

Table of Contents

Preface

Effect of Mutual Coupling Action between K_I and K_{II} on Fracture Toughness of Materials in a Mixed Mode Fracture Y.S. Zhao	1
Compliance Controlled Stress Intensity Factor Changes in Rivetted Repairs D.P.W. Horrigan and J.F. Williams	7
Study on the J-Integral Failure Assessment Curve of Heterogeneous Welded Joints L.X. Huo, X.Q. Yang and Y.F. Zhang	13
Mode I and Mode II Plane-Stress Near-Tip Fields for Cracks in Materials with Strain-Gradient Effects J.Y. Chen, Y.Y. Huang and K.C. Hwang	19
Interacting Circular Inhomogeneities X.L. Han and T.C. Wang	29
Effect of Material Character on Fundamental Solutions for Three Dimensional Transversely Isotropic Media M.H. Zhao, Y.P. Shen, Y.J. Liu and G.N. Liu	35
On J Integral as Fracture Parameter in Heterogeneous Welded Joints J.D. Kang, L.X. Huo and Y.F. Zhang	41
Evaluation of T Stress for a Finite Internally Cracked Plate by Using EEVM Method Y.H. Chen, Y.B. Luo and X.Y. Lin	47
On Several Problems of Macro / Micro Failure Mechanics S.W. Yu, X.Q. Feng and Q.H. Qin	51
Effect of a Circular Inclusion on Crack Propagation Path in a Plate under Tension H. Nisitani and A. Saimoto	61
Bifurcation in Growth Patterns for Arrays of Parallel Griffith, Edge and Sliding Cracks K.T. Chau, H.-. Muhlhaus and A. Ord	71
Analysis of Newly Defined Stress Intensity Factors at the End of Rectangular and Cylindrical Inclusions N. Noda, Q. Wang, T. Morodomi and Y. Uemura	77
A Method for Calculating T-Stress in Mixed Mode Problems M.R. Ayatollahi, D.J. Smith and M.J. Pavier	83
J_2-Integral and its Application in Estimates of Stress Intensity Factors Y.J. Xie, B.Z. Chen, H.B. Xu and P.N. Li	89
Elastic-Plastic Stress Singularity Near the Tip of V-Notch D.H. Chen and K. Ushijima	95
Stress Intensity Factor Equation for Center Cracked Tension (CCT) Specimens of Fiber Reinforced Metal Laminates under Cyclic Loading Y.J. Guo and X.R. Wu	101
Fractal Dimension of Fracture Surface Profiles in an Austenite Steel Fatigued by Repeated Bending M. Tanaka, A. Kayama, R. Kato and A. Muto	107
Dislocation Emission and Cleavage Process at Crack Tip T.C. Wang	113
Molecular Dynamics Simulation of Hydrogen Enhancing Dislocation Emission G.H. Zhou, F.X. Zhou, F.R. Wan and W.Y. Chu	123
Investigation of Atomic Structure Ahead of Crack Tip by STM and AFM X.D. Li, Y.B. Wang, W.Y. Chu, C.M. Wang, F. Tian, Y. Zhang, R.D. Xia and C.L. Bai	129
Fundamentals of Mode III Fracture: A Discrete Dislocation Simulation Approach S.B. Lee	135
Fractal Description of Fractured Surfaces in Materials C.W. Lung	145
Crevice Formation in Thin Plates by Stress Driven Mass Rearrangement A.N. Norris and C. Vemula	151

