

# Table of Contents

## Preface, Organization and Committees

## Chapter 1: Machinery Engineering

<b>Loading and Axial Deformation of Finite Element Analysis of Down-Hole Strings Used for Hydraulic Fracturing</b>	
D. Feng, A. Xiao, Z.J. Liao, Y. Xie, C. Ruan and J.W. Wang	3
<b>Researches on a Novel Gas Heat Pump with Multi-Stage Transmission Ratios</b>	
H.B. Zhao	7
<b>Vibration Testing and Analysis of ZJ70D Rig Base</b>	
S.Z. Zhou, X.L. Chen, J.P. Li, J. Xu and Y. Wang	11
<b>Analysis of the Opening Characteristic of Hydraulic Control One-Way Valve in Vertical Hydraulic Cylinder Balance Circuits</b>	
P.Q. Su and Z.H. Deng	15
<b>Research on the Dynamic Fitting and Prediction Model of Underground CBM Extraction Capacity Based on Improved Wavelet Neural Network Method</b>	
L. Wei	21
<b>A Periodic Noise Separation Method Research of well Field Three-Dimensional Drill String Vibration Signal</b>	
H.C. Wu, Y.S. Dai, W.F. Sun, L.G. Li and Y.N. Zhang	27
<b>Static Stiffness Analysis and Simulation of 6-PTRT Parallel Robot</b>	
D.L. Leng, D.S. Qu and Y.W. Liu	33
<b>Modal Analysis for the Framework of Beam Pumping Unit Based on Solidworks Simulation</b>	
Q. Wang and J.F. Xiao	39
<b>Numerical Analysis on the External Characteristic of Torque Converter Based on UDF</b>	
H.S. Su, G.L. Yang, L.Q. Zhang and W.B. Cao	44
<b>Optimal Design of QSY-Type Pumping Unit Balancing Adjustment Device</b>	
L.P. Wang, Y.Q. Zeng and Y.S. Liu	50
<b>Soft-Sensing Method for Flow of the Variable Speed Drive Constant Pump</b>	
Y.F. Jia, L.C. Gu and Q.Q. Tian	55
<b>Study on Nonlinear Dynamic Characteristic of Gearbox Based on Explicit Dynamic</b>	
M.X. Liang and H.Q. Yuan	59
<b>Digital Image Hiding Using Iterative Blending in Discrete Cosine Transform Domain</b>	
X. Wang and X.G. Sun	63
<b>The Median Filtering of Digital Image Based on MATLAB</b>	
H.Q. Wang and X.G. Sun	67
<b>Identification of Tool Wear Condition Based on Generalized Fractal Dimensions and BP Neural Network Optimized with Genetic Algorithm</b>	
K.F. Zhang, H.Q. Yuan and P. Nie	71
<b>Communication Module Design for BCM Based on AUTOSAR Specifications</b>	
L.W. Qi, A.G. Cheng and Z.C. He	76
<b>Virtual Manufacturing and Components of Virtual Reality</b>	
O. Bamodu and X.M. Ye	83
<b>The Frame Design and Analysis of the Postal Assisted Bicycle</b>	
Z.X. Xiang, H. Luo, X. Yang and Z.Y. Chang	87
<b>Full Hydraulic and Control Systems Application in Open-Cut Mine Drill</b>	
J.P. Zhang, X.P. Han, S.J. Ma and J.C. Zhang	91
<b>A New Support Structure in Waverider Force Measurement</b>	
X.J. Zhao, X.G. Guo and C. Zhao	96
<b>Research about Influencing Factor on Interpolation Accuracy in Data Exchange of Fluid-Structure Interaction</b>	
Z. Shen, B. Wang, H. Yang and Y. Zheng	100

