

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Computational Mechanics, Designing of Machine Parts and Mechanisms, Power Engineering

CATIA-Based Strength Analysis on Key Components of Large Bulb Turbine L. Tian, Y.X. Jin and J.W. Shi	3
Research on the Effect of Temperature to the Characteristic of Overhead Transmission Lines C.Z. Qu, Z.B. Xu and L. Lu	8
Experimental Investigation on Aerodynamic Characteristics of Propeller in a Ducted-Fan Type VTOL UAV J.Z. Han, B.Y. Jiang, C.W. Zhuang and X.C. Du	12
Study on Characteristics of Gas Flow in Catalytic Converter with Different Outlet Diameters Z.J. Cai, W.M. Kang and Y.B. Li	16
The Cooling Module Aerodynamic Noise Prediction Considering Porous Media P.F. Zhang, M.T. Zhu, Z.J. Li and K. Wang	20
Comparison of the Lubrication Performances of Water-Lubricated and Oil-Lubricated Plain Journal Bearings X.L. Zhang, Z.W. Yin, D. Jiang and G.Y. Gao	27
Elements of Pneumatic Transport J. Rajczyk and P. Helbrych	31
Effect on the Ability of Unit Frequency Modulation and the Dynamic Characteristic of Regulative System by Condenser Vacuum J.G. Jin and N. He	36
Low Cycle Fatigue Study for GH901 Material Based on Damage Mechanics Theory Y.Q. Wang and H.B. Zhang	40
Experimental Study of Effects of Joint on Rock Fragmentation Mechanism by TBM Cutters K.H. Li, P. Cao and J. Liu	44
Discrete Element Simulation of Coal Cutting Y.J. Ji, B.X. Xu and Y.J. Sun	48
A Research on a Medium-Speed Wire Cut Electrical Discharge Machining C.Z. Wu and S.S. Lu	53
Researches on Friction Performance of Water-Lubricated Polymer Composite Journal Bearings Based on Experiments G.Y. Gao, Z.W. Yin, D. Jiang and X.L. Zhang	57
The Solar Cell Mathematical Model Simulation and Verification R.L. Zhang, S.G. Li, H.X. Zheng and J. Zhou	61
Modal Analysis of Liquid Hybrid Bearing in the Spindle System of High-Speed Roll Grinder X.J. Meng, H.C. Wu, S.T. Chen, K.J. Linghu and F. Huang	65
3D Model of the Picks Configuration on the Cutting Head Based on Phyllotaxis Theory Y.J. Ji and M. Wan	70
Honeycomb Structure Design Based on Finite Element Method B. Wang, P. An, H. Jiang, Z.L. Zhang and D.Q. Zhang	74
Ride Comfort Simulation of Minibus under Road Random Input J. Li, Z.W. Zhang, S.W. Chen and C.X. Zhang	78
Finite Element Analysis of a Containment Vessel Structures Based on the Multi-Layer Shell Elements Y.J. Zhang	82
Simulation on Entrainment Process of Suction Mouth under Negative Pressure in the Medium Dry Sanitation Trucks J.Q. E, T. Liu, W. Zuo and Y. Huang	86

CFD Simulation of Airflow Organization in the Ship Accommodation K. Zhang, H.X. Li and J.L. Wang	91
Sequential Quadratic Programming Method of Cabin Optimization H. Liu, F.Z. Song, M.M. Li and B. Song	96
Lightweight Research of Cabin Structure Based on Response Surface Method H. Liu, F.Z. Song, M.M. Li and B. Song	100
Penetration Depth Analysis of K307 Cannonballs Colliding into Sand of Various Shear Moduli Y.K. Kim and W.C. Choi	104
The Design and Research of Hydraulic Drive Auto Lift Machine Based on Solidworks J.R. Yan, J.M. Liang, S.Z. Shi, C.H. Zhu and Y.N. Xiao	108
Research on Heat and Power Load Optimizing Distribution for Heat Supply Unit J.G. Jin, J.W. Yu and L.H. Cao	112
New Prospect Model for Liquid Loading in Gas Well Base on Energy Balance Theory X. Zhang, W.H. Liu and T. Zhang	117

