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Foreword

Mining provides the raw materials and the fuels that drive the economies of countries around the world. As a country grows its economy, so the need for mined products increases. Today this is happening on an unprecedented scale as China, and to a somewhat lesser extent, other countries, is transforming itself from a developing to a developed country.

The rapid growth of China is driving an equally rapid growth in mining activity in many countries. Mining companies have recognised that their planned growth cannot be achieved using the technologies that exist today.

Another, perhaps even more pressing, factor motivating the development of new technologies is the global recognition and acceptance that greenhouse gases emitted anthropogenically into the atmosphere are influencing climate change. Fossil fuels, and particularly coal because of its abundance, will necessarily continue to be used as a major global energy source for the foreseeable future. Technologies are needed, therefore, to allow the use of these fuels without them contributing significantly to atmospheric pollution, including greenhouse gases.

In summary, there is an absolute imperative to develop new technologies for mining, metals processing, and energy production. An enormous amount of work in these fields is underway. It is strategically sensible for China-one of the world's great mining countries and one of the largest consumers of mineral and energy products-and Australia-also one of the world's great mining countries and a major supplier to China of these products-to collaborate in this technological development.

This conference is the opportunity for academics and operators from around the world to exchange ideas and discuss the latest developments in mining science and technology.

The International Symposium on Modern Mining and Safety Technology is a premier conference organized by Liaoning Technical University, China and other collaborators. This is the 3rd International Symposium on Modern Mining and Safety Technology jointly organized by Liaoning Technical University, China; CRCMining, Australia; and the National Natural Science Foundation of China (NSFC). The theme for this symposium is 'Take the Challenge'.

We have accepted 300 papers for this Symposium. Eighty five of these papers have been selected by the members of the Symposium Science Committee to be published in the Journal of Coal Science & Engineering (Vol. 14, No. 2 & No. 4, 2008). The remaining 215 papers are published in the symposium proceedings by China Coal Industry Publishing House. Collectively these papers cover eight fields, including: mining technology; mine health and safety; geological surveying and mapping; electrics and machinery; information technology and computer applications; mine management; architecture and mechanics; mine environment and reclamation; and some other relevant top-

ics.

The organisation of a major event like this requires the strong support of a large number of people and organisations. We would like to acknowledge the contribution provided by our Symposium sponsors. All of the papers in this volume have been peer reviewed by a panel of experts and they are of a very high standard. We are grateful to the technical reviewers.

Finally, we would like to sincerely thank the organizations and individuals involved for their tireless work in the preparation of this symposium and its proceedings. We hope that you find this Symposium a rewarding experience.

Welcome and enjoy your Symposium.



Prof Shao Liangshan
Vice President
Liaoning Technical University, China
Organising Committee
August 3, 2008



Prof Michael Hood
CEO, CRCMining and
University of Queensland, Australia

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We would like to thank the following technical referees for their contribution towards enhancing the high quality of papers included in this volume.

