Kucharczyk and S. Münstermann	241
The Effect of Anchorage Strength with Anchorage Capacity in Flat Plate H.K. Choi	245
Experimental Study on Pounding between Structures during Damaging Earthquakes R. Jankowski, A. Seleemah, S. El-Khoriby and H. Elwardany	249
High Speed Fracture Phenomena by Underwater Shockwave of Explosive Energy and Large Current Pulse in Glass Container S. Honda, H. Sakamoto, Y. Ohbuchi, S. Kawabe, S. Itoh and Y. Nakamura	253
Gun Bullet Collision and Penetration Problem in Polycarbonate Board K. Gotoh, H. Sakamoto, Y. Ohbuchi, T. Katayama, Y. Nakamachi and H. Ando	257
Design/Manufacturing System for Composite Ankle Foot Orthosis S. Enoki, C.J. Huang, T. Katayama, Y. Nakamura, T. Matsuoka and K. Tanaka	261
Fatigue Characteristics of Nonferrous Bolts at Elevated Temperature S. Hashimura, T. Torii and T. Otsu	265
Crack Analysis in Piezoelectric Semiconductors J. Sladek and V. Sladek	269
Evaluation of Crack Tip Stress Field Using Combination of Advanced Implementation of Over-Deterministic Method and FE Analysis J. Sobek, T. Pail and V. Veselý	273

Numerical Simulation of Modified Compact Tension Test Depicting of Experimental Measurement by ARAMIS T. Holušová, S. Seitzl and A.F. Canteli	277
Wedge Splitting Test of Foam Concrete Specimens: Calibration Curves S. Seitzl, I. Merta and V. Veselý	281
Numerical Simulation for Mechanical Behavior of Carbon Black Filled Rubber Composites Based on Cubic Representative Volume Element Q. Li and X.X. Yang	285
Numerical Analysis of Three-Dimensional Semi-Elliptical Interfacial Cracks Subjected to Indentation Load N. Kurihara and M. Arai	289
Thermal Cycling Life of Porous Ceramic Coatings Subjected to Thermal Gradient and Coolant Pressure M. Arai, T. Hayashi and T. Suidzu	293
Deviations of Microcrack during Propagation in Thin Films of Austenitic Steel and Accompanying Accommodative Processes T. Eterashvili, T. Dzigrashvili and M. Vardosanidze	297
Comparison of Artificial Neural Networks and the Transfer Function Method for Force Reconstruction in Curved Composite Plates M. Thiene, Z. Sharif-Khodaei and M.H. Aliabadi	301
Fatigue Crack Growth Rates and Tensile Strength of Titanium Produced by Means of Selective Laser Melting T. Brynk, B. Romelczyk-Baishya, Z. Pakiel, T. Kurzynowski and E. Chlebus	305
Comparison of Full Field and Single Inclusion Approaches to Homogenization of Composites with Non-Ellipsoidal Pores I. Tsukrov, B. Drach and A. Trofimov	309
Application of Acoustic Emission for Identification of Differences in Fatigue Damage of Selected Materials for Power Plants V. Mentl, F. Vlasic, D. Bartkova and P. Mazal	313
Work of Fracture due to Compressive Component of Loading in Wedge Splitting Test on Quasi-Brittle Cementitious Specimens V. Veselý, J. Bedáň, J. Sobek and S. Seitzl	317
Prediction of Corrosion Processes on Weathering Steel Bridges V. Krivy, V. Urban and K. Kreislova	321
Analytical 1D Model of Delamination Development and Strength of Layered Composite Beam in Post-Buckling V. Pavelko	325
Microindentation Test Modelling in the Silicon Nitride Ceramics by Application of the Cohesive Zone Approach V. Kozák and Z. Chlup	329
Comparative Study on the Fatigue Behaviour of SCC and VC S. Korte, V. Boel, W. de Corte and G. de Schutter	333
Review of FE-Based Fatigue Evaluation Methods for the Rib to Floorbeam Welds in Orthotropic Bridge Decks W. de Corte and A. Jansseune	337
An Integrated Creep-Fatigue Theory for Material Damage Modeling X.J. Wu	341
Stress Analysis of Cracked MMCs with Lamellar Microstructure M. Kashtalyan, Y. Sinchuk and R. Piat	345
Continuum Approach to Computational Multi-Scale Modeling of Fracture J. Oliver, M. Caicedo, E. Roubin and A.E. Huespe	349
Correlation of Dent Depth to Maximum Contact Force and Damage of Composite Laminates Z. Shen, Y.G. Xu and A. Chrysanthou	353
Meshless Approaches for Fracture with Nonlocal Elasticity P.H. Wen, X.J. Huang and M.H. Aliabadi	357
Investigation of the Cracking Behaviors by Indentation Based on an <i>In Situ</i> Observation Y. Yamazaki	361