Emission of an Edge Dislocation from a Thin-Film-Covered Crack C.-. Qian, T.Y. Zhang and P. Tong	161
Vibration of Cracked Kirchhoff's Plates R.K.L. Su, A.Y.T. Leung and S.C. Wong	167
Analysis of Breathing Cracks Using a Cracked Beam Element D.P.W. Horrigan and J.F. Williams	173
A Numerical Simulation of the Crack Growth in a Smooth CT Specimen W.-. Yan, G.-. Shan, O. Kolednik and F.D. Fischer	179
Introduction to Composite Element Method for Structural Analysis in Engineering P. Zeng	185
Development of Hybrid Finite Elements for Stress Analysis of Composite Structures S.V. Hoa and W. Feng	191
Meshless Method on Massively Parallel Processors with Application to Fracture Mechanics G. Yagawa and T. Yamada	201
A Finite Element Analysis on Isotropic Damage Propagation in Axisymmetric Structures S.J. Kim, S.W. Chung and J.H. Kim	211
Effect of Shape and Arrangement of Inclusions on the Elastic Modulus of Composite Materials N. Noda, H. Nisitani, Y. Takase and T. Wada	221
Shape Optimization Analysis for Frequency Response Problems of Solids with Proportional Viscous Damping Z.Q. Wu, Y. Sogabe and H. Azegami	227
Micromechanical Modelling of Deformation Mechanisms for Rubber-Toughened Polymers X.H. Chen and Y.W. Mai	233
Finite Element Analysis of Porous Materials Fracture Toughness Z.H. Shan and Y. Leng	243
Prediction of the Effect of Craze Damage on Apparent Elastic Properties of Polystyrene by FEM C.Y. Tang, L.C. Chan, M. Jie and C.H. Yu	249
Steady State Analysis for Dynamic Crack Propagation in Gas Pipelines L. Zhuang and P.E. O'Donoghue	255
Dynamic Fracture Characteristics of Metallic Materials under Impact Loading S. Bahk, M.K. Park and D.J. Sun	261
The Transition Method of Geometrically Similar Element for Dynamic Crack Problem C.B. Hu, Y.L. Li, Y.T. Li and J.M. Gong	267
Dynamic Fracture Feature in Metals under Very High Strain Rate Induced by Shock Loading C.W. Sun, S.P. Feng, S.M. Zhuang and X.P. Long	273
Effects on Material Dynamic Initiation Toughness J.R. Luo, Y.Z. Chen, P. He, Z.S. Yu and W.G. Guo	279
On the Dynamic Ductile Damage and Fragmentation in Porous Metallic Materials Z.T. Chen and S.W. Yu	285
Hyperelastic Modeling of Dynamic Crack Tip Instabilities H.J. Gao	291
Transient Response of a Finite Plate with Multiple Cracks C.L. Chang and W.H. Chen	301
Theory of Caustics for Mode-III Unsteadily Fast Propagating Cracks T. Nishioka and M. Kinugawa	311
Determination of Impact Shear Strength of Adhesive Joints with the Split Hopkins Bar T. Yokoyama	317
Boundary Element Methods for Crack Dynamics F. M.H. Aliabadi	323
Slip Bands and Fatigue Life of a Steel under Repeated Impact Tension A. Chatani, A. Hojo and H. Tachiya	329
Dynamically Propagating Crack in Graded Particle Dispersed Composite Modeled by Neuro-Fuzzy Inference M. Nakagaki, Y.D. Wu and S. Hagihara	333