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CONTENT

Session 1 : Mining Engineering

| | |
|---|------------------------------|
| Geological Uncertainty and Risk : Implications for the Viability of Mining Projects | Li Shuxing (3) |
| Multidisciplinary Expertise Applied to Underground Coal Mining R and D | |
| Projects with Emphasis on Adoption of Lean Automation Techniques | Stephen Van Duin (10) |
| Seismic Monitoring of Advanced Longwall Top-Coal Caving Technology for Thick | |
| Coal Seam Extraction at Tashan Coal Mine | Liu Yuzhou (15) |
| Research on Water Flowing Fracture Development Features of Shallow Depth | |
| and Long-Wall Coalface under Unconsolidated Aquifer | Wang Xufeng (19) |
| Induced Caving Roof Technology Applying for Continual Mining | Zhang Shichao (24) |
| Analysis of Major Factors Influencing Heat Accumulating Process of Loose Coal | |
| in Mine | Niu Huiyong (31) |
| Study on Deep Shaft Roadway Fully-Mechanized Fast Drivage Packaging Tech- | |
| nology in Complicated Geological Conditions | Ma Liqiang (35) |
| Correlation between Top-Coal Press Cracking and Fracture Occurrence | Wei Jinping (41) |
| Study on Microseismic Waveform Characteristic and how to Reject Interference | |
| Wave by Monitoring in Mines | Cheng Yunhai (45) |
| Mine Fire Detection Based on Infrared Image Processing | Huang Yourui (49) |
| Qualitative Analysis on Adjacent Rock and Research on Support Method in the | |
| No. 1 Mine Section Uphill of Gequan Coal Mine | Zhang Hui (54) |
| Mechanisms of Underground Water Acting on Coalbed Methane System in the | |
| Fuxin Basin | Zhu Zhimin (59) |
| Simulation Study on Deformation-Failure of Roof on Coal Mining Overlapping Face | |
| Using Discrete Element Method | Liu Qimeng (63) |
| Application of DDA to Evaluate the Mechanism of Rock Slope Instability/Rock | |
| Fall | Ma Guichen (67) |
| Research on Sublevel Coal's Failure and Displacement of Extremely Thick Seam's | |
| Mining Face | Nan Hua (79) |
| Development of MP-PAD for Monitoring Stress Change of Mine Pillar | N. Nakamura (83) |
| Research on Confining Pressure Restored Reinforcement Theory and its | |
| Application | Pan Guihao (88) |
| Study on the Temperature Variation in Outburst of Coal Seam | Sun Zhongqiang (93) |
| The Differential Movements of Different Research Points in the Plates | Zhang Yaming (97) |
| Optimization of Located Level of Semi-Stationary Crushing Station in Surface | |
| Mine | Li Xinwang (101) |
| Analysis on Mechanical Properties of Bolt Support Units in Jining No. 3 Coal | |
| Mine | Liu Shaowei (106) |
| Research Advance of Intercalation in PVC/Montmorillonite Nancomposites | Yan Pingke (111) |
| Control and Simulation of the Ground Pressure Evolutional Process Based on the | |
| Reconstruction of Mined-out Environment & Continuous Mining Method | Zhu Heling (117) |
| Flotation Separation of Calcite from Apatite Using AADPA-12 as a Collector and its | |
| Mechanism | Xu Xia (123) |
| The Analysis of Stability of Surrounding Rock in Deep Mine Tunnel | Xiao Fukun (127) |
| Development-Strategy Research on Comprehensive Exploitation and Utilization of | |

| | |
|---|-------------------------------|
| Coal Mine Resources | Ren Ruichen (131) |
| Simulating and Optimizing of Logistics System in Strip Mines | Yang Libing (138) |
| Discussion on the Countermeasures of Prevention and Treatment of Pressure Bump in Yanbei Coal Mine | Li Zhenhua (144) |
| Game Analysis and Countermeasures on Command Violation of Regulations in Coal – Mining Enterprises | Peng Lianhui (149) |
| Research on Flotation Separation of Rutile and Garnet by ATF1024 | Ding Hao (153) |
| Research on the New FRP Bolt & its Application | Li Yingming (157) |
| Research on Mining Virtual Emulation System Based on Creator Software | Zhao Guoliang (161) |
| Study on Stability of Supporting Structure for Roadway Based on FLAC ^{3D} | Zhang Chuancheng (165) |
| Numerical Simulation of Predict Bubble Generation Diameter | Liu Hong (169) |
| Application of Improved Genetic Algorithm in Mine Ore Blending | Xu Tiejun (174) |
| The Method of Mine Surveying and Releasing Water on Mining the Near-Neighbored Coal Seams under the Goaf Water in Wusuotun | Bi Yajing (178) |
| In Shale Refinery ATP Round Silo Warehouse Dust Explosion Mechanism and Control Technology Research | Li Fangwei (182) |
| Analysis on Location of Ascending Stope Mining Roads and Section Coal Pillars Dimensions for Close Distance Seam in 1000m-Plus Deep Mine | Shi Yongkui (187) |
| Simulation Experiment Research on Mining Coal in Deep Inclined Thin Coal Seam | Ma Yulin (191) |
| Integrated Study on the Covered Karstic Collapse Columns in 3 – 2 Belt Roadway Area of Fangezhuang Mine | He Bao (197) |
| Dynamic Designing Study for Laneway Suspension Roof Support Based on Relia- bility | Zhang Daming (202) |
| The Stress Analysis and Study on Sealing Performance of Mining Hydraulic Supporter | Ye Zibo (208) |
| Feasibility Analysis of Mining Methods Under Village | Wang Meng (213) |
| Photoelastic Experimental on Stress Field of Surrounding Rock in Deep Strip Pi- llar Mining | Guo Wenbing (216) |
| Numerical Test on Instability of Rock Slope Based on RFPA-SRM | Wang Dong (221) |
| The Pilot-scale Experiment on the Compositive Utilization of Asbestos Tailing | Du Gaoxiang (224) |
| Study on Auger Mining Application in Complex Geology Condition | Huo Bingjie (230) |
| Gas Unusual Gush Region Prediction Based on Geological Dynamic Division | Liu Baojing (235) |
| Numerical Simulation Analysis of Bolt Supporting Function of Three-Dimensi- onal along the Roadway in Mine | Kang Zhiqiang (240) |
| Analysis of Guiding Gas Outburst by Roof Fall and Top Coal Caving | Zhao Yuqi (244) |
| Research on Fuzzy Solution of Cross Method for Analysis of Mine Ventilation Networks | Wang Shugang (248) |
| Infrared Spectrum Analysis of Chemical Function Radicle in Coal | Li Xuping (252) |
| An Analysis of the Coal Seam Gas Reservoir Conditions and Resource Potential in the Northeast China | Mao Jianmin (258) |

