

# Table of Contents

## Preface and Committees

## Chapter 1: Material Application and Structure in Civil Engineering

<b>Literature Review of Precast Concrete Frame Structures in Civil Engineering</b> K.W. Ding and X. Zhang	3
<b>Experimental Study on Fire Resistant of Shield Tunnel Segment in Civil Engineering</b> X.J. Guo, Z.S. Xu and Y. Zhang	7
<b>Study on the Pyrolysis Kinetics Characteristics of the Wood from the Ancient Buildings</b> X. Zhang and F. Zhang	13
<b>Practical Research on Desulfurization in Converter with the Analysis of Sulfur in Steel for Civil Engineering</b> D.G. Zhao, J.S. Li, S.H. Wang, H.W. Liu, Z.X. Tong and F.P. Wu	17
<b>An Analysis on Engineering Properties of Peaty Soil in Kunming Civil Engineering</b> Z.X. Yu, J. Cao and H.M. Zhao	21
<b>The Microstructure and Performance Analysis of HRB400 Rebar Manual Arc Welding Joints with Rebar Materials in Civil Engineering</b> M. Zhang, X. Zhang, C.C. Wu and M.M. Xi	27
<b>Analysis of Soil Moisture Characteristics with the Application of Soil in Civil Engineering in 2011 in Gaoyao</b> L.L. Fan	31
<b>Study on Indoor Thermal Environment with Building Materials of Urban Residences in Zhejiang Region: Summer Investigation</b> J.H. Ma and Y. Gao	35
<b>Analysis of Two Cross Arm of Reactive Powder Concrete Pole Design with Structure Materials in Civil Engineering</b> Y.Z. Jia and L. Lin	39
<b>Research on Material Properties and Heat Treatment of Clamping Blocks</b> X.Q. Chen, G.L. Jiang and G.Z. Cheng	43
<b>The Current Situation and Analyze of Huizhou Traditional Architectural Components and Materials to Repair Alternative Techniques</b> Q. Sun and G. Chen	47
<b>Synthesis of an Intumescent Flame Retardant and its Application to Fireproof Coatings of Steel Structures</b> X. Zhang, F. Zhang and C.L. Yin	52
<b>Contrastive Analysis on Limitation Span between Suspension Bridge Using Steel and CFRP Cable</b> Y. Jiang and L.J. Jia	57
<b>The Research about Plastic Cement Playground and Constructed Materials</b> J.Y. Hou, S.Q. Zhang and Z.Y. Xia	61
<b>Simulation and Analysis on Supporting System of Composite Soil Nailing Technology in the Process of Digging</b> B. Guo	66
<b>Exploration of the Strategies in Civil Engineering to the Safety Evaluation and Reinforcement Technique of Wood Structure of Ancient Architecture in Huizhou</b> Q. Sun and W. He	71
<b>Structural Design on a Building Stair by Folded Steel Plates in Civil Engineering</b> S.C. Li, Y. Qian and Y. Liu	76
<b>Test of Solidification Characteristics of Grouting and the Effect on Strata Deformation in Shield Tunnelling</b> X.C. Zhong, W.K. Qin and H. Wang	80
<b>Seismic Damage Analysis and the Study of Reinforcement Measures for RC Frame Structure Building in Civil Engineering</b> M. Gao	85

<b>Influence of C/N Ratio on SND and Microbiological Analysis in Catching Bed Biofilm Reactor Using Acrylic Resin Fiber as Carrier Materials in Civil Engineering</b>	89
Y. Zhang, Z.Y. Yang, L.L. Wang, X.Y. Zhao, H.G. Liu and M. Zhu	
<b>Study on Reconstruction of Elevation Structural Shape for Historic Industrial Buildings in Chinese Civil Engineering</b>	94
Y. Liu	
<b>Bored Pile Settlement Analysis of Pile End Grouting in Civil Engineering</b>	99
S.H. Li, Q.X. Lin and J. Wu	
<b>Study on Parameter Optimization of Copper Smelting in Civil Engineering</b>	103
X.L. Zhang, S.W. Yao, J.H. Hu and H. Wang	
<b>Cantilever Construction Optimization of Cable-Stayed Bridge with Hybrid Bridge Deck System and Building Materials in Civil Engineering</b>	107
Y.W. Dai, Y.Y. Wang and Z.X. Li	
<b>Study on the New-Style Building Materials in Civil Engineering — Architectural Sandwich Panel and its Application</b>	112
L. Pan and C. Han	

