# TABLE OF CONTENTS

## ADVANCED TECHNOLOGIES IN CONSTRUCTION AND UPGRADING OF COAL MINING ENTERPRISES

- **Resource Approach to the Estimation of International Cooperation in Integrated Development of Calciphore Deposits** .................................................. 1  
  Olga Kamkicheva, Anna Voznaya, Tatyana Mikhailova, Galya Gribanova
  Wu Duohua, Qiao Weiguo, Song Weijie, Vladimir Pershin
- **Roadway Support Optimization by Improved BP Neural Network and Numerical Simulation** ....... 11  
  Wang Jun, Tan Yunliang
- **The Prediction of Distribution Characteristics of the In-Situ Stress for Liuhuanggou Mine Field** .......................................................... 17  
  Yongkui Shi, Yonglu Ding, Xiaomeng Wang, Mingwei Xu
- **Research on Inclined and Very Thick Coal Seam Mining** .......................................................... 21  
  Cheng Weimin, Sun Lulu
- **The Improved Construction of Reinforced-Concrete Support of Slope Mouth** ....... 27  
  Vladimir Pershin, Michail Vojtov, Pavel Budnikov
- **"Lean Production" in the Coal Mining Industry** .......................................................... 33  
  Vadim Mikhailchenko, Yuri Rubanik, Natalia Osokina, Anna Mikhailchenko
- **Lean Governance as a Condition for the Creation of Intellectual Coal Industry** ....... 39  
  Natalyi Zaruba, Natalyi Egorova
- **A New Method for Studying the Roadway Stability** .......................................................... 45  
  Qin Zhongcheng, Wang Shengchao, Yu Xin, Cao Bin
- **Application of SCADA Systems in the Coal Mining Industry** .......................................................... 50
  Lyudmila Samorodova, Oleg Lyubimov, Yulia Yakunina
- **Justification of Requirements for Crushed Rock for Open-Pit Automobile Road Topping** ....... 55  
  Sergey Shabaev, Dmitriy Boyko
- **The Research in the Use of Monolithic Concrete for the Mine Construction** ....... 62  
  Natalia Gilyazidinova, Nadezhda Rudkovskaya, Tatiana Santalova
- **Filling of the Vertical Mine Workings with the Autoclave Slag-Concrete** .......................................................... 66
  Andrey Uglyanitca, Kirill Solonin
- ** Prestressing Method of Rigid Joints in Multi-Storey Steel Frame Mining** ....... 72  
  Dmitry Vershinin, Valery Dobrachev
- **Dynamic Models of Deformation of Crustal Blocks in the Area of Development of Coal Deposits - The Basis of the Information Security of Their Development** .......................................................... 80
  Aleksandr Solovitskiy
- **Rock Destruction with Volumetric Compression** .......................................................... 86  
  Vyacheslav Gogolin
- **Considering Behind Limit Deformation for Calculation of Coal Pillars Parameters by Finite Element Method** .......................................................... 90  
  Inna Ermakova, Natalya Pirieva

## COAL MINING EQUIPMENT. PRODUCTION AND OPERATION

- **Enhancement of Efficiency of the Magnetic Suspension of Belt Conveyor** .......................................................... 94
  Aleksandr Zacharov, Pavel Chepikov
THE POWER CHARACTERISTICS OF THE REVERSIBLE RADIAL CROWNS WITH DISK TOOLS FOR ROADHEADERS OF SELECTIVE ACTION .......................................................... 98
Leonid Mametyev, Alexey Khoreshok, Aleksandr Tshekin, Sergey Mukhortikov, Andrey Borisov

CONDITIONS FOR MINIMUM DYNAMIC LOADING OF MULTI-BRAKE HOISTS ................................................. 104
Alexey Khoreshok, Maxim Tyulenev, Stefan Voth

EVALUATION OF THE TECHNICAL CONDITION OF AUGER EQUIPMENT UNITS BY VIBRATION INSPECTIONS .......................................................................................... 111
Leonid Mametyev, Yuriy Drozdakho, Oleg Lyubimov

THE DIAGNOSTICS OF MOTOR-WHEEL GEARS OF QUARRY DUMP TRUCKS BASED ON BEARING WEAR MONITORING ................................................................. 117
Andrey Kudrevatykh

EVALUATION OF THE OPEN PIT VEHICLES LOADING INFLUENCE ON THE RELIABILITY OF MOTOR–WHEEL REDUCERS .............................................................................. 121
Dmitriy Stepin, Natalia Stenina, Alexander Bakanov