Session 2: Safety Engineering

| | |
|--|---------------------------|
| Tracer Gas Measurement and Simulation of Turbulent Diffusion in Mine Ventila- tion Airways | Arpa Gabriel (265) |
| Research on Dynamical Disasters Prediction in Mine Based on the Coupling Law between EME and Stress | Xiao Hongfei (273) |
| The Application of Catastrophe Theory in the Safety Assessment of Construction | Gong Zhimin (279) |
| Application of Performance-Based Design Method in Mine Spontaneous Fire Safety | Deng Hongwei (283) |

| | |
|--|------------------------------|
| A Simple Safety Assessment for Jointed Rock Slope/Tunnel in Mine | Yashima Ataushi (288) |
| The Discussion and Analyse of Long-Distance Driving without Air Supply | Qu Guona (294) |
| Research on the Diffusion of Oxygen in the Low-Temperature Oxidation of Sulfide Ore Stockpile in Confined Storage | Li Ming (299) |
| Research on Interaction Mechanism and its Applications of Methane Migration Process in Low Permeability Coal Seam | Sun Keming (305) |
| Numerical Simulation on Migrating Laws of Mixed Gas after Nitrogen Injection in Sealing Fire Zone of Coal Mine | Zhu Yingchun (311) |
| Optimal Design of Water Supply Network for Dust-Proofing in Mine Based on Improved Genetic Algorithm | Hou Xiaodong (317) |
| Numerical Simulation on the Influence of a Fault on the Ground Gas Drainage Boreholes | Yan Jingjing (321) |
| Designing System Predicting Coal Spontaneous Combustion by Means of Method of Gas Analysis | Wang Fusheng (326) |
| Fire Accident Relief and Disaster Prevention Response Technology of Super-Long Highway Tunnel | Guo Chun (329) |
| The Design and Experiment for Mining Unsafe-Behavior Prevention | Zhang Jiangshi (335) |
| Grey System Theory and its Application on Prevention of Fire | Gao Hongliang (341) |
| Coal Mine Production Safety Precautions Decision Support System Research | Yu Benhai (345) |
| Experimental Study on Seepage Rule of Gas under the Condition of Non Isothermal | Yang Xinle (349) |
| Experimental Investigation of Premixed Methane-Air Flame Propagation in Tube | Wang Quan (355) |
| Study on Application of Heat Pipe Air Cooler in Mine Cooling | Su Zhaogui (360) |
| Study on Adding Coal Cinder at the Bottom of Bittern Filled Solar Pond | Wang Hua (365) |
| Exploration of New Gas Drainage Technology on the Basis of Ultrasonic Wave's Cavitation | Qi Liming (371) |
| GIS-Based Emergency Rescue Operations in a Underground Mine | Gao Rui (374) |
| Study on the Outburst Regional Prediction and Effect of Daning Coal Mine | Liu Jun (382) |
| A Fuzzy Multi-Criteria Group Decision Making Approach of Making Emergency Decisions | Liu Mao (387) |
| Back -Analysis of Parameters of Gas Extraction by Relief Pressure from a Long-Distance Using RFPA2D-GASFLOW Model | Yang Tianhong (392) |
| Application of Motion Reference Frame on Numerical Simulation of Mine Piston Wind | Wang Conglu (397) |
| An Ordinary Discussion and Analysis on the Safety Production Protection Systems with the Butterfly Catastrophe Theory | Lin Dajian (404) |
| Research on Safety Risk of Mine Based on the Three Dimensions Forecast Model | Li Hui (408) |
| The Analysis of the Xiaoqing Mine's Ventilation System Based on Network Flow Distribution and Q-H Equilibrium Graph | Li Yanchang (413) |
| Experiment Study of Coalbed Methane Hydrate Formation | Zhao Jianzhong (417) |
| Coal Surface Containing Phosphorus Group Physical Adsorption to Oxygen Molecules Mechanism | Zhao Qingfu (421) |
| Combining Application of Safety Ergonomics Engineering and Safety Management in Coal Mine Safety Production | Liu Gang (427) |
| The Study of Mine Ventilation's Topology Managed Automatically Algorithms | Ni Jingfeng (432) |
| Effect on the Propagation Path to Bent Crack Due to Compressive Residual Stress Around Slant Pre-Crack | Ma Youli (435) |
| Harness the Heat-Harm on Work Face in Comprehensive Mining | Hao Fengshan (440) |
| System Analysis of Regional Coal Mine Safety and Construction of Index System | Zhang Xiaobing (443) |

