Table of Contents

Preface

Chapter 1: Mechanical and Fatigue Properties of Structural Materials

Research on Brittle Fracture of X70/X80 Line Pipes with Big Wall Thickness at Low	
Temperature H.T. Wang, S.L. Li, Y.L. Luo, J.Q. Wang, H.B. Zhang and N. Lin	3
Initiation and Propagation Behaviors of Small Fatigue Crack in Titanium Alloy TC4 L. Zhu, X.T. Hu, R. Jiang, Y.D. Song and S.D. Qu	9
Calculation of Diffusion Coefficients in γ-Ni y. liu, Q.S. Wang, R.C. Thomson and S. Kenny	15
A Novel Method to Predict the Mechanical Properties of DP600 Y.Q. Peng, L.X. Cai, D. Yao, H. Chen and G.Z. Han	22
Low Cycle Fatigue Behavior of CP-Ti at Different Temperatures T.H. Ma, L. Chang and C.Y. Zhou	29
Deformation Features of a High Mo Nickel-Based Single Crystal Superalloy during Creep at High Temperature H.J. Yan, S.G. Tian, G.Q. Zhao and S.K. Zhang	35
Effect of Ratcheting Strain on Mechanical Properties of Additive Manufactured 4043 Aluminum Alloy	
Y. Wang, S.L. Yang, J.X. Gu, C.F. Duan and Q. Xiong	43
Microstructure and Mechanical Characterization of Laser Welded 6013 Aluminum Alloys Overlap Joint	
J.X. Gu, S.L. Yang, C.F. Duan, Q. Xiong and Y. Wang	49
Evolution of Impact Properties of 16MND5 Forgings for Nuclear Reactor Pressure Vessel during Thermal Aging at 500°C R.S. Xing, X. Chen and D.J. Yu	54
Fatigue Life Properties of Stainless Steels in Wide Ranged Biaxial Stress State	34
S. Saito, F. Ogawa and T. Itoh	60
Investigation of Mechanical Properties and Ductile-Brittle Transition Behaviors of SA738Gr.B Steel Used as Reactor Containment Y.L. Zhang and H. Hui	66
Research on the Micro-Mechanical State at Tip of Environmentally Assisted Cracking Based on Latin Hypercube Sampling Method K. Zhao, H. Xue and L.Y. Zhao	74
A more Accurate Constraint Parameter to Characterize the Creep Constraint Effect at Crack Tip of Cr-Mo-V Steel Y. Luo, Q. Zhang and W.C. Jiang	79
The Precipitation Behavior and Mechanical Properties of Long Term Serviced HR3C/T92	1)
Dissimilar Joint Y. Guan, T.S. Cao, C.Q. Cheng and J. Zhao	86
Effects of Curing Temperature and Pressure on the Mechanical Properties of Gasket Material Used for Polymer Electrolyte Membrane Fuel Cells R.D. He, Z.Q. Wang, J.Z. Tan, L. Yin and Z.H. Liu	93
Study on Stress Corrosion Cracking Sensitivity of CrNiMoV Steam Turbine Rotor Steels S.X. Lin, Y.H. Huang, F.Z. Xuan and S.T. Tu	102
Low Velocity Impact Responses of GLARE Hybrid Laminates Based on Simplified Finite Element Model Z.W. Wang, J.P. Zhao and S. Wang	109
Experimental Study on Peeling Properties of T Type Brazing Joint P.Y. Duan, D.X. Wang, G.Y. Zhou and S.T. Tu	116
Creep Damage of a Re/Ru-Containing Single Crystal Nickel-Based Superalloy at Elevated	110
Temperature G.Q. Zhao, S.G. Tian, S.K. Zhang, N. Tian and L.R. Liu	123

