Table of Contents

Preface, Committees and Sponsors

Chapter 1: Scientometric	Researches	in Area	of V	/ery	High	Cycle
Fatigue						

The most Influential Articles in Very High Cycle Fatigue Q.Y. Wang and M.K. Khan	3
Construction of Electronic Factual Database on Very High Cycle Fatigue Properties for Structural Metallic Materials T. Sakai, K. Hanaki, A. Sakaida, K. Okada, Y. Nakamura, K. Mukoyama, N. Oguma, T. Matsumura, Y. Shimamura and A. Ueno	12
The Top 10 Influential Articles in Very High Cycle Fatigue Y.J. Liu, M. Kashif Khan and Q.Y. Wang	22
Chapter 2: Advancements in Very High Cycle Fatigue Instrumentations	
Energy Dissipation in Very High Cycle Fatigue for Polycrystalline Pure Copper and Armco Iron	
A. Blanche, C. Wang, N.L. Phung, N. Ranc, V. Favier, D. Wagner, C. Bathias and A. Chrysochoos	33
Three Point Bending Fatigue of Carbon Fiber Fabric Reinforced Polyphenylensulfide in the Very High Cycle Fatigue Regime D. Backe, F. Balle and D. Eifler	47
Thermal Dissipation Calculation in Very High Cycle Fatigue Z.Y. Huang, C. Wang and Q.Y. Wang	55
On the Research and Application of Ultrasonic Fatigue Testing Technology W.J. Peng, Y. Wang, H. Xue and J. He	62
Chapter 3: Advanced Materials on Very High Cycle Fatigue	
Very High Cycle Fatigue and Damage Behavior of Ti6Al4V S. Heinz and D. Eifler	71
Effect of Shot Peening on the Long Life Fatigue Properties of Ti6Al4V with Different Heat Treatment	
X.J. Cao, L.P. Xu, C. Wang, J. Jin and Q.Y. Wang Study on Very-High-Cycle-Fatigue Property of Aero-Engine Blades Based on	81
Subcomponent Specimen S.B. Jiao, L. Cheng, Q.T. Li and X.W. Li	87
Ultra-High Cycle Fatigue Behavior of DZ125 Superalloy Used in Turbine Blades Y.L. Gu and C.H. Tao	96
Study on the Fatigue Properties of the TIG Weld Joint with the Stainless Steel Conduit in Aircraft	
Y. Liu, D.J. Li and X.H. Li	104
Effects of Stress Concentration on Fibre Reinforced Composites C.S. Dong	111
Evaluation of Very High Cycle Fatigue Properties of Low Temperature Nitrided Ti-6Al-4V Alloy Using Ultrasonic Testing Technology S. Kikuchi, S. Heinz, D. Eifler, Y. Nakamura and A. Ueno	118