| | |
|--|----------------------------|
| Based on the Sensitivity of Ventilation Relative Stability of Branch Network | Liu Xin (449) |
| Genetic Mechanism of Mine Geothermal Damage in Songji Structural Zone | Xu Lianli (453) |
| The Numerical Simulation of Distribution Law of Effective Temperature Field in Coal Face | Liang Yin (460) |
| Research on Public Safety Management of China's Large-Scale State-Owned Coal Mines | Wang Xinsheng (466) |
| Safe Assessment of Production System in the Workshop of Explosive Factory | Hao Xiaohua (472) |
| CFD Ventilation Simulation of Deep Mine with High Temperature Based on Human Thermal Comfort | Long Tengting (476) |
| The Gray Forecast of Mine Safety Production Status Relating Indexes | Li Yongjun (481) |
| Research on Safety Evacuation Model Based on Evacuation Wave in Building while Firing | Zheng Dan (484) |
| Study on the Stability Control of Deep Soft Rock Caverns in the High Geostress | Fu Zhiliang (487) |
| Research on Oxygen-Increasing Ventilation in Alpine Region | Tang Zhixin (494) |
| Numerical Simulation Study of Nitrogen Injection for Fire Prevention and Param- eter to Confirm in Goaf | Zhao Xin (498) |
| Discussion about Establishing and Perfecting the Safety Monitored Control System in Building Trade in China | Wang Xiaoqun (501) |
| Digital Simulation of Mine Fire Disaster Based on CFD | Du Weijia (505) |
| Forecast of Coal and Gas Outburst Based on Chaotic Time Series | Gao Leifu (509) |

Session 3: Computer Applications, Management, Information Engineering

| | |
|---|-----------------------------|
| Study of Decision Support System Based on On-Line Analytical Mining | Shao Liangshan (517) |
| Research of D-InSAR Technique in Monitoring Coal-Mining Subsidence | Li Fuping (523) |
| Visualization and Fine Description to Blast-Caving and Induce Cracks of Roof | Hu Jianhua (527) |
| Research on Positioning System of WSN-Based Fire Source of Coal Spontaneous Combustion | Deng Ming (531) |
| Safety Climate Compare Between China Coalmine and Outstanding International Organization | Zhang Jiangshi (536) |
| Study on Synergetic Characteristic of AE Phenomenon in Rock Failure Process | Liu Ning (542) |
| Study on Enterprise Resource Planning (ERP) System for Coal Mine Safety | Zhou Dehong (548) |
| Study on the State of Northeast Ecological Environment and the Adjustment of Preferential Tax Policy | Li Shaoping (553) |
| Development of Occupational Hazard Management Information System | Liu Jingxian (559) |
| The Transportation Statistics Information System of Trucks and Shovels in Open Pit Based on RFID/GPRS | Gu Qinghua (562) |
| Chief Security Officer and Security Management of the Digital Mine | Peng Shoujian (567) |
| The Present Situation, Existed Problem, and Countermeasures of China Min- ing Overseas Investment | Chen Jianhong (572) |
| Study on Innovation of Accounting System for Safety Resources Invested in Mining Enterprises | Li Enzhu (577) |
| The Experimental Study of Electron Paramagnetic Resonance to Oxidation of Coal at Lower Temperature | Dai Guanglong (581) |
| The AHP Grey Relational Evaluation of Influence Factors and Scheme in Deep Hole Pre-Splitting Explosion | Xu Ameng (586) |
| The Suggestions for the Website Construction Based on the Web Customers' Con- suming Mental State | Wang Xinhai (593) |
| The Multi-Objective Fuzzy Optimization Model Based on Entropy Theory is App- lication on Layout of District Roadways | Ma Jianhong (598) |
| Study on Setting Undergraduate Course Profession of <i>Emergency Rescue</i> | |