Chapter 2: Material Engineering and Processing Technologies

Cotton Fabric Finished by WPU/LPAA Modified Nano-ZnO for Antibacterial Applications Q. Li, P.Y. Li, X.H. Zhao, X.W. Li, J.P. Wang and L.P. Wang	123
Failure Characteristics of Rock-Like Material with Multi-Fissures under Uniaxial Compression R.H. Cao, P. Cao, P.H. Wen and R.W. Chen	129
Fluorine Gypsum Modification and Preparation of Self-Leveling Material P. Fu and G.Z. Li	133
Nanoscale Modeling and Elastic Properties of Portlandite and Graphene Based on Atomic Finite Element Method J. Fu, F. Bernard and S. Kamali-Bernard	137
Preparation and Characteristics of the Ag/SiO₂ Nanocomposite Prepared by Magnetron Sputtering and ICP Plasma L.J. Sang, H.Q. Zhu, F.C. Chen and Q. Chen	143
Effect of Solution Treatment on the Microstructure and the Corrosion Resistance of Welding Joint of Ni56Cr22Mo13 Alloy A.L. Dai, Z.Y. Zhu, H.Y. Jiang and C.B. Zheng	149
Research on the Effects of Admixtures on the Physical Properties of Titanium Gypsum Y. Liu and G.Z. Li	154
Research on the Preparation of Carbon Fiber Reinforced Calcium Silicate Hydrates Insulating Material X. Zhang, C.K. Wang, R. Zhang, C.W. Du and G.Z. Li	158
Research on the Preparation of Calcium Silicate Hydrates Insulating Material R. Zhang, C.K. Wang, X. Zhang, C.W. Du and G.Z. Li	162
Study on the Waterproofing Properties of Cement-Based Composite Thermal Insulation Materials J. Li and G.Z. Li	166
The Effects of Reaction Temperature on Nanographites Supported by SiC Particles C. Chen, J.S. Yu, X.G. Zhou and C.R. Zhang	170
The Preparation of Modified Fiber Reinforced Desulfurization Gypsum Insulation Board L.L. Li and G.Z. Li	177
Stress Behavior of AZ31 Magnesium Alloy Sheet Asymmetrical Accumulative Rolling-Bond Based on Simulation Analysis G.J. Xue, S.R. Wang, J. Wang, C.X. Zhou and Y. Han	181
The Preparation of Desulfurization Gypsum-Based Lightweight Insulation Board L.L. Li and G.Z. Li	185
Research on the Effects of Calcination Temperature on the Physical Properties of Titanium Gypsum Y. Liu, G.Z. Li and C.W. Du	189
Comparative Study of Two Laser Coatings Used in Turbine Blades W.F. Wang, J.Z. Xie, L.Y. Huang and F.F. Zhang	193

Desulfurization Gypsum Whisker Preparation and Performance Study P. Fu and G.Z. Li	197
Energy Absorption of Basalt Filament Wound Rectangular Tubes: Experimental Study I. Mokhtar, M.Y. Yahya, A.S. Abd Kader and S. Abu Hassan	201
Microstructures and Thermal Stabilities of High Silicon Aluminum Alloys Prepared by Spray Deposition F. Huang, L. Hua, X.P. Qin, Z.L. Hu, Z. Wang, Y.L. Song and Y.X. Liu	206
Synthesis of Several Micrometer-Size Cu Particles by a Green Wet Reduction Method J.H. Hwang and J.H. Lee	210
The New Progressive Polymeric Materials for the Reduction of VOC in the Woodworking Industry E. Ružinská, J. Wilkowski, I. Mitterová and M. Zachar	214
Development of the Process of Manufacturing Pig Iron for Cast Iron from Copper Slag J.P. Wang	218
Curve Cutting ZrO₂ Ceramic and Cooling Lower Surface Cutting Silicon Wafer with Laser Induced Thermal-Crack Propagation C.Y. Zhao, H.Z. Zhang, L.J. Yang and Y. Wang	222
Identification of Creep Property by Small Punch Creep Test and Neural Networks X.S. Feng and K.S. Guan	227
Friction Properties Study of Metals by Principal Component Analysis Z.Z. Zhou, X.Y. Jin, X.W. Zhang and Y.Y. Lin	231
Microscopic Investigation of Geopolymers Made of Fused Slag from Gasification Processes Using Low-Grade Coal and Spent Catalyst Slag Y.T. Kim, J.W. Choi and S.Y. Kim	235
Modification of Magnesium Hydroxide Flame Retardant Using Oleic Acid by Wet Method B.X. Li, L.X. Zhu, Z.Q. Liu and L.J. Li	245
The Biocompatibility of Ti Alloy Improved by Nitrogen-Doped Diamond-Like Carbon Films W. Baheti, M.X. Li, F.G. Wang, J.G. Song, L.H. Xu and B. Liu	250

Chapter 3: Communication, Information Science and Data Processing, Mechatronics and Control