Chapter 4: Influence of Environment and Temperature

Effect of Temperature and Loading Frequency on the Fatigue Behavior of Ti-17 J.K. Li, Y.J. Liu, Q.Y. Wang and F. Hou	131	
VHCF Strength of Helical Compression Springs - Influence of Heat Treatment Temperature before Shot Peening I. Brunner, D. Veleva, J. Beyer and M. Oechsner	140	
Influential Factors for Very High Cycle Fatigue Behavior of Metallic Materials Y.X. Yu, B.L. He, Z.M. Lv, K. Wei and Z.J. Zhang		
Impact of High-Pressure Gaseous Hydrogen on the Fatigue Behaviour of Austenitic Steel A-286 under Asymmetric Loading Conditions M. Bruchhausen, B. Fischer, A. Ruiz, P. Hähner and S. Soller	156	
Essential Characteristics and Frequency Effect for Very High Cycle Fatigue Behavior of	100	
Steels Z.M. Lv and B.L. He	168	
Chapter 5: Influence of Small Damages Conditions		
Dislocations Gliding Study by IR Thermography in C-Mn Steels with Different Solute Atoms Content in the Gigacycle Fatigue Domain Z.Y. Huang, N. Ranc and D. Wagner	177	
Estimation of Fatigue Limit in Interior Inclusion Induced Fracture Mode for Bearing Steel	1,,	
in Rotating Bending N. Oguma, N. Sekisugi, Y. Odake and T. Sakai	188	
Fatigue Behavior of Riblet Structured High Strength Aluminum Alloy Thin Sheets at Very High Cycle Numbers S. Stille, T. Beck and L. Singheiser	199	
Interior-Induced Fracture Mechanism of High Cleanliness Spring Steel (JIS SWOSC-V) in		
Very High Cycle Regime T. Miura, T. Sakakibara, T. Kuno, A. Ueno, S. Kikuchi and T. Sakai	209	
Chapter 6: Microstructure and Initiation Mechanism		
A Study on Very High Cycle Fatigue Property of High Strength Steel for Particular Use as Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto	221	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime	221	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses	231	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel		
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai	231	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime	231 246	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai Experimental Investigation and Simulation of the Fatigue Mechanisms of a Duplex Stainless Steel under HCF and VHCF Loading Conditions	231 246 255	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai Experimental Investigation and Simulation of the Fatigue Mechanisms of a Duplex Stainless Steel under HCF and VHCF Loading Conditions B. Dönges, C.P. Fritzen and H.J. Christ Failure Mechanism of Very High Cycle Fatigue for High Strength Steels	231246255267	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai Experimental Investigation and Simulation of the Fatigue Mechanisms of a Duplex Stainless Steel under HCF and VHCF Loading Conditions B. Dönges, C.P. Fritzen and H.J. Christ Failure Mechanism of Very High Cycle Fatigue for High Strength Steels K. Wei and B.L. He	231246255267	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai Experimental Investigation and Simulation of the Fatigue Mechanisms of a Duplex Stainless Steel under HCF and VHCF Loading Conditions B. Dönges, C.P. Fritzen and H.J. Christ Failure Mechanism of Very High Cycle Fatigue for High Strength Steels K. Wei and B.L. He Chapter 7: Life Prediction and Modeling Statistical Estimation of Duplex S-N Curves D.S. Paolino, A. Tridello, G. Chiandussi and M. Rossetto Statistical Duplex S-N Characteristics of Bulk Amorphous Alloy in Rotating Bending in	231246255267275	
Medical Tablets Compressing Punches T. Sakai, A. Kokubu, S. Kikuchi, H. Tanaka, F. Ikai and K. Okumoto Ultrahigh Plasticity Behavior of Metallic Materials in the Ultra-High-Cycle (or Gigacycle, Very-High-Cycle) Fatigue Regime A. Shanyavskiy VHCF Behavior and Word Hardening of a Ferritic-Martensitic Steel at High Mean Stresses T. Beck, S.A. Kovacs and F. Ritz Fatigue Crack Initiation and Propagation Behaviors in Rotating Bending of SNCM439 Steel in Very High Cycle Regime A. Nakagawa, B. Lian, T. Kondo, D.P. Romilly, N. Oguma, M. Jono and T. Sakai Experimental Investigation and Simulation of the Fatigue Mechanisms of a Duplex Stainless Steel under HCF and VHCF Loading Conditions B. Dönges, C.P. Fritzen and H.J. Christ Failure Mechanism of Very High Cycle Fatigue for High Strength Steels K. Wei and B.L. He Chapter 7: Life Prediction and Modeling Statistical Estimation of Duplex S-N Curves D.S. Paolino, A. Tridello, G. Chiandussi and M. Rossetto	231246255267275	

Simulation of the Interaction of Plastic Deformation in Shear Bands with Deformation-	
Induced Martensitic Phase Transformation in the VHCF Regime	
P.M. Hilgendorff, A. Grigorescu, M. Zimmermann, C.P. Fritzen and H.J. Christ	314
Influence of High-Cycle Fatigue on Crater Wear Characteristics of Cemented Carbide Tool X.Q. Song, J. Saigawa and T. Ihara	326