A Very High Strain Rate Compression Test Using a Modified Split Hopkinson Pressure Bar Technique	
O.S. Lee, J.H. Chong, S.S. You, S.S. Choi, H.S. Kang, M.J. Han and M.S. Han	343
Analysis of Impact Fracture Behavior of Laminated Glass of Bi-Layer Type Using Discrete Element Method	
J. Oda and M.Y. Zang	349
Modelling of Dynamic Behaviour of Elastic-Plastic Structures under Impact	
K.Q. Wu and T.X. Yu	355
Higher Order Solutions of the Near-Tip Fields for a Rigid Flat Inclusion in a Damaged Nonlinear Material	
T.J. Wang and K. Kishimoto	361
A Method of Damage Mechanics Analysis for Solder Material	
H.E. Fang, C.L. Chow and F. Yang	367
Some Advances in Study of Crack Identification Problems	
C.T. Liu and W.J. Chen	375
Interacting Multiple Cracks	
X.L. Han and T.C. Wang	381
A Geometrical Description in Finite Elasto-Plastic Deformation	
F. Song, Y. Sun and D. Wang	387
Artificial Neural Network Assessment System for Fatigue Life	
P. Zeng	393
Analysis of Damage Moments in the Collective Evolution of Short Fatigue Cracks	
Y.S. Hong and Y. Qiao	399
Crack Identification by Artificial Neural Network	
C.B. Hwu and Y.C. Liang	405
Dynamic Function of Damage and Its Implications	
Y.L. Bai, M.F. Xia, F.J. Ke and J. Bai	411
An Interface for Implicit Constitutive Modelling	
T. Furukawa and G. Yagawa	421
Estimation of Bending Strength of CFRP Cross-Ply Laminates from Damping Capacity Using by Neural Network	
O.I. Byon(Goichi Ben), Y. Nishi, K. Mori and T. Yamaguchi	427
A Method of Damage Mechanics for the Prediction of Fatigue Lives	
X.R. Zhang, J.H. Zhao and K.C. Hwang	433
Neural Network Based Inverse Analysis for Defect Identification with Laser Ultrasonics	
S. Yoshimura, G. Yagawa, A. Oishi and K. Yamada	443
Prediction of Fracture Limits of Sheet Metals by Using a Damage Mechanics Criterion	
C.Y. Tang, W.H. Tai, L.C. Fung and T.C. Lee	453
Damage Evolution and Energy Dissipation in the Crazing of Polymers	
C.Y. Tang, M. Jie and W.B. Lee	459
Influence of Fiber/Matrix Interface Properties on Complementary Energy and Composite Damage Tolerance	
V.C. Li, T. Kanda and Z.C. Lin	465
The Effect of Interface Damage on the Microbuckling of Unidirectional Fiber-Reinforced Composites	
Y.Y. Huang, C. Liu, M.G. Stout and K.C. Hwang	473
Closed-Form Interacting Solutions for Overall Elastic Moduli of Composite Materials with Multi-Phase Inclusions, Holes and Microcracks	
Q.S. Zheng and D.X. Du	479
On the Modeling of Interfacial Zone Containing a Griffith Crack: Plane Problem	
Z.Z. Zou, X.Y. Wang and D. Wang	489
Singular Integral Equation Approach to Push-In Tests in Fiber-Reinforced Composites	
Q. Wang and S.X. Sun	495
Influence of Interfacial Debonding on the Elastic Property of a Particle-Reinforced Composites	
Y.H. Zhao	501
A Tensile Strength Model for AVCO Mod 3a C/C Composite	
J. Liang, S.Y. Du and X.F. Chen	507

An Analysis of a Crack Normal to Bimaterial Interface Using Cubic Isoparametric Finite Elements	513
W.K. Lim, K.C. Jeong and C.H. Song	
Application of Shear Lag Analysis to Tensile Behaviour of Fiber-Composites	519
S. Ochiai	
The Singularity of Stress Field Near the Axisymmetric Interface End of Push-In Test Specimen of Composites	529
X. Ji, B.L. Zheng, Y.G. Wang and P.F. He	
Damage Tolerance of Adhesively Bonded Composites Single Lap Joints	537
L. Tong, X.C. Zhu and G.P. Steven	
Analytical Techniques for Bonded Repairs	543
Y.C. Lam and C.S. Zhu	
A 4-Cylinder Model to Evaluate Interfacial Properties of Fibre-Reinforced Composites	553
H.R. Daghyani, A. Hosseini Monnazah and L. Ye	
Evaluation of Interfacial Bonding Strength of Films	559
J.W. He, K.W. Xu and N.S. Hu	
An Application of Conservation Integrals to Elastic T-Stresses of Interface Crack	567
H.J. Moon and Y.Y. Earmme	
Intensity of Singular Stress Field at the Interface Edge Point of a Bonded Beam	577
D.H. Chen and K. Nonomura	
Elastoplastic Constitutive Law for Particle Dispersed Composite Material Accounting for Mesoscopic Inhomogeneity	583
M. Nakagaki and Y.D. Wu	
Stress Intensity Factors of Three-Dimensional Interface Crack under Mixed-Mode Loading by Finite Element Analysis	589
K. Machida	
An Analysis of Singularity in Single Fibre Pull-Out Test Using BEM	595
Y. Dai, J.K. Kim, X. Ji and S.T. Xue	
Computational Modeling and Analysis of a Center-Cracked Panel Repaired by Bonded Composite Patch	601
R.W.T. Chau and S.W.R. Lee	
Tensile Failure of Short Fiber-Reinforced Composites	607
B. Mu and Z.J. Li	
Finite Element Analysis of Stress Distributions in a Fibre/Matrix Fragment	613
H.Y. Liu, Y.W. Mai and L. Ye	
Theoretical Consideration on Cavity Growth Process under Creep-Fatigue Condition	621
M. Arai and T. Ogata	
Incorporating the Effect of Stress-Free Thermal Ageing into Creep Damage Models	627
J.K.L. Lai	
Fatigue Crack Growth in 316L Stainless Steel	631
G. Wheatley, R. Niefanger, Y. Estrin and X.Z. Hu	
Analysis of Crack Closure by Different Measurement Methods	637
X.Y. Huang, M. Lang, X.R. Wu and H. Döker	
Prediction of Fatigue Life of MIG Welded Cruciform Joints Failing from the Root LOP Region	643
V. Balasubramanian and B. Guha	
Damage Analysis of High Temperature Isothermal and Thermomechanical Fatigue on a TZM Alloy	649
H.J. Shi and G. Pluvinage	
Cyclic Creep Behavior of SiCw/6061Al Composites at High Temperatures	655
P.L. Liu, Z.G. Wang, H. Toda and T. Kobayashi	
Correlations Among Curves Equations and Materials Parameters in the Whole Process on Fatigue-Damage-Fracture of Components	661
Y.G. Yu, W.G. Pan and Z.H. Li	
Characteristics and Miromechnism of Low Cycle Fatigue under Non-Proportional Loading for 316L Stainless Steel	669
G.Q. He, C.S. Chen, X.Y. Zhang, Q. Gao and X.F. Sun	