<b>Crack Position Recognition of Metal Deep Drawing Parts Based on BP Neural Network</b> J.Y. Xu, J.L. Zhao, B. Zhao and Y.Q. Shao	108
<b>A New Evaluation Criterion of Minibus Compartment Thermal Comfort Based on the CFD</b> T. Chen, M.S. Huang and K. Song	114
<b>Characteristics and Elimination of Vibration Transfer on Small- and Medium-Sized Turbo Generators</b> R.P. Zhang and S.Y. Lu	120
<b>Displacement Measurement of Derrick Model Base on the Non-Contact Type Video Measurement Technology</b> X.B. Xu, X. Han and L. Yu	125
<b>The Application of Bridgman's Seal and B-Ring Seal in the Process of Pump Head Auto-Fretting</b> X.B. Xu and L. Zhu	130
<b>The Fault Diagnosis of Aircraft Power System Based on D-S Evidence Theory</b> J.X. Cheng and Y.K. Shi	134
<b>Fluid Dynamics Analysis and Research of Electrostatic Oiler Knife Beam</b> Y. Yao, Y. Bai and M. Liu	140
<b>The Defect Management Model Design Based on the Project</b> Z.J. Chen and Z. Qin	144
<b>Numerical Simulation of Oil Film State and Mechanical Performance of Heavy Hydrostatic Thrust Bearings</b> Y.Y. Hong, L.J. Du and S.M. Qi	148
<b>Design and Simulation of New Unit Earth Anchor for Pre-Stressed Cementing</b> Q. Zhang, X.H. Dong and S.S. Hu	153
<b>Research on Measurement and Control System of Eccentric Mechanism Based on the Well Trajectory Control Tool</b> D. Feng, J.W. Wang, H. Zhang, P. Wang and X.H. Liu	158
<b>A Kind of Improved Pass Structure of Double Regenerative Burner with the Numerical Simulation of Thermal Stress Field</b> F.Z. Jiang, J.Y. Kong and D.G. Ouyang	162
<b>SOC Estimation of Power Battery in Electric Vehicle Based on MC9S12DG128</b> W.L. Xu, J.M. Lyu, H.H. Zhao and Z.Y. Lan	167
<b>Discuss the Relevance of Heavy Truck Body and Modeling</b> H. Li, R.Q. Lin, W. Wang and M. Ma	171
<b>Study on User Experience and User Cognitive in Product Design</b> R.Q. Lin, H. Li, M. Ma and W. Wang	174
<b>Combined Drill String Design and Length Limit Calculation in Deepwater Abandonment</b> H.X. Tang, C. Ruan, J.F. Luo, P. Wang and D. Feng	177
<b>Study and Design on Optimization of Carport Structure Based on ANSYS</b> Z.B. Chen and Q. Xie	182
<b>Downhole Propulsion/Steering Mechanism for Wellbore Trajectory Control in Directional Drilling</b> X.H. Liu, Y.H. Liu and D. Feng	185
<b>Vibroseis Nonlinear Scanning Signal Simulation Analysis</b> G.M. Zheng, Y.Y. Shen and L.L. Song	191
<b>A Calculation Method for WOB Conducting of Directional Well</b> S.J. Zheng, Z.Q. Huang and H.J. Wu	196
<b>Dynamic Performance Measurement and Modeling for a Prototype Accessory Drive System with Three Pulleys and One Tensioner</b> H.Y. Wang, J.Y. Zhao and W.B. Shangguan	200
<b>Study on the Method for CFX Numerical Simulation of Flow Field in Screw Conveyer of Sand Fracturing Blender</b> H.Y. Jia, J.Y. Kong, S.Z. Zhou and C.X. Liu	207
<b>Design and Research of the Hydraulic Motor Type Test Station</b> D.H. Su and H.L. Xue	212
<b>Hydrodynamic Simulation for Intake Valve of Reciprocating Compressor</b> Z. Qin, M.L. Zhang and Z.H. Zhou	216

<b>Analysis of EHL Line Contact in Rapid Braking Motion</b> L.J. Du, Y.Y. Hong and S.M. Qi	220
<b>The New Rotary Steering Drilling Tool and Blind Area Borehole Trajectory Spline Curve Predicting Method</b> F.D. Xu, H.L. Xu, B.Z. Hua, H.X. Li and D. Feng	225
<b>Simulation Study of Nozzle in Fire Engine Based on Fluent</b> D.H. Su, H. Jing and Y.L. Wang	231
<b>The Research on Connection-Oriented Convergence of Triple Networks</b> G.M. Zheng, L.L. Song and Y.Y. Shen	235
<b>Analysis of Forming Process and Enabling Techniques for Three Dimensional Printing Technology</b> H.Q. Luo, Z.D. Shan, F. Liu and Y.Z. Li	239
<b>Noise Analysis of a Range Hood</b> W. Zhang, R.H. Su, Y. Gao and H.S. Shen	243
<b>Research on Conceptual Design of Laser Shock Processing Equipment</b> H.B. Deng and W.J. Liu	248
<b>An Algorithm for Particle Size Analysis of Gravel Image by Using Gray-Value Vibration Frequency</b> S.Y. Yu, S.H. Li, J. Li, D.W. Song and J.H. Shi	253
<b>Optimization of Local Body Shape about A Minibus Based on CFD and Wind Tunnel Test</b> L. Jiang, Z.C. He and T. Chen	257
<b>Wavelet Basis Function Optimization and its Application in Carbonate Reservoir Fluid Detection</b> H.Q. Xu and Z.X. Gui	263
<b>The Development of the LWD-200B Full Hydraulic Open Cut Mine Drill</b> J.P. Zhang, X.P. Han, S.J. Ma and Z.F. Yang	267