## **Chapter 2: Mechanics Research in Civil Engineering and Material Engineering**

<b>Study on the Resistance of Structural Optimization of Pipeline Elbow in Civil Engineering</b>	119
H.M. Sun and Z.L. Zan	
<b>Finite Element Analysis of Dual-Angle Variable of Four Steel Angle Composite Joint with Steel Materials in Civil Engineering</b>	125
Y.Z. Jia and L. Zhao	
<b>Effect of the Inhomogeneity of a Substratum Soil on Longitudinal Settlements of a Shield Tunnel</b>	129
Q. Yang, J.X. Zhang and G.N. Zhang	
<b>The Detection Research of Tension about Vertical Prestressed Fine Rolled Twisted Bar in Box-Girders Construction of Civil Engineering</b>	134
X.Y. Lin, Y.F. Wu, W.W. Wang and F. Zhang	
<b>The Dynamic Analysis of Concrete Pump Truck Arm in Civil Engineering</b>	138
L. Dai, Y.G. Li, Y. Liu and J. Wang	
<b>Research on the Methods of Determination of Characteristic Strength of Brittle Rock Materials in Compression Test</b>	142
B. Wang, J.B. Zhu and A.Q. Wu	
<b>Effect of Dynamic Loading on Mechanical Properties of Concrete</b>	147
J.W. Deng, C.W. Liu and J.F. Liu	
<b>Typical Calculation Method of Stress Intensity Factors and Crack Growth Criteria on Infinite Plate Containing Hole-Edge Cracks</b>	154
J.F. Zhao and Q. Zhao	
<b>Study on Determining Method of Rig's Hydraulic Pressure in Civil Engineering</b>	159
Y.B. Sha, X.Y. Zhao and L.D. Wang	
<b>Effect of Variant Water Pressure Loading on Soil Improvement by Vacuum Preloading Technique in Civil Engineering</b>	163
A.M. Liu and S.W. Yan	
<b>The Research of Pure Bending Flanged Beam's Stress Distribution in Civil Engineering</b>	168
J.O. Pan, Y.J. Jia and G.Z. Cheng	
<b>Analysis of Load Transfer Mechanism with Rock-Soil Anchoring Technology in Soil Tension-Type Prestressed Anchor for Civil Engineering</b>	172
X.Y. Wang, J. Cao and H.X. Zuo	
<b>Calculation of Water-Soil Pressure of Silt Layer in the Foundation Pit Considering the Seepage Effect</b>	176
B.J. Zhang, J. Cao and X.Z. Zhang	
<b>Analysis Research Progress on the FRP Reinforced RC Beam-Column Joints in Civil Engineering</b>	182
J. Han and H. Yuan	