Fatigue Properties of Self-Fusing-Alloy-Sprayed Steel K. Sonoya and M. Kitagawa	675
Evaluation of Fatigue Life in Microelectronics Solder Joints of a Surface-Mounted Type K. Kaminishi, M. Iino and M. Taneda	681
A Study on Fatigue Crack Growth Behavior of Aged Stainless Steel at Elevated Temperatures J.K. Lim, D.W. Seo and Z.S. Li	687
Analysis of Fatigue Crack Closure Behavior for Various Cracked Geometries J.Z. Liu and X.R. Wu	693
Evaluation of Cumulative Fatigue Lives under Different Biaxial Loading Mode Sequences for Notched Specimens M.C. Yip and Y. Jen	699
Fatigue Damage Repair by Artificial Introduction of Crack Closure C.S. Shin, K.C. Huang and R.Z. Li	705
Creep Behavior and Rupture Life of Short Fiber Reinforced Metal Matrix Composites H.W. Nam, S.W. Jung, J.S. Lee and K.S. Han	711
Fatigue Crack Propagation in Titanium Single Crystals Y. Mine, T. Yamada, S. Ando, K. Takashima, H. Tonda, Y. Higo and P. Bowen	721
Unidirectional Carbon Fibre/Epoxy Laminates Interleaved by Film Adhesives and Chopped Kevlar Fibres M. Sohn and X.Z. Hu	727
Load History Effects on Composites Laminates and Composite Repairs W.K. Chiu, S. Galea and R. Jones	733
Fracture Behavior of ABS Resin under Mixed Mode Loading K. Kishimoto, H.M. Notomi and T. Shibuya	743
Advanced Composites for Medical Applications B.S. Kim	749
Mode II Fracture Behaviour of PBT Modified Brittle Epoxies H.S. Kim and P. Ma	759
Improvement of Mechanical Properties of Materials by Biomimetic Treatment B.L. Zhou	765
Effects of Thermal Cycling on Microscopic Damage Progress in Laminated Composites S. Ogihara, N. Takeda and A. Kobayashi	775
Static Mechanical Behavior of Bamboo/Aluminum Composites for Applications in Industrial Structures G.X. Sui, T.X. Yu, J.K. Kim and B.L. Zhou	781
Effect of Blending Sequence on the Impact Strength of PET/PC Blends J.S. Wu and Y.W. Mai	787
Impact Strength and Failure Mechanisms of PBT/PC Blends J.S. Wu and Y.W. Mai	793
Interlaminar Properties of Glass Woven Fabric Composites: Mode I and Mode II Fracture M.L. Sham, J.K. Kim and J. Wu	799
Interface Modification of PC/LCP in Situ Composites and its Influence of Impact Strength N.F. Kong and Y. Leng	805
Interphase Morphology and Fibre Pull-Out Behaviour of Carbon Fibre PEEK Composites S.L. Gao and J.K. Kim	811
A Study of the Elastic Storage Moduli of Glass Bead Filled LDPE Composites J.Z. Liang, C.Y. Tang, R.K.Y. Li, S.C. Tjong and K.C. Yung	817
Mechanical Properties of Glass Beads Filled Polypropylene Composites C.Y. Tang, J.Z. Liang, K.C. Yung, R.K.Y. Li and S.C. Tjong	823
Effects of Cyclic Thermal Loadings on Fatigue Behavior of Carbon/PEEK Laminates M.C. Yip, C.M. Tseng and N.H. Tai	829
Fatigue Crack Growth in Carbon Fiber Filled PEEK under Mixed Mode Conditions D.J. Lee	835
Stretch Strength of Al-Li Alloy Sheet K. Sato, T. Sakamoto, Y. Sawa, T. Yokoyama and S. Fujimoto	841