REDUCING DYNAMIC LOADS OF MINING MACHINERY ELECTRIC DRIVE AT STARTING ................................................ 125
Evgeniy Eshchin, Igor Sokolov

CALCULATION AND JUSTIFICATION PARAMETERS OF STRENGTHENING TECHNOLOGY TO PRODUCE DRILL RIG SHAFT GEAR ON THE BASIS OF MECHANICS OF TECHNOLOGICAL INHERITANCE ................................................................. 130
Valeriy Blumenstein, Alina Ferranti

COMPUTER SYSTEM FOR ELECTRIC DRIVES FAULT DIAGNOSIS OF MINING SHOVELS ............................. 139
Veniamin Kashirskikh, Andrey Gargayev, Valeriy Zavyalov, Irina Semykina

RESEARCH ON THE SUPPORT TECHNOLOGY OF BOLT AND CABLE IN DEEP HIGH STRESS ROADWAY ............................................................... 145
Song Weijie, Qiao Weiguo, Vladimir Pershin, Wu Duohua, Li Yanzhi

DEEP COAL PROCESSING, COAL CHEMISTRY, GASIFICATION, ECOLOGY

THE ROLE OF INNOVATIVE TECHNOLOGIES IN SOLVING KUZBASS COAL INDUSTRY GEO-ECOLOGICAL PROBLEMS ........................................................................ 152
Vladimir Kovalev, Alexey Khoreshok, Oleg Litvin

REGARDING ONE ESTIMATION OF THE TECHNICAL CONDITION OF THE SELECTIVE HEADERS ................................. 156
Vladimir Kovalev, Alexey Khoreshok, Boris Gerike, Anatoly Meshkov

STUDY OF SULFUR OXIDE REDUCTION DURING COMBUSTION OF COAL-WATER SLURRY ........................................................................................................... 162
Vasiliy Murko, Viktor Karpenkok, Yulyi Sentsurova, Oleg Tailakov, Veniamin Khymyalyayinen

CLEANING THE FLUE GASES OF THERMAL COAL POWER PLANTS FROM SULFUR AND NITROGEN OXIDES ............................................................................................................. 166
Mihail Slihvae, Alexandr Bogomolov, Igor Dvorovenko, Andrey Sysolyatin, Sergey Kryukov, Maksim Chemakin

INVESTIGATION OF THE SORPTION PROPERTIES OF ORE MATERIALS FOR THE REMOVAL OF SULFUR DIOXIDE FROM EXHAUST FLUE GASES OF POWER PLANTS ........................................................................ 171
Nadezhda Shikina, Tatyana Teryueva, Zinfir Ismagilov, S. R. Khairulin, Vladimir Kaznetsov, N. A. Rudina

THE DEVELOPMENT OF GAS ENERGY POTENTIAL OF COAL DEPOSITS AS THE NECESSARY STEP TOWARDS THE RUSSIAN COAL INDUSTRY MODERNIZATION .......................................................................................... 177
Sergey Lazarenko, Georgiy Dubov, Anastasia Shirokolobova

CATALYSTS FOR NITROGEN OXIDES REMOVAL FROM FLUE GASES .................................................................................. 183
Nadezhda Shikina, Oleg Tailakov, Zinfir Ismagilov

JUSTIFICATION OF A METHOD FOR DETERMINATION OF GAS CONTENT IN COAL SEAMS TO ASSESS DEGASIFICATION EFFICIENCY ................................................................. 189
Oleg Tailakov, Alexey Kormin, Denis Zastrzelen, Evgeniy Utkuev, Sergey Sokolov

RESEARCH IN THE PROPPING AGENT FOR THE HYDRAULIC FRACTURING CRACKS FOR THE METHANE EXTRACTION FROM THE MASSIVE COAL SEAMS ............................................................................. 195
Mikhail Baev, Veniamin Khymyalyayinen

METHODOLOGICAL BASES OF ADVANCED GEO-ECOLOGICAL PROBLEMS RESOLVING IN NEO-INDUSTRIAL CLUSTERS ......................................................... 198
Maxim Tyulenev, Yury Lesin, Svetlana Vik, Sergey Zhironkin