## **Chapter 2: Materials Science and Materials Processing**

<b>Experimental Study of Mechanical Properties of Rubber during the Curing Process</b> Y.S. Wang, Q. Liu and Z.B. Cui	275
<b>Experimental Study on Stress Sensitivity of Ultra-Low Permeability Sandstones</b> H.Y. Zhang, S.L. He, G.H. Luan, S.Y. Mo, Z.K. Lv and G. Lei	279
<b>The Experiment Research of Corrosion Behavior about Tubing Steel in Environment with High H<sub>2</sub>S and CO<sub>2</sub> Content</b> W.F. Li and X.Y. Li	284
<b>Study on Morphology and Structure of Wax Crystals in Waxy Crudes at Apex Temperature of Wax Precipitation</b> S.Z. Yi and P. Gao	293
<b>Study on the Influence of Polypropylene Fiber and SBR Latex on the Static Strength of Rubber Mortar</b> S.Q. Ruan, C.Y. Lin and S.X. Jiang	297
<b>Comparative Study on Pyrolysis Characteristics of Lignite Binderless Briquette and Raw Coal</b> B. Xu, M. Chu, A.B. Hong and F.L. Zhang	303
<b>Research Status of Plastic Vacuum Coating</b> G.W. Yu, L.L. Zhao, Z.H. Sun and J.L. Zhang	308
<b>Corrosion of 434 Stainless Fibres in Hydrochloric Acid</b> X. Yang, J. Tong and X.M. Li	312
<b>An Optimization Text of the Cemented Carbide EDM on Electrode Material</b> X. Yang, X.M. Li and J. Tong	316
<b>Surface Modification of PBO Fibers by Low Temperature Plasma</b> Q.S. Guo and D.D. Liu	321
<b>Study on Preparation of Mullite Powder Using Fly Ash by Mechanochemical Method</b> L. Zhang, Q.Y. Chen and D. Gao	326
<b>Fracture Failure Analysis of N80 Q Marine Casing</b> H. Zhang, Q. Luo, X.H. Liu, P. Wang and D. Feng	331

<b>Research on Degreasing Method of the Parts in Aviation Oxygen Generating and Charging Equipment</b>	
J. Zhou, S. Lu, F.H. Wang, J.H. Wang and C.J. Cai	336
<b>The Improvement of Casing Premium Connection Machining Method</b>	
K. Yan, H.B. Zhang, G. Wu and N. Lv	340
<b>Optimal Design of Combined Cold Extrusion Concave Die with Oblique End Face</b>	
X.M. Yuan, S.Z. Zhou and T.C. Huang	346
<b>MRR Prediction in Micro Channel Grooving Process by Ultra-Fast Pulse Laser</b>	
G. Chang and Y.L. Tu	350
<b>Magnetron Sputtering Target Structure Optimization Research Status</b>	
J. Lin, J.L. Zhang and G.W. Yu	356
<b>The Experimental Study on Consolidating Effect of Acrylic Non-Aqueous Dispersion for Earthen Ruins in Southwest China's Moist Areas</b>	
W. Yi	360