Deformation-Induced Dynamic Precipitation during Creep in Magnesium-Tin Alloys Y.D. Huang, H. Dieringa, K.U. Kainer and N. Hort	365
Mechanical Properties of Concrete Produced with Wastepaper for Application of Construction Materials H.K. Choi	369
Point Load Effect Determination for Different Pressure Pipe SDR Series Z. Majer, M. Ševčík, L. Náhlík and P. Hutař	373
A Technique for Detection and Sizing of Cracks on Plate Structures Using Piezoelectric Transducer Networks F. Zou and M.H. Aliabadi	377
Second-Order Computational Homogenization Scheme Preserving Microlevel C^1 Continuity T. Lesičar, Z. Tonković and J. Sorić	381
The Relationship of Compressive Strength and Tensile Strength of High Performance Concrete J.E. Kim, W.S. Park, S.H. Yun, Y.I. Jang, H.D. Yun, S.W. Kim and D.G. Kim	385
Optimized Ultra High Performance Fiber Reinforced Concrete Mixture with Intensified Volumetric Stability J.J. Park, D.Y. Yoo, J.H. Park and S.W. Kim	389
Effect of Area Ratio of Coarse Aggregate on Erosion Resistance of Offshore Concrete Structure J.H. Park, J.J. Park, J.H. Moon and S.W. Kim	393
Investigation on Compressive Strength after Impact Damage of Carbon/Epoxy Laminate H.B. Park	397
Effect of Mineral Admixture on Modulus of Elasticity in High Performance Concrete under Hot Weather Condition N.Y. Eom, W.S. Park, S.H. Yun, Y.I. Jang, H.D. Yun, B.S. Khil and D.G. Kim	401
A Study on the Fatigue Test of Truck Materials for Railway Vehicles S.C. Yoon	405
A Study on the Safety of Carbody for Railway Vehicles S.C. Yoon and Y.S. Kim	409
A Development of Innovative Slip-Form System for Concrete Pylons H.J. Yoon, W.J. Chin, H.S. Kim and Y.J. Kim	413
Fatigue Behavior of Extruded Mg-Al-Ca-Mn Alloy with T6 Treatment at Elevated Temperature Y. Miyashita, H. Inzunza, A. Elizondo, Y. Murayama, Y. Otsuka and S. Kamado	417
Contact State Investigation of a Three-Point Bend Specimen Using Numerical Methods R.A. Javed, S.F. Zhu, C.H. Guo and F.C. Jiang	421
An Experimental Evaluation for Four Multiaxial Fatigue Approaches D. Jin, D.J. Tian, Q.Z. Wu and W. Lin	425
Very High Plastic Strain Zones in 304 Stainless Steel Small Punch Specimen Loaded at RT by Martensite Formation and Recrystallization Technique Y. Iino, H.S. Yu, J.H. Kong and M. Okumiya	429
Comparison between Subjective and Objective Measurement of Slipperiness C.H. Bang and J.S. Kim	433
Micro-Computed Tomography Image Based Numerical Elastic Homogenization of MMCs Y. Sinchuk, S. Dietrich, M. Merzkirch, K.A. Weidenmann and R. Piat	437
Fibre Concrete Foundation Slab Experiment and FEM Analysis R. Čajka and J. Vaskova	441
Influence of Cold Weather on Compressive Strength in High Performance with Silica Fume Y.I. Jang, W.S. Park, S.W. Kim, S.H. Yun, H.D. Yun, B.S. Khil and D.G. Kim	445
The Behavior of Pseudo Strain-Hardening Cementitious Composite (PSH2C) Using Synthetic Fibers under Uniaxial Tensile Loading W.S. Park, Y.I. Jang, H.D. Yun, I.S. Yang and B.S. Khil	449
A Boundary Element Method for Structural Reliability X.Y. Huang and M.H. Aliabadi	453
Simulations of Bending Experiments of Concrete Beams by Stochastic Discrete Model J. Kaděrová and J. Eliáš	457

Evaluation of Slip Resistance of Safety Footwear Using Novel Equipment C.H. Bang, T.G. Kim and J.S. Kim	461
Application of the Radial Integration Method into Dynamic Formulation of Anisotropic Shallow Shells Using Boundary Element Method L.J.M. Jesus, C.A. Cimini and E.L. Albuquerque	465
Influence of Different Crack Propagation Rate Descriptions on the Residual Fatigue Lifetime of Railway Axles P. Pokorný, L. Náhlík and P. Hutař	469
Numerical Analysis about the Strength of Jointed Rock under Hydrodynamic Pressure R.Q. Hao and P. Cao	473
Investigations on Direct Shear Tests and PFC^{2D} Numerical Simulations of Rock-Like Materials with a Hole and Prefabricated Cracks P. Cao, Y.F. Zhong, Y.J. Li and J. Liu	477