Method for Determination of the Strain Hardening Law and for Analysis of Early Fracture Stages of Some Structural Components V.P. Shveikin and S.V. Smirnov	847
An IFS Constitutive Description of the Fractal Microcrack Evolution for SiC_p Reinforced Al Alloy Matrix Composite in Large Plastic Deformation S.C. Shin, S. Grünert and L.L. Wang	853
Development of New Welding Pattern in Order to Minimise Distortions in Marine Structure D. Ischenko and R.N. Ibrahim	859
Effect of Thermo-Mechanical Conditioning Cycle on Retardation of Crack Growth in Cylinders Manufactured from an Aluminium Alloy R.N. Ibrahim and D. Ischenko	865
Effects of Orientation and Loading Mode on Short Fatigue Crack Growth in Ni₃Al Alloy Single Crystals G.P. Zhang and Z.G. Wang	871
Mechanical Behavior of Two-Dimensional Carbon Fiber Fabrics Reinforced Carbon Matrix Composites S.S. Tzeng and W.C. Lin	877
A Study on Deformation Behaviour of Ultrafine Grained Materials W.Y. Yeung	883
Effect of Microstructure and Several Parameters on J_i and δ_i Q.F. Li, G.Z. Chen, X.B. Liu, P. Long, S.H. Tan and J.H. Wu	889
Evaluation of the Interaction Effects of SiC Particles During Damage Process of MMC M. Kikuchi and M. Gheni	895
Fracture and Damage at Interfaces of Ceramic Laminates X.Z. Hu and H. Wang	901
Division and Delamination Processes of WC+Co Film Coated by High-Velocity Flame Spraying K. Nakasa, M. Kato and D. Zhang	907
An Inverse Analysis Approach to Identify the Elastic-Plastic Material Properties of Al-Based Functionally Graded Materials H. Okada, Y. Fukui, N. Kumuzawa and Y. Nakagawa	913
Oxidation Behavior of Si-Ti-C-O Fiber-Bonded-Ceramics N. Tohyama, B.N. Kim, M. Enoki and T. Kishi	919
Simulation of Crack Propagation with Microcracking in Al₂O₃ Particle-Dispersed SiC Composites M. Watanabe, B.N. Kim, M. Enoki and T. Kishi	925
Mechanical Properties of a NiTi-Based Smart Composite W.B. Lee, M. Jie and C.Y. Tang	931
Experimental Study on Dynamic Crack Propagation of Steel Fiber Reinforced Concrete Y. Ma, X.H. Guo, Y.M. Sun and X.F. Shu	937
Fracture Systems Caused by Mechanical Indentation in Medium or Hard Rocks S.Q. Kou	941
Computational Estimation of Tensile Strength of Lightweight Concrete and its Application to Material Design M. Katagiri and H. Sekine	947
Peak Strength of Replicated and Real Rocks Containing Cracks R.H.C. Wong and K.T. Chau	953
Nondestructive Evaluation of Cracks and Elastic Constants of Concrete Using Transient Elastic Waves T.T. Wu and J.S. Fang	959
Tensile Strain Hardening Behavior of Cementitious Composites Reinforced with Short Steel Fibres F.M. Li and Z.J. Li	965
Electroelastic Analysis of a Partially Debonded Inhomogeneity in Piezoelectric Materials Z. Zhong	971
A Nonlinear Constitutive Theory for Ferroelectrics X.Q. Chen and D.N. Fang	977
A Constitutive Theory for Ferroelectric Ceramics W. Lu, D.N. Fang and K.C. Hwang	983