| | |
|---|----------------------------|
| <i>Engineering</i> | Ni Wenyao (602) |
| The Effect of Coal Mine Disasters on the Coal Industry in China | Zheng Aihua (607) |
| Study on Modern Mine Harmonious Development Cycle Development | Ma Qihua (613) |
| Study on the Development Trends of Coal Logistics Industry in China | Liu Lijun (619) |
| Study on Simulation Test and Survey Technology of Working Square Subsidence and Shaft Damage | Sui Huiquan (624) |
| Research on Land Utilization Change of Feicheng Mine Area Based on ENVI | Zhong Weijing (628) |
| Research of Mining Safety Investment and Accident Control on Game Theory | Jiang Fuchuan (633) |
| Calculation Model for Chinese Colliery Safety Accident Losses | Feng Sijing (637) |
| Study on Coal Resource Value Evaluation Model of a Active Mine Based on Safety | Wang Yuhuai (642) |
| Virtual Reality System for Inert Gas Injection of Fire Zone in Coal Mine | Liang Yunfeng (646) |
| The Research on Arrangement and Combining of Industrial Legacy and Human Resources in Fuxin City | Dong Linying (649) |
| Psychology Analysis of Miners' Job Burnout and Insecurity | Li Naiwen (653) |
| VOIP Network Telephone Solution | Chu Lili (657) |

Session 4: Surveying and Mapping Engineering

| | |
|---|------------------------------|
| Research, Manufacture and Application of the GPS-SR-GDAMS-UM (GPS-Based Surveying Robot Ground Deformation Automatic Monitor System for Underground Mining) | Jiang Chenguang (663) |
| Distance Discriminant Analysis Model for Predicting Mining-Induced Damage Degree of Buildings and its Application | Liu Jinhai (667) |
| Deformation Monitor Based on 3D Laser Scanner | Zhang Guohui (672) |
| GIS-Based OWA Method and its Application to Site Safety Evaluation | Zhu Qingjie (675) |
| Transformation and Analysis Between City Independent Coordinate System and National Coordinate System | Zhang Hengjing (681) |
| Using InSAR to Monitor Mining Surface Subsidence | Jiang Yan (686) |
| Application of New Surveying Techniques in Open-Pit Slope Monitoring | Ma Zhenli (689) |
| Mine Safety Information System's Design and Application Based on GIS | Wang Jianmin (694) |
| Approach to Some Issues on GPS Technique in Open-Pit | Ren Dongfeng (698) |
| Establishment and Application of Geologic Model in Three-Dimensions for Ore Deposit in Open-Pit | Xia Chunlin (703) |
| On Electronic Map to Represent Geo-Information by Multi-Resolutions | Yang Yongchong (707) |
| Study on the Opencast Landslide Monitoring and Warning Methods Based on the GPS, RS and GIS Technology | Fan Qiang (713) |
| Analysis on the Application of GPS Combined with GIS in Mine Environment Inspection and Survey | Wu Liangcai (717) |
| Research on Integration Field Digital Surveying and Mapping Based on GTS-720 Electronic Total Station | Yang Guoqiang (721) |
| Study on Evaluation and Decision-Making System of Mine Damage Based on GIS | Zhang Chunhui (724) |
| Study on the Application of GPS in Mine Ecology Environment | Zhu Yufeng (729) |
| Distribution Laws of Abutment Pressure in Coal Pillar for Light Type Top-Coal Caving Face under Dynamic Pressure and its Engineering Application | Xu Xuefeng (733) |
| Study of the Fitting Method Used for GPS Leveling in Mining Area | Huang Jilai (739) |
| Study on Reserve Salt Cavity in the Building of the Oil and Gas Measurement | Zhou Dan (742) |
| Study of GPS Vehicle Navigation Location Based on GIS Technology | Zhang Yue (746) |
| Analysis on the Accuracy of GPS Monitoring to Open-Pit Deformation | Zhao Gang (749) |