An Improved Omega-Based Method for Creep Life Prediction Using Hyperbolic Sine Stress Correlation	
X. Yang, R. Barrett, S.B. Leen and J.M. Gong	130
The Effect of Surface Self-Nanocrystallization on Low-Temperature Gas Carburization for AISI 316L Steel Z. Liu, Y.W. Peng, J.M. Gong and C.M. Chen	137
Determination of Ratio of Yield Strength and Reduced Modulus during Cold Work Processing in 304 Austenitic Stainless Steel	
K. Li, H. Xue, K. Zhao, S. Wang, T. Wang and R.H. Song	145
Effect of Pre-Strain on Small Punch Creep Test of 316L Stainless Steel at 373K K.S. Li and J. Peng	152
Creep Void Formation and Rupture Lifetime in Multiaxial Stress States M. Sakane, H. Kobayashi, R. Ohki and T. Itoh	159
Determination of Material Fracture Toughness by Circular Pre-Cracked Small Punch Test Specimens W.L. Wang, D.W. Wang and K.S. Guan	165
Multiscale Modeling of a Notched Coupon Test for Triaxially Braided Composites Y.Q. Hu and W.K. Binienda	172
Modelling of Hysteresis Behavior of Ceramic Matrix Composites X.F. Teng, D.Q. Shi and X.G. Yang	180
Comparison of Tensile Properties of 1.25Cr-0.5Mo Steel Characterized by Miniature Specimen and Standard Specimen B. Yang, W.C. Jiang and W.Q. Sun	188
Experimental Study on High Temperature Creep Damage of 1Cr5Mo Steel Based on Magnetic Parameters	104
G.X. Gao, S.S. Shao, G.T. Shen, F.K. Zhuang and Z.F. Li Evaluation for Properties of Anti-Corrosion Epoxy Coating after Photo-Oxidation Aging	194
B. Zhao, Y.X. Yu, T.Y. Zhou, S.W. Zhou, J. Guo and T. Xu Effects of Building Orientation on Fatigue Behavior of Ti-6Al-4V Alloy Produced by	200
Selective Laser Melting R.D. Xu and H.C. Yu Anisotropia Floria Constants Colonlation of Stainless Steel Cladded Levers of Pressure	208
Anisotropic Elastic Constants Calculation of Stainless Steel Cladded Layers of Pressure Vessel Steel Plate J.L. Xue, J. Bouchard, X.D. Chen, Z.C. Fan and Y. Zhou	215
Chapter 2: Structural Integrity Assessment of Components and Systems	
Reliability Calculation Method for Natural Gas Pipelines with Girth Weld Defects Identified through In-Line Inspection M.F. Li, J. Chen, Z.Q. Lei, H.L. Zheng and Z.R. Li	225
A Study on the Safety Factor for Corrosion Assessment of Oil and Gas Pipeline through In- Line Inspection	
J. Chen, M.F. Li, J.H. Wang and X.L. Wang Microstructural Characterization and Property Evaluation of Service Exposed Reformer	233
Tubes Z.Y. Han, G.H. Sun, G.S. Xie, L.W. Cao and Z.J. Li	239
Sealing Performance Evaluation for Bolted Flange Joint with Spiral Wound Gasket Based on the Bolt Force	246
F.K. Zhuang, X.P. Li, G.S. Xie, J. Shi and Y. Wang The Fatigue and Fracture Analysis of Steam Turbine Rotor Shafts Containing Defects S. Wang, W.Q. Wang, M.D. Song and H. Zhang	254
The Method of Design by Analysis for Cylindrical Pressure Vessels with Spherically Dished Head	231
Z.Y. Wang, J. Wu, M.D. Xue and S.Y. Li	262
Stress and Fatigue Analysis of Pressurizer Surge Line under Thermal Stratification P. Tang, Z.W. Liu, H. Qiao and P.Z. Li	268
A Parametric Investigation of the Through-Thickness Residual Stresses in the Thick Weld Plate Considering Back Chipping: Neutron Diffraction and Finite Element Method Y. Wan, W.C. Jiang and J. Li	276