The Forecast of Co-Rotating Twin-Screw Extruder's Screw Based on BP Neural Network Model G.S. Zeng, H. Zhang and H. Chen	257
Review of the Methods to Reliability Assessment of Electric Power Communication N.P. Zhang, L. Liu and S. Zhou	261
Research of Methods of Electromagnetic Induction Communication Signal Quality Assessment Y. Chang, X.D. Zhou and Z.J. Li	268
Power Grid Decision Information Generation Model Based on Knowledge Clustering-Ensemble J.D. Wang and J. Li	273
Application of ActiveX Technique in Disaster Tolerant System M. Luo, B.T. Liu, Y.B. Li, M.J. Li and H. Deng	276
An Improved Image Compression Algorithm Based on Block and Classification Scheme C.M. Wu, L.F. Su and T. Yang	282
Fuzzy Comprehensive Evaluation Model of Computer Network Security and its Application Y. Huang, J.Q. E, C. Tao and Z.Q. Wang	286
Design and Research of Intelligent Knowledge Push Model J.D. Wang	293
Research on Terminal Piecewise Sliding Mode for Excitation Control System Based on the Nonlinear Disturbance Observer X.F. Liu, H. Zhang and H. Qiao	297
The Existence of Positive Solutions for Boundary Value Problems of Fractional Differential Equation J. Gao	303

A CUDA Implementation of the All-Pairs N-Body Algorithm	308
Design of a Compact Bluetooth and UWB Antenna for Wireless Communications H. Feng, H.B. Mao and G.Z. Long	312
Design of a Compact Dual Band-Notched Ultra-Wideband Diversity Antenna for MIMO Applications B.J. Song, H. Zhao, T. Xu and Q. Zhang	316
Design of FDM Rapid Prototyping System C.Z. Wu	320
Design of Four-Rotor Unmanned Aircraft Control System Based on ARM C.Z. Lv, Y.C. Hao, D. Fan and L. Wan	324
Numerical Control Lathe Cutting Force Signal On-Line Monitoring Design L. Zhao	329
Study on the Measuring and Positioning of the Rim Valve Hole Based on Machine Vision F. Wang, C.K. Ma, S.Q. Dai and C.C. Li	333
Application of Federated Filter to AUV Based on Terrain-Aided SINS Q. Wang, C.S. Qian, Z.J. Zhang and C.S. Yang	338
Compensation Control Network and Test of Bus Air Brake System in Under-Pressure State Z.S. Wang and G.Y. Li	342
Video Analysis of Conflict Situations at Cross Intersection with Cranked Priority J. Petru, V. Krivda, I. Mahdalova and V. Skvain	347
Engineering Science: Developmental History, Definition and Roles Y. Qiu, F.Y. Wei, J. Li and R.S. Jiang	352

Chapter 4: Theory and Practice of Industrial and Civil Construction

Analysis on Construction Control about Main Cable System of Cableway Bridge G.J. Yang, X.W. Hao and J.P. Yang	361
Slip Field of Slope Method for Complex Geological Slope J.H. Zhang and S.G. Sun	366
Durability Evaluation of Frost-Resistant Concrete Modified with Additives J. Rajczyk, J. Halbiniak and B. Langier	370
Experimental and Numerical Research on Voids and Cracks with Geological Radar Method C. Zhou, G.Q. Liang and H.M. Li	376
Experimental Research on Seismic Behavior of Wall Component with Double Steel Plates and Infill Concrete X.D. Ma	384
Research on Motion Characteristics and Formation Mechanism of Debris Flow J.W. Xu, M.D. Zhang and M.S. Zhang	388
Experimental Study on the Effect of Vibration of Pile Foundation Construction F.B. Chen	392
Influence of Rectangular Holes on Stability of Three-Layer Plates G. Kipiani, M. Rajczyk and L. Lausova	397
Study of the Effects of Karst Area Beneath the Tunnel on the Stability of Surrounding Rock L.W. Dong, P. Cao and J. Liu	402
Research on Waste Glass Concrete Basic Mechanical Property F.C. Wang, H. Gong, S.L. Jia, B.C. Zhang and C.F. Zhang	406
The Influence of Bridge Length on Failure Patterns of Specimens Containing Two Coplanar Cracks under Uniaxial Compression Load J. Jin, P. Cao and J. Liu	410
Anti-Earthquake Evaluation and Reinforcing of Brick-Concrete Structure Building of an Army in Zhangjiakou J. Yan, J. Xie and G.S. Sun	414
Experimental Research on Seismic Behavior of I-Section Composite Shear Wall with Steel Plate Reinforced Concrete Y.J. Zhang	418
Experimental Study on the Compressive Strength of Cement Mortar Y.Q. Yuan, X.L. Jiang, Z.L. Zhu and J. Chen	422