Session 5: Architectural & Mechanics Engineering

| | |
|--|------------------------------|
| Use of the Finite Elements Method for Modelling the Dynamic Load Impact on Hydraulic Leg Equipped with Gas Accumulator | Horst Gondek (755) |
| Affection on the Deformation of Surrounding Rock of Railway During Bottom-Slice Mining with Sublevel Caving | Zhai Xinxian (762) |
| Preliminary Failure Process Modeling of Strain-Softening Rocks with Heterogeneity and Stiffness Deterioration | Wang Xuebin (767) |
| The Influence of Vertical Distance Between Floor Roadway and Upper Coal Pillar on Stability of Surrounding Rock | Chen Xiaoxiang (772) |
| The Influence of Horizontal Distance Between Floor Roadway and Upper Coal Pillar on Stability of Surrounding Rock | Chen Xiaoxiang (777) |
| Laboratory Testing of AE Precursors of Different Rock Fracture Under Uniaxial Compression Condition | Zhao Xingdong (782) |
| Research on Chamber Tunnelling Blasting Vibration Based on Testing and Finite Element Numerical Simulation | Jia Hu (786) |
| Simulation of Stage Excavation and Stability Analysis for Stratified Rock Slope | Jiang Xueliang (791) |
| Study of Porosity in Goaf of Fully Mechanized Coalface | Qin Ruxiang (798) |
| Stress and Failure Mode Analysis of Oil-Water Well Casing | Lv Xiangfeng (803) |
| Study of Deformation-Damage and Acoustic Emission Character of Coalrock Under Compression | Liu Baoxian (808) |
| Finite Element Numerical Simulation of Coal Roof Tension Damage in the Gob | Zhao Na (813) |
| Application of Empirical Mode Decomposition (EMD) in Processing Data of the Slope Deformation | Xu Jia (817) |
| Research on the Deformation Mechanism and Test Technology of Deep Soft Rock Roadway | Zhang Jun (821) |
| Mechanics Model of the Surrounding Rock Structure Under Condition of the Stable Roadway Walls | Gao Jinhai (826) |
| The Pillar's Finite Element Analysis for Two-Pillar Shield Hydraulic Powered Support | Guo Wei (829) |
| The Finite Element Analysis on Driving Wheel-Axle System of Adhesive Tape Conveyor with Steel Wire Towing | Su Ronghua (833) |
| Coal Mine Stope Surrounding Rock Stress Control Method and Applied Research | Ma Qihua (838) |
| Research on Rectification Simulation of the Building Above Mine Goaf Based on the Substructure | Yin Zhixiang (843) |
| Numerical Analysis of the Building Base Stabilization Change by Tunnel | Wu Xiufeng (849) |
| The Study on the Radial Decoupling Coefficient in Tunnel Smooth Blasting Based on Numerical Simulation | Luo Wei (854) |
| Analysis of Reservoir Seepage and Perforation Pipeline Coupling Under Stress | Di Junzhen (861) |
| Study of Fluid Inclusions in the Yixian Fluorite Deposits, Liaoning | Yang Zirong (865) |
| Study on Gas Changing-Color Response Core and Safe Suit Preparation Technology in Coal Mine | Yang Zhenhong (870) |
| Effect on Stability of the Surrounding Rock with Different Parameters | Zhang Xiangdong (877) |

Session 6: Electrical Engineering & Mechatronics

| | |
|--|----------------------------|
| Reliability Study of Australian Longwall Equipment | Guan Zhiqiang (883) |
| A Reasonable Liquefaction Countermeasure for a Large-Scale Existing Structure Grounded on Performance Based Design Concept | Kato Tomoo (890) |
| Technical Development on Non-Contact Measurement of Monitoring Self-Heating of Sulfide Ore Dumps | Yang Fuqiang (900) |