Fracture, Fatigue and Domain-Switch of Ferroelectrics under Electric and Mechanical Loading	
T. Zhu and W. Yang	989
On Multiple Circular Piezoelectric Inclusions Embedded in an Intelligent Material	
C.K. Chao	999
Electromechanical Response of Cracks in Piezoelectric Materials under Combined Mechanical and Electrical Loadings	
S. Kumar and R.N. Singh	1005
Mechanical Properties Analysis of Piezoelectric Smart Structures	
Y.P. Shen, C.Q. Chen, X.M. Wang, Z.K. Wang and Y.C. Zhang	1011
Energy Release Rate for a Crack or a Cavity in a Piezoelectric Material	
T.Y. Zhang	1021
Environmental Embrittlement of a Ni-22.6Al(at%) Intermetallics	
S.J. Gao, J.Q. Su and Z.Q. Hu	1031
Effects of Stress Concentration Factors on Corrosion Fatigue Strength of a Steel Plate for Ship Structures	
Y. Kobayashi, Y. Tanaka, H. Goto, K. Matsuoka and Y. Motohashi	1037
Retrogression and Reaging Revisited	
W. Wallace, R.T. Holt, C. Butler and D.L. DuQuesnay	1043
In Situ TEM Observations of Liquid Metal Embrittlement of Al Single Crystals in HG + 3 atm% Ga	
Y.J. Su, Y.B. Wang and W.Y. Chu	1053
Investigation of Tensile Stress Induced by Oxide Film During Corrosion Process for α-Ti	
H. Lu, K.W. Gao and W.Y. Chu	1059
Analysis and Design of Pressure Washer Drums for Pulp and Paper Industry	
M.S. Gadala, S. Fok and M. Tayler	1065
Several Issues Concerning Reliability Assurance of Equipment for Nuclear Power Plants	
Q.K. Wu, B.G. Nie, C.Q. Li and P. Li	1071
Estimations of Total Life in Whole Fatigue-Damage-Fracture Process of Structures and their Components under Many-Stage Loading Conditions	
Y.G. Yu, Z.H. Li and W.G. Pan	1077
Adjustable Real-Time Interval Digital Shearography and its Applications	
J.B. Dai, Z.D. Liu and Z.Y. Peng	1083
Applications of Long Distance Microscope (LDM) in the Testing of Fracture Mechanics	
X.W. Sun, H.M. Jin, X. Hua and N.H. Liu	1089
A Study on the Development of Photoelastic Experimental Hybrid Method for Fracture Mechanics	
J.S. Hawong, D.C. Shin and H.J. Lee	1095
Methodology and Illustrations for Material Design against Fractures	
J.M. Xiao	1105
Self-Organization of Mechanical Structure by Cellular Automata	
N. Inou, T. Uesugi, A. Iwasaki and S. Ujihashi	1115
Experimental Measurement of Fast Branching Cracks	
T. Nishioka, T. Kishimoto and K. Sakakura	1121
Thermal Stress Analysis of a PQFP Moulding Process: Comparison of Viscoelastic and Elastic Models	
J.H. Park, J.K. Kim, M.M.F. Yuen, S.W.R. Lee, P. Tong and P.C.H. Chan	1127
Effects of Temperature Profile on the Life Prediction of PBGA Solder Joints under Thermal Cycling	
X.W. Zhang and S.W.R. Lee	1133
Detection and Characterization of Cracks and Corrosion in Aging Aircraft Structures (Part 1)	
J.D. Achenbach	1139
Detection and Characterization of Cracks and Corrosion in Aging Aircraft Structures (Part 2)	
J.D. Achenbach	1149
Evolution of Orientation Hardening in the Cold Rolling of an AA3003 Aluminium Alloy Sheet	
W.B. Lee and X.Y. Wen	1161

Mode III Crack in the Piezoelectric Layer of Two Dissimilar Materials

J.X. Liu, B.S. Wang and S.Y. Du

1167

Strengthening of Wire Electro-Discharge Machined SiAlON Ceramic by Quenching

T.C. Lee, J.H. Zhang and C.Y. Tang

1173