Improvment of Thermal Power Plant Construction Features and Technology X.D. Ma	426
Influence of Mineral Admixtures on Corrosion Rate of Reinforced Steel in Concrete H.H. Li, Z.H. Fan and P.P. Li	430
Observation on Single Fiber Pull-Out Testing of Carbon Fiber Concrete with Scanning Electron Microscopy J. Wu and A.Q. Xu	434
Reliability Analysis on Load-Bearing Capacity of Axially Loaded of Recycled Aggregate Concrete-Filled Steel Tube R.H. Yang and G.B. Mai	438
Research on Calculation Method for the Reinforced Concrete Coupled Column in Certain Fuel Power Plant Main Building W.X. Liu	444
Structural Responses of Recycled Concrete Beams under Room Temperature W.X. Cui and Z.F. Chen	448
Study on Macroseismic Response of an Special-Shape Concrete-Filled-Steel-Tube Arch Bridge G.P. Huang	454
The Experimental Study of Ultrasonic Testing Prestressed Bellows Pore Grouting Quality S.L. Zhou, F. Zhang and Y. Cao	461
Influence of Waterproofing Agent on Foamed Thermal Insulation Materials and its Mechanism Inquiry J. Li and G.Z. Li	469
The Effect of Concrete Cracks on Chloride Erosion Y. Chen, Z.H. Xu and R.G. Liu	473
The Influence of Modified Natural Records on Seismic Response of Reinforced Concrete Structure D. An and T.J. Qu	477
Research on Chloride Diffusion Model of PC with Chloride Attack in Marine Atmosphere Zone Y. Chen, J. Xu, R.G. Liu, S.B. Chen and Y. Gao	481
Wooden House from Natural Renewable Materials L. Kucerova and R. Trajkov	485
Deterioration of FRP-Concrete Interface under the Environment of Dry-Wet Cycling at High Temperature Based on Reliability Theory T. Yang	489
Optimization of Stay Cables in the Double-Set Arch Pylon Cable-Stayed Bridge S.X. Hu, W.G. Ma and M. Luo	495
Extended BP Network-Based Pavement and Road Settlement Prediction J. Wang	499
The Solution and Parameter Analysis of the Single Pile Response Subject to Lateral Load Based on Three-Parameter Subgrade Resisting Force Model Q. Fu, J.H. Huang, S.T. Liang and X.Q. Sun	503
Analysis of Pile-Support Supporting Structure Internal Force in the Open Cut Section of Metro Tunnels Y. Kuang, J. Yang and A.C. Shan	510
The Finite Element Simulation Analysis of Urban Subway Shield Tunnel F.Q. Zhu, H.Q. Liu and J. Zhang	514
Elastic-Plastic Seismic Response Analysis on the Special-Shaped Chimney H.Q. Liu, W.B. Li, R.Y. Wu and L.F. Yan	520
Numerical Analysis on Square CFT Stub Columns with Binding Bars under Cyclic Loading Based on OpenSEES Y.T. Wang, J. Cai, B.Z. Zheng and Y.L. Long	525
Weight Analysis of Accident Factors in Deep Foundation Excavation Based on Analytic Hierarchy Process Z.S. Yang, J.X. Liu and Y.R. Wang	529
Finite Element Analysis of Guyed Offshore Monotower Subjected to Extreme Environment in Malaysian Water M.A. Jamaluddin, M.S. Liew, K.V. John and L.H. Eik	535

Topology Optimization Design of Spacecraft Antenna Pedestal Structure under Random Excitations	
H. Liu, J.H. Zhu and W.H. Zhang	542
Acoustical Design Study on Application of Absorption Materials	
W. Lin and W.H. Chiang	546
Design and Research of Prestressed Anchor Wind Turbine Foundation	
L. Qin, X.Y. Yang, L. Li and P.J. Zhang	550
Design and Research of Tower Foundation in Sandy Slope Terrain	
L. Qin, N. Shi and P.J. Zhang	554
An Approach to Slope Stability Analysis Based on Newton Interpolation	
R.W. Chen, P. Cao and K. Zhang	558
Basement Stretch and Ground Fissures Formation in Linfen Basin	
M.D. Zang, J.W. Xu, Y.H. Deng, J. He, J.W. Qiao and Y. Liu	562
Connectivity Evaluation of Water Curtain System of Underground Oil Storage Caverns	
W.S. Yu and Y. Ping	566