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| Finite Time Thermodynamic Evaluation of New Type Engine Based on the Combustion in Porous Medium | Liu Hongsheng (906) |
| Applications of a Portable Rock-Stratum Video Monitor in the Inspecting System of Coal Mine Terrane | Yuan Xiaoping (915) |
| Dynamic Optimization of Sensor Mesh for Underground Environment Monitoring Systems | Yang Gemei (919) |
| Application of the Gas Sensor in Coal Mines | Li Duanyang (927) |
| Experimental Research on Properties of Reduction in Vibration and Noise of Foamed Aluminum Damping-Plug in Gear | Yu Yinghua (932) |
| Research of a High-Speed X-Ray Nondestructive Detector Based on FPGA | Meng Xianyi (937) |
| Research on Mine Dynamical Disaster Early-Warning System Based on the Field-Strength Variation | Wang Lili (943) |
| The GPR Forward Modeling of the Karst of Coal Mine | Yang Nini (948) |
| Research on Experiment System of Mechanics and Electric Characteristic of Rocks | Ran Huafeng (953) |
| The Research of Electric Wheel Dump Truck's Safety Monitoring System Based on Agent | Su Weijia (957) |
| Study on Mine Dynamic Disaster Intelligent Monitoring System Based on Multi-Agent | Su Chang (964) |
| Protection Against Lighting Utensils Explosion in Inflammable and Explosive Places such as Mine Roadway by Single-Chip Microcomputer | Shi Lianwen (970) |
| Analysis of Nonlinear Stochastic Dynamic Model and Simulation of Coal Plough | Kang Xiaomin (974) |
| The Using of Vacuum Brazing in the Manufacturing of EGR Cooler | Chu Lili (980) |

Session 7: Environmental Engineering

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| Coal Exploitation and Landscape Interaction Changes in Jinggezhuang Mining Area | Fu Meichen (987) |
| Property and Control Measures of Soil Pollution in Mining Area | Sun Haiyun (993) |
| GM-SVM Prediction Model for Land Subsidence at Finished Underground Mining and its Application | Xie Zhengwen (1000) |
| Thermo-Hydro-Mechanical Coupling Model of Hydraulic Fracturing | Pei Guihong (1005) |
| The Research on the Fuxin Zeolite Used in Eliminate the Fluorine Waste Water and it's Mechanism | Ma Zhijun (1009) |
| Application and Mechanism of Modified Sodium Silicate on Fluorite Ore Flotation | Lv Zhenfu (1017) |
| Ground Water Quality Assessment of Open Pit Coal Mine Based on Fuzzy Cluster Analysis and BP Neural Network | Wang Jinli (1024) |
| The Green Exploitation Technique in Coal Mine | Liu Ping (1029) |
| Study On Sustainable Development Model in Mine Based on Circular Economy | Li Yingde (1035) |
| Treatment of Acidic Mine Drainage Using Passive Treatment Technology-SAPS | Xiao Liping (1041) |

Session 8: The Rest

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| Utilization of SAR Differential Interferometry for Surface Deformation Detection Caused by Natural Resources Mining | Sawada Kazuhide (1047) |
| Trend Forecast of Mine Hoist Fault with Wavelet Neural Network | Liu Zhaojun (1050) |
| Fuzzy Cluster Analysis of Slope Stability | Yuan Jing (1054) |
| Random Reliability for Opencast Mine Slope Stability with Interaction of Solid and Fluid | He Xiang (1059) |
| Fuzzy Comprehensive Judgment for Degree of Damaged Environment by Surface Subsidence | Huang Shenglin (1063) |
| The Role Regional Media Play in the Development of Regional Economy | Du Baifang (1067) |
| On the Technical Process of Safety before the Maintenance of Chemical | |

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| Equipments | Bu Quanmin (1073) |
| Research on Conveying of the Screw Coal Miner | Zhang Qiang (1077) |
| Study on Influence of Blasting Operation on Design of Roadway Cross-section | Tu Jianshan (1080) |
| Flammable and Inert Gases for the Determination of Explosion Risk | He Jingning (1086) |
| The Effects of Solar Light Pipes on Room Temperature in Office Buildings | Wu Yanpeng (1091) |
| Research on Law of Gas Emission at Excavating Roadway in Thick Seams of High Gas and Outburst Mine | Zhang Haixiang (1095) |

Session 1 : Mining Engineering