### **Chapter 3: Energy Engineering and Technologies for Extraction Energy Resources**

<b>Experimental Study on Gas Pressure Effects on Gas Desorption Characteristic of Coal Seam</b>	
L.C. Dai, D.Y. Lu and Z. Liu	367
<b>Study on Modified Natural Gas Engine Considering NOx Emission</b>	
C. Fan	371
<b>The Evaluation Index System of China's Energy Security</b>	
Y.C. Zhao	375
<b>A Prediction Model of Mine Gas Emission Base on a New Ant Colony Algorithm</b>	
X.Q. Qin	379
<b>Experimental Analogy Method for Measuring S-Wave Slowness of Low Porosity and Low Permeability Reservoir</b>	
Z.H. Wang and F.L. Qin	385
<b>Correction Method of RPM C/O in Offshore Heavy Oil Reservoir</b>	
Z.H. Wang, J.B. Wu and J.G. Li	390
<b>The Hydrocarbon Generation and Exploration Prospect of Yanji Depression</b>	
S.S. Gao, H.J. Wang, X.H. Wang, J.J. Fan and X. Zhang	395
<b>Organic Facies and Distribution Forecast of Hydrocarbon Source Rocks in Carboniferous, Northern Xinjiang</b>	
D.S. Yang, R.F. Jiang, X.P. Luo, Z.H. Chen and J.M. Ren	399
<b>Numerical Simulation of Foamy Oil Stability Using Natural Gas Huff and Puff for Ultra-Deep Heavy Oil Reservoir</b>	
J.H. Li, R. Bao, B. Qin and T. Jiang	405
<b>A New Calculation Method for Micro-Hole Collapse Pressure of Shale Gas Reservoirs in Thrust Fault</b>	
J.L. Yuan, J.G. Deng, Q. Tan and L.B. Hu	410
<b>Study on Systematic Parameter Optimization of Jibai Oil Pipeline in Changqing Oilfield</b>	
Y. Tang, Y. Liu, W.J. Tang and Y.Q. Wang	414
<b>Analysis of Factors Affecting Productivity of Chang 4+5 Ultra-Low Permeability Reservoirs in Jiyuan Area</b>	
Q. Zhou and Y.Y. Yin	419
<b>Significance of Terrace Deposits in Fluvial Sequence Stratigraphy</b>	
G.M. Hu, S.S. Luo, M.A. Chan and H.P. Xiao	423
<b>Seismic Reservoir Prediction in Lengjia-Leijia Area</b>	
Q. Zhou and W.L. Ding	428
<b>The Game Analysis of China Energy Security</b>	
J.Z. Wang and X.T. Wang	432
<b>The Effect of Gas Slippage on Laboratory Results and Gas Well Production</b>	
Z.K. Lv, S.L. He, S.Y. Mo and H.Y. Zhang	437