EVALUATION OF THE COKING CAPACITY INDICATOR OF COKING COAL CONCENTRATES BASED ON THE RESEARCH OF NON-VOLATILE RESIDUE STRENGTH VIA DETERMINATION OF THE COKING CHEMICAL PRODUCTS YIELD .................................................................................. 202
Elena Vassileva, Tatiana Cherkasova, Sergey Sabbatin, Aleksandr Nevedrov, Andrey Popin, Nikolay Kolyukov
RESEARCH ON IMPACT CHARACTERISTICS OF INCLINED COAL-ROCK COMPOSITE BODY
Tan Yunliang, Zhang Yubao ................................................................. 304

CLUSTERING AND EMERGENT FEATURES OF THE REGIONAL ECONOMICS OF THE KEMEROVO REGION
Sergey Bereznev, Maria Kumaneeva, Maksim Makin ......................................................... 308

JUSTIFICATION OF EFFICIENCY OF HEAVY DUMP TRUCKS EFFECTIVENESS IN OPEN PIT MINES ACCORDING TO OPERATING LIFE CRITERION OF THE BACK AXLE
Ivan Panachev, Georgiy Shirakolobov, Ilya Kuznetsov, Anastasia Shirakolobova .......................... 313

USING INNOVATIVE TECHNOLOGIES OF 3D MODELING FOR ADVANCED PLANNING OF RECLAMATION RESULTS
Olesya Aksenova, Anna Pachkina ............................................................................. 318

INFLUENCES ON PRESSURE releASING BY BLASTING BREAKING HARD ROOF
Zhang Wei, Tan Yunliang, Guo Weivao, Gu Shitan, Mu Dianrui, Hu Shanchao ........................................ 322

STUDY ON THE DISTRIBUTION LAW OF FRONT ABUTMENT PRESSURE OF LONG FULLY-MECHANIZED WORKING FACE IN DEEP MINE
Ji Yuguo, Wang Xianjun, Zhou Yongpei, Zhang Xiantang .............................................. 328

SIMULATION AND FIELD MEASUREMENT STUDY ON ROOF STRATA BEHAVIOR OF FULLY MECHANIZED CAVERNG FACE
Liu Weitao, Song Wencheng, Wang Jianning ........................................................................... 332

DISPLACEMENT BACK ANALYSIS BASED ON GA-BP AND PSO-BP NEURAL NETWORK
Gu Dongdong, Tan Yunliang .................................................................................. 338

INDUSTRIAL SAFETY IN COAL INDUSTRY

ELECTROPHYSICAL MONITORING OF THE PROCESSES OF ELECTROOSMOTIC TREATMENT OF SOIL FROM OIL POLLUTION ON LABORATORY INSTALLATIONS
Evgeniy Shabanov, Sergey Prostov ........................................................................ 344

DEBIT GAS IN WELL AS A COMPREHENSIVE INDICATOR OF GAS PERMEABILITY OF THE COAL SEAM
Leonid Shevchenko ........................................................................................................... 353

ANALYTICAL PREDICTION OF STABILITY OF EARTHFILL DAM
Svetlana Bakhaeva, Dmitriy Guriev .................................................................................. 357

TECHNICAL AUDIT OF EXTERNAL POWER SUPPLY NETWORKS OF COAL MINES IN THE KEMEROVO REGION
Sergey Zakharov, Vyacheslav Voronin ............................................................................. 362

IMPACT ASSESSMENT OF MINING – AND – GEOLOGICAL FACTORS OF KUZBASS COAL MINES ON THE LEVEL OF THEIR POWER CONSUMPTION
Alla Zakharova, Irina Lobur, Nadezda Shauleva, Valeriy Borovtsov ......................................... 367

DETERMINATION OF SEISMIC SAFE DISTANCES DURING MINING BLASTS WITH CONSIDERATION OF A DOMINANT VIBRATION FREQUENCY
Aleksey Novinkov, Aleksandr Tashkinov, Sergey Protasov .............................................. 371

MODELING OF GEOMECHANICAL PROCESSES CASE OF UNEVEN SETTLING OF FOUNDATIONS CONSTRUCTIONS
Mikhail Sokolov, Sergey Prostov .................................................................................. 375

STABILIZATION CONTROL TECHNIQUES FOR A ROADWAY IN DEEP HIGH-STRESS SOFT SURROUNDING ROCK
Jin-Tan Hu, Deng-Ge Lin, Ru-Mei Zhao .............................................................................. 382

RESEARCH ON SIMULATION AND FIELD MEASUREMENT TECHNOLOGY OF FLOOR MINING FAILURE DEPTH
Song Wencheng, Zhao Chunbo, Li Guang, Wang Donghui .................................................. 389