<b>Material Mechanical Performance about Worm Bending and Twisting Deformation for Civil Engineering</b>	187
X.Q. Chen, G.L. Jiang and G.Z. Cheng	
<b>The Fractal Research of 16MnR Steel Fatigue Fracture after High Temperature</b>	191
S. Zhang and A.Z. Liu	
<b>Mechanics Behavior Analysis of K Type Flashboard Node of Transmission Tower in Civil Engineering</b>	196
Y.Z. Jia and D. Luo	
<b>Study on the Effective Slab Width of Composite Cable-Stayed Bridge under Axial Force</b>	200
X.N. Wu, X.L. Zhai and M.M. Zhou	
<b>Research and Realization of Air Leak Test System in Civil Engineering Based on Virtual Instrument and Equipment Materials</b>	204
C. Wang and S.J. Zhao	
<b>Analysis and Depiction of the Dynamical Characteristic of Burning Zone Temperature in Rotary Kiln of Cement Material Production</b>	208
W.Q. Ge, B. Xiang and P. Zhou	
<b>The Design of Disc Brake for Mine Hoist in Civil Engineering</b>	212
H.T. Zhang, Y.J. Dai, Y.J. Jia and G.Z. Cheng	
<b>Numerical Analysis of Shear Stress on Adhesive Joint between FRP and Steel Structure in Civil Engineering</b>	216
S.K. Zhang, P.Y. Huang, H. Zhou and C.Y. Zhao	
<b>The Safety Analysis for Underground Tunnel of Civil Engineering by the Stress and Deformation of Rock Mass Material</b>	222
X.G. Xie, Z.Y. Yu and Z.B. Jiang	
<b>The Anisotropy Characteristic of Rock Material Described by the Stress Softening Criterion in Civil Engineering</b>	226
H.B. Zhang and Q.Y. Liu	
<b>Material Stress Analysis of Hydraulic Support in Deeply Inclined Top Coal Caving Face Based on Virtual Prototyping Technology</b>	230
L.M. Cao and W.M. Zhao	
<b>Meso-Damage of Emulsified Asphalt Concrete Based on CT Test under Continuous Uniaxial Compression</b>	234
Y. Shi, X.H. Yan, H.Q. Yang and S.S. Peng	
<b>Simulation of the Cracking Behavior for Fiber Reinforced Composite Materials with Different Inclusion Quantity</b>	238
J.X. Luo	
<b>Research on Influence of the Bank Slope on the Acceleration Distribution of the Central Points of Concrete-Faced Rockfill Dam</b>	242
H. Zhou, P. Hu and R.C. Xiao	

### **Chapter 3: Environmental Material and Civil Engineering**

<b>Study on the Thermal Properties of the Wood from the Ancient Buildings</b>	251
X. Zhang and F. Zhang	
<b>Finite Element Analysis on Contact Surface Slip of Profiled Steel Sheet and Composite Slab</b>	256
L. Liu, F. Wang and K. Wang	
<b>A PCR-DGGE Approach to Evaluate the Influence of Environment Materials for Civil Engineering-Different Carbon Sources on a Catching Bed Biofilm Reactor in Start-up Phase</b>	260
Y. Zhang, L.L. Wang, Z.Y. Yang, X.Y. Zhao, H.G. Liu and M. Zhu	
<b>Discussion on Green Building Materials</b>	265
X.Q. Yu, M. Lin, L. Jia, Y.S. Lu and N. Wei	
<b>Study on Energy Material Application in Changchu City for the Low-Carbon Economy Development</b>	269
X.Z. Tong, T. Liu, H.Q. Liu, H.Y. Duan and X.E. Wang	