<b>Logging Fluid Identification Method of Low Resistivity Contrast Reservoir Invaded by Fresh Water Mud — A Case Study of well Block YD in Erdos Basin</b> Z. Qin, M. Hou, Z.H. Wang, M.C. Guo and R. Liu	442
<b>Deep-Water Contourite Drifts in the West of North-China Platform</b> S.S. Luo, Z.Z. Gao, Y.B. He, Q.Q. Lv and Y. Meng	447
<b>Influence of Hydrodynamics on Formation of Braided Fluvial Delta</b> S.S. Luo, F. Shang, Q.Q. Lv, Z.B. Liu and Y. Meng	453
<b>Numerical Simulation Research on Locations Optimization of Horizontal Well to Exploit Remaining Oil of Lateral Accretion Interbed after Polymerflooding</b> T.P. Chen, C. Jiang and L.L. Wang	460
<b>Statistical Study on Formation Natural Deviating Rule in Puguang Gas Field</b> S.M. Dong, J.G. Xu and Q.Y. Wang	465
<b>Current Situation of China's Shale Gas Exploration and Development</b> B.H. Yu and J.L. Yuan	469
<b>The Deliverability of Horizontal Wells of the Oil-Water Fluid in Bottom Water Drive Reservoir</b> C.S. Zhao, C. Li and P.J. Li	473
<b>Preliminary Study on Relations between Methane Carbon Isotopic Fractionation and Accumulation of Natural Gas of Lower Paleozoic in the Center of Ordos Basin, China</b> Y.F. Zhang	477
<b>The Coal Occurrence Tectonic Units and Coal Controlling Characteristics in Northwest China</b> S.Z. Ning, D.Y. Cao and L.M. Chen	482
<b>Foamy-Oil Flow Characteristic Considering Relaxation Effects in Porous Media</b> J.H. Li, R. Tang, J. Xu and T. Jiang	486
<b>Research and Application of Deep Profile Control &amp; Oil Displacement by Polymer Gel - Surfactant in High Salinity Oilfield</b> Y. Luo, D. Wang, L. Bai and K.J. Zha	491
<b>Application of Truncated Gaussian Simulation Algorithm in Alluvial Fan Reservoir Architecture Modeling</b> X. Bao, S.H. Li, J. Li, C. Zhang and W. Wang	496
<b>A New well Pattern for Enhancing Waterflood Performance of Ultra-Low Permeability Reservoir in Changqing Oilfield</b> Z. Zhang, S.L. He and H.Y. Zhang	501
<b>Rheological Properties of Water Based Drilling Fluid in Deep Water Drilling Conditions</b> Q.S. Yue, Q.Z. Yang, S.J. Liu, B.S. He and Y.L. Hu	507
<b>Application and Cognition of Unconventional Horizontal Well Drilling Technology in Shengli Oilfield</b> H.B. Niu, H.S. Zhao and J.F. Cao	513
<b>Feasibility Study on Supercritical Carbon Dioxide Drilling Equipment</b> X.L. Liu, J.G. Liu and H.B. Niu	519
<b>Experimental Study on Emergency Reclaiming of Offshore Underwater Leakage Oil</b> X.J. Chu, H. Gao and S.S. Xu	522
<b>The Clustering Analysis about Casing Damage and Sidewall Collapse in Six and Seven Area of Tahe Oilfield</b> J.J. Zhang, F. Liu, X.Z. Yi, W. Chang, W.N. Wan and Y.Q. Ji	527
<b>Sensitivity Analysis of Parameters Affecting the Number of Data Points in Kriging Interpolation</b> J. Li, S.H. Li and R.Z. Li	531
<b>Distribution Regularity of the Wide-Spread Sandstone of He8 Fomation in Ordos Basin</b> S.S. Luo, Q.Q. Lv, F. Shang, Z.B. Liu, R. Dai and L.J. Li	535
<b>The Numerical Simulation of Hydraulic Transmission in the Process of Coalbed Methane (CBM) Wells Drainage in the South Block of Shizhuang</b> X.H. Wang, Y.B. Wang, S.S. Gao, J.H. Cheng, H.J. Xu and J. Wu	541
<b>Study on the Variations of Corner and Load on Bottom Ball Joint of Deep-Water Drilling Riser</b> Q. Tan, J.L. Yuan and J.G. Deng	547
<b>Application of Energy-Saving Technology about Integrated Control at Cluster Well Group</b> Y.S. Liu, L.P. Wang, Q. Zhang, L.J. Wei and C. Qin	551

<b>Research and Application of Energy-Saving Technology about Intelligent Parameter Adjustment for Pumping Unit</b>	556
Y.S. Liu, Y.Q. Zeng, L.P. Wang, H.F. Yang and M. Wang	
<b>Oil and Gas Pipeline Residual Strength Research Based on Reliability Analysis</b>	562
X.Y. Zhang and J. Feng	
<b>The Disposal of Tailed Peak in the Time Spectrum of Pulsed Neutron Oxygen Activation Logging</b>	567
W. Dong, H.M. Guo and X. Qi	
<b>Quality Monitoring System for Seismic While Drilling</b>	572
L.L. Yu, Y.H. Li and A.F. Wang	
<b>Development of Drilling Engineering</b>	576
L. Ming	
<b>Microcor Corrosion Monitoring Technology and its Applications</b>	579
Y.H. Pi, C. Zhang, K.X. Liao and O.Y. Sun	
<b>Key Parameters Simulation and Design of Natural Gas Engine Based on Diesel</b>	584
M.X. Liu, X.L. Liu, J.K. Gong, F. Yang and J.B. Chen	
<b>Research and Application of Thermal Insulation and Injection-Production Process Technology in the Shallow and Thin-Bedded Heavy Oil Reservoirs</b>	588
D.J. Xu, L. Ma, J. Li and Y.L. Shi	
<b>Equipment Selection Requirements of Offshore Drilling</b>	593
H.X. Tang, J.W. Wang, Z.L. Liu, W. Liu, P. Wang and D. Feng	
<b>A Novel Islanding Detection Method for Inverter-Based Distributed Generation Systems</b>	597
D. Xie and X. Zhang	
<b>The Analysis and Study on Separation of Overlapping Peaks in the Time Spectrum of Oxygen Activation Logging</b>	601
W. Dong	