Burst Strength Study of Glass-Fibre Reinforced Composite Pipes by Simulation and Theoretical Analysis	
Q. Zhang, W.C. Jiang and Y.T. Zhang	32
Analysis on Bursting of Rupture Disc Made by Inconel 600 Alloy J.Q. Tang, L.Y. Geng and J.M. Gong	€0
Effects of Hydroforming Process on Fatigue Life of Reinforced S-Shaped Bellows Z. Yuan, S.H. Huo and J.T. Ren) 6
Durability Airworthiness Verification Connotation Analysis and Compliance Method Investigation for Turbine Blade	
G.F. Hu, Z. Li, D.Q. Shi and X.G. Yang 30 10 10 10 10 10 10 10 10 10)4
Investigation on Creep Properties of Welded Joint of Modified 9Cr-1Mo Martensitic Heat- Resistant Steel F.C. Ren, X.Y. Tang and J. Si	12
Tracking Supervision of Service Performance and Life Assessment of Defective 15Cr1Mo1V Steel Pipeline	
X.X. Xia, B.Y. Zhu, G.D. Zhang and J.H. Shi	18
Progressive Failure Analysis of an Integral Composite Joint for Thrust Reverser Cascade J.S. Yang, H.Y. Qi, X.G. Yang and D.Q. Shi	25
Influence Factors of Fracture Mechanics Analysis of Reactor Pressure Vessel under Pressurized Thermal Shock	
J. Luo and J.C. Luo Failure Analysis of Hot Clamp Induced Cracking on Hydrogen Reformer Outlet Pigtail	55
Tubes L.W. Cao, G.S. Xie and M.Z. Zhao 34	40
The Study of Inspection and Supervision for Overage Service Pressure Vessels in Petrochemical Plants	
J. Si, J.S. Xu, Y.Q. Yang, X. Wen and X.Y. Tang	1 6
Fatigue Behavior of Metal-Packaged Regenerated Fiber Bragg Grating Strain Sensors at High Temperatures: A Preliminary Study H. Xu, Y. Tu, Y.L. Wang and S.T. Tu 35	52
Chapter 3: Theoretical Basis and Development of Structural Integrity Assessment Methods	
Simulation Implementation on the Direction Prediction of Crack Propagation Based on the First Principal Stress C.M. Liu, D.J. Yu and X. Chen	51
J-Resistance Curve Testing Using Modified Normalization Method for SENT Specimens Z. Liu, X. Wang and X. Chen	
Effect of Material Property Difference on the Creep Behavior of Bending Specimen F.K. Zhuang, S.T. Tu, G.S. Xie and L.W. Cao	75
A Novel Fatigue Evaluation Approach with Direct Steady Cycle Analysis (DSCA) Based on the Linear Matching Method (LMM)	
X.T. Zheng, Z.Y. Ma, H.F. Chen and J. Shen Effects of T-Stress on Fracture Behavior of Central-Cracked Stiffened Plate	
X.L. Huang and Y.H. Liu Characterization of Mismetch Constraint Effect for the Central Creek Plate under Pieriel	39
Characterization of Mismatch Constraint Effect for the Central Crack Plate under Biaxial Loading H. Peng and Y.H. Liu 39	95
Effect of Orthotropic Mechanical Property on the Limit Load of Cylindrical Shell under Internal Pressure	
C. Miao, F. Lv, C.Y. Zhou and X.H. He)1
Estimation of Residual Stress and Plastic Properties of a Material without Plastic Plateau by Using Continuous Spherical Indentation	20
Z.Y. Wang and J.P. Zhao Numerical Simulation of Residual Stress in P91 Repair Welding Incorporating Martensitic	J9
Transformation Z.X. Hu, J.P. Zhao and Y.J. Zhang 41	16

Study on Sufficiency of Reference Stress Solutions for Crack-Like Flaws for Fitness-for- Service Evaluation	424
N. Miura and K. Oyamada	424
The Method to Obtain J _R - Curve by Continuous Ball Indentation Method J.M. Zhang, K.S. Guan, Q.Q. Wang, S.N. Fan and G.Y. Chen	432
Demonstrating Structural Integrity under Challenging Load and Material Conditions C. Timbrell, R. Chandwani and C.L. Ma	439
Crack Tip Stress Analysis of the Steam Generator Dissimilar Steel Welded Joint under Residual Stress Field	
B.Y. Zhu, X.X. Xia, H. Zheng and G.D. Zhang	451
A Multi-Surface Plasticity Method for Lower Bound Shakedown Load A. Jappy, D. Mackenzie and H.F. Chen	458
Recent Developments in Small Punch Testing: Interlaboratory Tests and Standardization O. Bursik, R. Kopřiva, P. Petelova and B. Maresova	466
A Hybrid Method for Detection and Diagnosis of Faulty Roller Bearings F. Xu, Z.S. Jiang and H. Jiang	473
Novel Method to Improve the Imaging Accuracy of Defect Based on Zero-Signal Filling for the Plate	
S.M. Zhai, S.J. Chen, G.Y. Hu, C.F. Chen and S.P. Zhou	479