### **Chapter 4: Material Engineering and its Application Technology**

<b>Impact of Degree of Polymerization Combination on Structure and Properties of Cellulose Membrane</b>	
J.B. Li, M.Y. Zhang, H.J. Xiu and X.P. Li	275
<b>Effect of NaH<sub>2</sub>PO<sub>4</sub>, Na<sub>2</sub>HPO<sub>4</sub>, MgSO<sub>4</sub>, and Ascorbic Acid on Survival of <i>Lactobacillus acidophilus</i> during Freeze-Drying</b>	
H. Chen, Z.X. Ma, G.W. Shu and T. Qin	279
<b>Effect of some Materials on Growth of <i>B. longum</i> and <i>B.adolescentis</i></b>	
P. Sun, Q.L. Yu, G.L. Pei and X.F. Sun	283
<b>The Flame Retardant Synergism between Cobalt Complexes and Ammonium Polyphosphate in Cottonwood</b>	
L.P. Yuan, G.Y. Wu, G. Tian and Y.C. Hu	287
<b>Study on Interface Failure of Propellant and Liner Material with Mechanics Analysis</b>	
A.M. Jiang, G.C. Li and A.P. Tian	291
<b>Study on Synthesis and Characterization of AgCl Microparticle Materials Based on One-Step Solution Phase Route</b>	
J. Liao, K. Zhang, W.Z. Wang, Y.G. Wang and L. Yu	295
<b>Synthesis and Antioxidant Behavior of Carbon-Coated Copper Nanoparticles</b>	
J. Chen, H.Y. Zhang, X.P. Liu and L.P. Li	299
<b>Influence of Heat Treatment on the Magnetism of Carbon Coated Iron Nanoparticles</b>	
J. Chen and H.Y. Zhang	303
<b>Preparation and Performance of Porous Silica of Sound-Absorbing Coating</b>	
J. Chen, X.G. Wang, M. Zhang, A.X. Guo and L. Tang	307
<b>Finite Element Analysis of Creep Behavior of AZ91D Magnesium Matrix Composites Reinforced with Aluminum Silicate Short Fibers</b>	
J. Tian, S.Y. Zhong and Z.Q. Shi	311
<b>Aluminum Alloy Plate with a Hole Fracture Experiment and Numerical Analysis</b>	
C.F. Duan, W. Li and J.L. Zhang	315
<b>TiO<sub>2</sub> Nanotubes of Inorganic Functional Materials Research Progress</b>	
X. Zhou, Q. Wen, Q.L. Shu and W.P. Xiong	320
<b>Analysis of Inclusion Microstructure in Material Engineering of Steel</b>	
D.G. Zhao, S.H. Wang and M.J. Guo	324
<b>Combustion Process's Kinetics Study of Biomass and its Cellulose Based on Biomaterials in Material Engineering</b>	
C.C. Zhang, H.J. Lu and X. He	328
<b>Study on BaO-Bi<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> Glasses in Material Engineering with Electronic Polarizability and Optical Basicity</b>	
X.Y. Zhao, D.W. Yu, X. Han and X.L. Wang	332
<b>Research on Oxyfluoride Glasses in Material Engineering with Optical Basicity and Electronic Polarizability</b>	
X.L. Wang, D.W. Yu, X. Han and X.Y. Zhao	336
<b>Study on Lanthanide Oxides Materials in Material Engineering with a New Method</b>	
X.L. Wang, D.W. Yu, X. Han and X.Y. Zhao	340
<b>Analysis for Modeling of Molten Carbonate Fuel Cells Material Characteristics</b>	
Y.D. Tian	344
<b>Growth Mechanism and Characterization of Porous CuS Microspheres</b>	
S. Xu, N. Song, C.L. Qiu, Y.P. Zhang and J.F. Wang	348
<b>The Synthesis and Characterization of ZnO-Tubular Nanostructures</b>	
S. Xu, J.F. Wang, Y.P. Zhang and C.L. Qiu	352
<b>Selective Synthesis and Photocatalytic Activity of PbTiO<sub>3</sub> Nanoparticles with Different Crystal Structures</b>	
W. Li and Y.S. Zhong	356
<b>Study on Combustion Characteristics of Impurity Coal Based on TG-DTG-DTA</b>	
Z.W. He and C.C. Zhang	360
<b>Preparations and Photocatalytic Properties of Visible-Light-Active Nitrogen-Doped TiO<sub>2</sub></b>	
Y.H. Li, D.D. Tan, D.F. Bi, W. Lu and S.H. Xu	364
<b>PVD Preparation Process of (TiN + CrN) / CrAlN Superhard Nanocomposite Multilayer Coatings</b>	
J. Tian and Z.Q. Shi	368

<b>The Application of Carbon Fiber Reinforced Material in Sports Equipments</b> J. Chen and Y. Ji	372
<b>Photophysical Properties and Performance of Semiconducting Block Copolymers</b> L. Guo, Y.G. Zhang and J.Q. Hu	376
<b>Preparation, Characterization and its Photocatalytic Performance of Rare Earth Element Erbium Doped with TiO<sub>2</sub> Material</b> S.T. Li, G.X. He, W. Ma and Y.H. Liu	380
<b>Characterization of Poly(paraphenylene vinylene)-Polystyrene Block Copolymers in Solution</b> L. Guo, Y.G. Zhang and S.Z. Yang	384
<b>Influence of Molecular Structure on Properties of Polycarboxylate Superplasticizers</b> M. Liu, J.H. Lei, X.D. Du and B. Huang	388
<b>Hydration Activity of Ceramic Polishing Powder at Autoclaved Condition</b> M.F. Zhong, D.G. Su and Y.X. Zhao	392
<b>Rheological Characteristics on Solution of NMMO/Cellulose with Different Degree of Polymerization and its Combination</b> J.B. Li, M.Y. Zhang, H.J. Xiu and X.P. Li	396
<b>Preparation and Thermosensitivity of Poly(N-Isopropylacrylamide) Hydrogels with Graded Structure</b> Q.J. Yan	400